In the name of God, the companionate, the merciful

Alcohol and Alcoholic Products and Explanation of Its Islamic Jurisprudential Rulings

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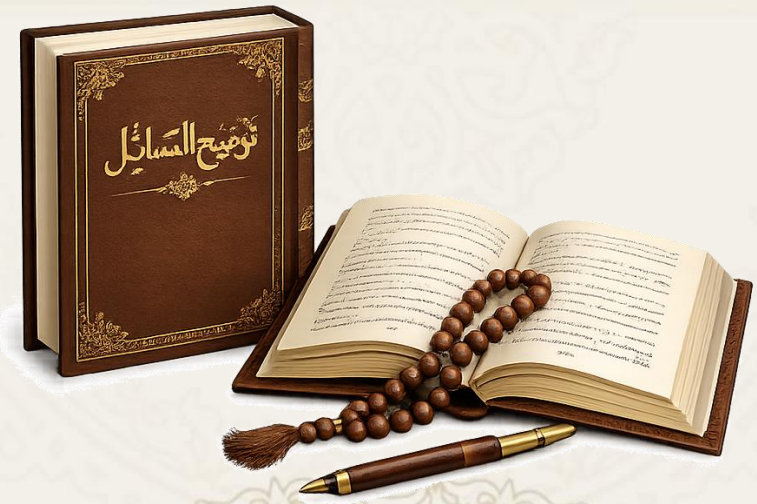

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Foreword

The rapid scientific and industrial developments in the contemporary world have opened up new areas for Islamic jurisprudence; areas that either did not exist in the past or were not raised in the present form. One of these areas is the issue of "alcohol" and products based on it. The expansion of the use of alcohol in pharmaceuticals, food industries, disinfectants, biofuel production, perfumery, and thousands of other products has led to the raising of many jurisprudential questions in the public and scientific space of society; questions such as: Are all types of alcohol impure? Does industrial alcohol have the same ruling as drinking alcohol? What is the ruling on alcoholic perfumes? Is the use of alcohol in medicines and medical materials permissible? And dozens of similar questions.

In the meantime, one of the fundamental problems that has caused differences in perceptions and ambiguity among the public and even some scholars is the lack of accurate knowledge of the subject. Islamic jurisprudence has always emphasized the rule that "judgment revolves around the subject, whether it exists or not," and it is clear that any error in understanding the subject leads to an error in the ruling. Therefore, before entering into the discussions of jurisprudence, I considered it necessary to discuss the scientific and industrial explanation of the types of alcohols, production methods, the difference between natural and synthetic alcohols, their various applications, and their position in various industries.

This research is the result of an effort to bring the language of science and jurisprudence closer together and to remove ambiguity from an issue that has played a widespread role in today's individual and social life. In compiling this work, I have tried to use reliable jurisprudential sources and the opinions of contemporary jurists, as well as new scientific findings in the field of chemistry and the alcohol industry to present a clear and reliable picture.

I hope that this book can be a small step towards improving scientific and jurisprudential understanding of this subject and will be useful for researchers in the field and universities, students, pharmaceutical and medical specialists, and the general public.

I am sincerely grateful to all the professors, experts, and companions who helped me in the formation of this research. Obviously, this work is not without criticism and review, and I am eager for suggestions and corrections from educated readers.

Abstract

The present study aims to accurately explain the subject of "alcohol" from a scientific, industrial and jurisprudential perspective. Understanding the religious ruling of any subject in Islamic jurisprudence depends on the correct understanding of the truth of that subject and its various functions in the outside world; therefore, the study of alcohol - which currently plays a widespread role in the pharmaceutical, food, health, biofuels and chemical products industries - is an undeniable necessity.

In this work, first, the chemical nature of various alcohols, methods of synthesis and industrial production, the difference between natural and synthetic alcohols, the limits and nature of impurities, as well as their various applications have been examined. Next, with reference to Imamiyyah jurisprudential sources and the opinions of contemporary jurists, the issue of purity or impurity of alcohol, the ruling on drinking, and the ruling on its medicinal, industrial and health uses have been analyzed. To clarify the scope of the subject, common types of alcoholic products such as cologne, perfumes, disinfectants, medical and industrial alcohol have also been subjected to jurisprudential analysis.

The results of this study show that the distinction between types of alcohol and its uses plays an important role in deducing the Islamic ruling, and many of the common ambiguities in the field of alcohol jurisprudence are due to confusion between types or ignorance of new scientific developments. This book can be useful as a practical source for jurisprudence researchers, seminary and university professors, students of theology, as well as activists in the fields of pharmacy, medicine, and the chemical industries.

Explanation of the topic

Alcohol is a chemical substance that was discovered and invented centuries ago; however, its extensive and remarkable applications are not very old. In the past, alcohol was thought of only as an effective agent in wine and alcoholic beverages; however, with the advancement of empirical knowledge and human familiarity with the various capabilities of this substance, its use has increased significantly. Today, alcohol is used to prepare many health and cosmetic products; it is used in the production of many medicines, and in the medical field, its disinfectant or preservative properties are widely used. It is known as a halal substance in various food industries. It is also considered a raw material and main element in the production of alcoholic beverages.

The widespread use of alcohol has caused many people from different walks of life - including producers, distributors, and consumers - to deal with it and to suffer from some kind of problems. This raises some jurisprudential questions, especially in the case of religious communities that are bound to observe the rules of Sharia. These jurisprudential questions, which are mostly about the purity and impurity of alcohol, or the permissible and forbidden nature of its production and use, will remain unanswered and ambiguous without a proper understanding of the subject and will not solve any of the problems that have been closed. Therefore, although alcohol is a well-known substance from a scientific point of view and its external examples are quite clear, it seems that jurisprudential researchers are also not without the need to properly understand this substance and its production process when examining jurisprudential issues related to “alcohol and alcoholic products”.

Jurisprudential Background

Although most jurists have stated the legal and obligatory rulings on alcohol in their practical treatises and istifta’at, many of them have not discussed the subject in their argumentative and jurisprudential books and have left such discussions to the common people or to the experts.

Among the Shiite jurisprudential books, there are very few works that implicitly discuss the subject of alcohol and its types, some of which are mentioned:

1- Sayyid Muhammad Baqir al-Sadr (may Allah have mercy on him) in his book “Bhuth fi Sharh al-Urwa al-Wathqi” in the discussion of non-traditional intoxicants, briefly explains the nature of alcohol and its types and explains its ruling in terms of its purity or impurity. It seems that he is the first jurist who found himself forced to discuss the subject in order to state the ruling on alcohol.[1]

2. Sayyid Muhammad Sadr (may Allah have mercy on him) also dedicated a chapter to alcohol in his book "Ma'awra' al-Fiqh" and examined in detail the types of alcohol, their use, and how it affects the human body and mind, and devoted a relatively extensive discussion to it.[2]

[1] . Sadr, Mohammad Baqir, Pekhuse fi Sharh al-Arwa al-Waghti, vol. 3, pp. 360-362
[2] Sadr, Muhammad, Beyond Jurisprudence, Vol. 7, pp. 216-179

Other contemporary jurists, although they have also stated the ruling on alcohol under the discussion of unconventional intoxicants, have not paid much attention to examining the subject.[1]

Apart from these works that have discussed alcohol independently, independent treatises have also been written in this field, some of which are mentioned:

1. Dr. Ahmad Sabour Ardobari, in a book titled "Investigation of Alcohol Products in Terms of Impurity and Sanctity," has studied the nature of alcohol and its types and examined it in terms of purity and impurity or sanctity and sanctity. This book has well addressed the jurisprudential thematic issues of alcohol, and it seems that its comprehensiveness in the field under discussion has been to such an extent that its effects on other works related to jurisprudential issues of alcohol are quite clear and evident.

However, despite raising some important issues in this work, it has not explained some other important branches such as the hadd of oskar and the intoxication of alcohol in food and pharmaceutical products. In addition, some technical and scientific errors can be seen in this work in terms of content. For example, it has considered medicinal alcohols to be the result of distilling khum; while not all types of alcohol are like this.

2- Hassan Vahdati Shubeiri has also examined the subject of alcohol and its products in his book "Alcohol and its Products in Islamic Jurisprudence", but in this work, in addition to the fact that, like other related works, the legal perspective prevails over the thematic perspective and a large volume of it is dedicated to examining the jurisprudential rulings of alcohol, some content problems are also evident.

In general, it can be said that the few works that exist in connection with the jurisprudential discussions of "alcohol and its products" have taken its legal dimension into account and have been concerned with discovering and deducing its religious ruling, without delving into the subject of alcohol and its various forms.

Accordingly, it can be said that there is still no research work that has independently addressed the thematic analysis of "alcohol and its products".

Importance and Necessity

The present study is based on the fact that understanding the subject of "alcohol and alcoholic products" plays a significant role in understanding its jurisprudential ruling, and therefore addressing it is an inevitable necessity. Given the gaps and shortcomings in this field, this study attempts to examine and scientifically explore all dimensions and aspects of the topic. Some aspects that indicate the importance of thematic studies of "alcohol and alcoholic products" and even require such discussions include:

1. The applicability of the subject: As previously stated, today alcohol is one of the most widely used chemicals in various fields of medicine, pharmaceuticals, health, industry, and food, and

[1] Khoei, Abu al-Qasim, Revisions in Sharh al-Arwa al-Waghti, vol. 2, pp. 97-101

this requires that before addressing its jurisprudential ruling, its nature and how it is used in various products be identified.

2. The pervasiveness of the issue: The numerous uses of alcohol have made this issue one of the issues affecting people. Different segments of society, including manufacturers, industrialists, doctors, nurses, students, and many who deal with "alcohol and alcoholic products" for professional reasons, have raised many questions that are of a thematic nature and have demanded appropriate answers from jurists and authorities. Clarifying the issue under discussion and removing the ambiguities surrounding it can help fatwa holders in providing accurate and untangleable answers.

3. Resolving some jurisprudential disputes and ambiguities: A brief look at the fatwas and inquiries regarding "alcohol and alcoholic products" shows that there are differences among jurists regarding some rulings on alcohol and its products.

Although some of these differences are due to differences in jurisprudential principles and are inevitable; But some others are due to ambiguity in the subject and insufficient knowledge about it and can be resolved with thematic research. For example, some differences are mentioned:

1- Some jurists believe that alcohol is an intoxicating substance.

2- Some other jurists do not consider alcohol to be intoxicating in fact.

3- Some jurists, without specifying whether alcohol is intoxicating or not, have left it to the mullahs to determine it and have issued fatwas such that "alcohol is impure if it is derived from liquid intoxicants, and if not, it is pure." Of course, such suspended fatwas in jurisprudential works are not very useful for the mullahs, and only thematic research can reduce such suspensions in religious answers and clarify the individual's duty in terms of action.

4. Others have not reached a conclusion about whether alcohol is intoxicating or not, and have left this issue vague and unanswered. After expressing some scientific views on alcohol and its use in food products, a contemporary writer writes:

Know that such statements are a great calamity for the religious and may turn the original purity and original haliyah into the original impurity and original haram in many food and medicine. We may have eaten several kilograms of intoxicants, blood, and pig parts in this time that has passed. We seek refuge in God and may God curse this Western materialism that opposes the divine law.[1]

It seems that such differences and ambiguities in fatwas are not due to differences in jurisprudential basis, but rather are rooted in the lack of sufficient knowledge of the subject, and if a reliable scientific authority with religious authority can explain the subject well, such differences will be resolved by themselves.

[1] «و اعلم أنّ هذه الكلمات مصيبة عظيمة للمتدينين، و ربّما تبدّل أصالة الطهارة و أصالة الحلّية بأصالة النجاسة و أصالة الحرمة فی مواد غذائية و دوائية كثيرة، و لربّما أكلنا و شربنا- لحدّ الآن من عمرنا كيلوغرامات- من المسكرات و الدم و أجزاء الخنزير. نعوذ باللّه منه، و لعنة اللّه على الماديّة الغربيّة المخالفة لشرائع اللّه تعالى فی أرضه».(Mohammad Asif Mohseni Kandahari, Jurisprudence and Medical Issues, Vol. 1, p. 332)

The above material clearly shows that there is no complete familiarity with this subject in the knowledge of jurisprudence, and the mindset of some researchers in this field remains ambiguous.

4. Shortcomings of existing research: Another reason for the necessity of conducting this research is that few studies have addressed the jurisprudential thematics of “alcohol and alcoholic products,” and among the few works and researches that exist on this subject, some scientific and content errors are also seen. Such shortcomings make it necessary to conduct a thematic research.

Accordingly, the present research, without entering into legal discussions, attempts to first explain the nature of this substance well through the thematics of “alcohol and alcoholic products,” and then examine its relationship with jurisprudential titles and concepts. Some thematic questions are:

1. What is alcohol and what are its different types?

2. What are the raw materials for producing alcohol and how is its production process?

. How does the mechanism of alcohol's effect on human behavior and the mental disorders it causes?

4. What is the usual amount of alcohol in edible products that causes intoxication?

5. From a jurisprudential perspective, which types of alcohol are considered "intoxicants" or "intoxicants"?

And other questions like these are thematic questions that are necessary and essential to address in order to explain the jurisprudential ruling.

Existing jurisprudential research has addressed these questions less, and the handful of researches that exist in the field of alcohol have focused more on its ruling dimension. In this research, an attempt is made to examine and scientifically explore all dimensions and aspects of the topic of the discussion.

Research Organization

This research is organized into four chapters:

• The first chapter describes the nature of alcohol and its types.

• The second chapter examines the various uses of alcohol and types of alcoholic products.

• The third chapter examines the consequences of alcohol consumption on the human psyche and, based on scientific findings, states the limit of alcohol consumption.

• The fourth chapter also examines the relationship between alcohol and alcoholic products by explaining some of the concepts and jurisprudential titles such as "Khamr", "Muskr" and "Fiqqa".

Chapter One: The Nature of Alcohol and Its Types

1. The Nature of Alcohol

Alcohol is a chemical substance that was discovered by Muhammad ibn Zakariyya al-Razi, a scientist of the third century AH, through the distillation of wine. He was the first to discover the existence of a substance in alcohol that evaporates quickly and has intoxicating properties.[1]

The original name of this substance in Arabic was "al-Ghoul" which was called "al-Kahl" in later texts.[2] Another name for alcohol in Arabic is "esperto" or "spirto" which is the Arabic form of the Latin word "spirit" meaning soul. The reason why alcohol is called al-Khal in Arabic means substance or active substance and "esprit" means spirit of wine or essence of wine is because alcohol is the main active substance in wine that has intoxicating properties.[3]

From the point of view of chemistry, any substance that contains the hydroxyl (–OH) group in its chemical formula is considered an alcohol.[4] Alcohols are among the most important organic oxygen compounds. Oxygen compounds are classified according to the type of functional group present in the molecule. The functional group consists of an atom or group of atoms and gives certain properties to the organic compound. Perhaps the hydroxyl group (–OH) is the simplest functional group. This group is present in all organic compounds that are called alcohols. So, in the alcohol molecule, a hydroxyl group (OH) is attached to a saturated carbon atom.

2. Types of alcohol

Scientific studies have shown that there are numerous alcohols in nature, each of which has different properties and uses due to its different chemical structure. Therefore, there are types of alcohol that can be classified into the following groups according to their chemical structure, production method, purity, and application:[5]

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1 . Ibn Abi Asibiah, Ahmad Bin Qasim, Eyes of Al-Anba in Tabaqat al-Idiq, vol. 1, p. 79

2 Al-Barr, Muhammad Ali, Al-Khamr between Medicine and Jurisprudence, p. 30.

3 Al-Maghribi, Abdul Qadir, The Word (Alcohol) Meaning Spirit, p. 651-647

4 Sabur Ar-ud-Barri, Ahmad, A Study of Alcohol Products in Terms of Impurity and Sanctity, p.

5 Hydroxyl, in chemistry, is a molecule made of a hydrogen atom and an oxygen atom that are linked together by a covalent bond (a bond).

6 Carbon with SP3 hybridization means carbon that is bonded to four similar or different atoms and has used all of its bonding capacity.

7 In chemistry, hydrocarbons are substances that contain only the elements carbon and hydrogen in their molecular structure.

2-1. Types of alcohol based on chemical structure

Alcohol is a derivative of hydrocarbons,[1] each molecule of which is a combination of several hydrogen and carbon atoms, and finally, a hydroxyl group (OH) replaces a hydrogen atom. Depending on the number of (OH) groups, alcohols are called monovalent or polyvalent.[2]

The structural formula of all alcohols is similar and they are similar in terms of participating in chemical reactions.[3] The formula of alcohols is represented as R-OH. R may be a primary, secondary, or tertiary alkyl group. In this way, alcohols are also classified into primary, secondary, and tertiary types.[4] Primary and secondary alcohols are well-known compounds.[5] The common names for these compounds are methyl alcohol and ethyl alcohol, and their IUPAC names are methanol and ethanol:[6]

A) Methanol

Methyl alcohol, also known as "methyl hydrate" or "methyl hydroxide", is also known as wood alcohol.[7] When hardwoods such as beech or maple are heated to about 300 degrees Celsius in a closed container without air, the following results are obtained:

- A solid, namely charcoal, which is mostly carbon;

- A foul-smelling liquid consisting of methanol (methyl alcohol), acetic acid and many other organic compounds;

- A gas consisting mainly of carbon monoxide and carbon dioxide.

Thus, from one kilogram of wood, about 250 grams of charcoal and 20 grams of methanol are obtained. This process, called destructive distillation of wood, was known as a source of methanol forty years ago,[8] but today, for economic reasons, most methanol is made from carbon monoxide and hydrogen in a chemical process from fossil raw materials (usually natural gas and, in China, coal). The reaction is carried out at temperatures of 300 to 400 degrees Celsius and high pressure (200-300 atmospheres) in the presence of a metal oxide as a catalyst.[9]

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[3] Sheikh, Abul Hasan, Organic Chemistry, Vol. 1, p. 114.
[4] Masterton, Slavinsky, Walfour, Basic Chemistry, p. 592.
[5] Sidi, Ali, Organic Chemistry, p. 163, McMurray, John, Organic Chemistry, p. 600 .
[6] Masterton, Slavinsky, Walfour, Basic Chemistry, p. 593. Simple alcohols are named according to the IUPAC system as derivatives of the original alkane and using the suffix -ol. The simple and common way of naming alcohols is as follows: In this method, the name of the alkyl group, R, is first written and then the word "alcohol" is added. Consider the following examples:
CH3OH methyl alcohol (systematic name: methanol); CH3 CH2 OH ethyl alcohol (a first-order alcohol: systematic name: ethanol); CH3 CH2 CH2 OH propyl alcohol (a first-order alcohol: systematic name: 1-propanol; Other compounds, alcohols, can also have systematic and common names. Thus, the systematic name for methyl alcohol, which is derived from methane, is methanol. Ethanol is derived from ethane. Propanol is derived from propane, and so on.
[7] Masterton, Slavinsky, Walfour, Basic Chemistry, p. 598.
[8] Same, p. 598.
[9] Same, p. 168.

Methanol is a light, volatile, colorless, odorless, flammable liquid and is completely toxic. For this reason, it is not for drinking under any circumstances, and even people who are addicted to alcohol will experience very serious complications if they consume a small amount of it.[1]

Due to the toxicity of methanol, swallowing and eating it causes irritation in the mucous membranes of the mouth and throat. It affects the nervous system and causes nausea, blindness and even death. Some reports indicate that consuming 30 ml of it has caused death.

Methanol toxicity is not only transmitted to humans through drinking and swallowing, but also through inhalation and skin contact. [2]This substance can be absorbed through the skin and affect the nervous system, reducing its efficiency. In case of skin contact, it causes dryness, loss of skin fat, and mild irritation and burning.

Although methanol is not used for drinking due to its toxicity, it has many uses in industry due to some of its capabilities. For example, some uses are mentioned:

- Due to its flammability, methanol can be used as a raw material for the production of gasoline.[3]

- Methanol is also used as a solvent for paint or fuel for picnic stoves and soldering torches.

- Another use of this substance is to dilute and make other alcohols undrinkable. For this purpose, this substance is added to ethanol to prevent its consumption.

Therefore, due to its numerous applications, methanol is the most important alcohol in terms of production and consumption in all industrialized countries.[4]

B) Ethanol

Another of the most important groups of alcohols is ethyl alcohol or ethanol, which is also known as fruit alcohol. Ethanol is a volatile, clear, flammable liquid with a characteristic odor that mixes with water in any ratio, burns easily, and upon combustion, water and carbon dioxide are produced. It also evaporates quickly and does not leave any adverse environmental effects.

This type of alcohol is not drinkable on its own, but if it is mixed with other liquids in a certain proportion and its concentration is reduced, it is drinkable and has intoxicating properties. For this reason, there are different percentages of this substance in the composition of alcoholic beverages.

In addition to ethanol leaving its effects through drinking, its vapor can also be easily absorbed through the lungs and be effective. In addition to the edible uses of ethanol, this substance is used in many other cases, such as the pharmaceutical, food, cosmetic and health industries.

Given these wide applications, its religious ruling has been the focus of many jurists. Since the ruling on this type of alcohol is disputed in jurisprudential discussions, understanding the

[1] Sabur Ordabadi, Ahmad, Examination of Alcohol Products in Terms of Impurity and Sanctity, p. 86

[2] Due to the wide use of methanol in industries, it is sometimes referred to as industrial alcohol.

[3] Petersi, K., Organic Chemistry, Structure and Application, p. 426.

[4] Clausweisermel, Hans-Jürgen Arp, Industrial Organic Chemistry, p. 193.

different methods of production and awareness of its process and the raw materials from which alcohol is extracted will be of great importance in deducing the ruling.[1]

2-2. Types of alcohol based on production method

Alcohols are divided into two types based on production method: natural alcohol (fermentation) and synthetic alcohol (synthetic). These two types of alcohol differ in production methods, characteristics and applications.

Natural alcohol can be produced using biotechnology from various raw materials of natural origin. Ethanol produced using this method and using raw materials of natural origin is called "bioethanol". Natural ethanol is obtained in alcohol factories by fermenting sugars present in some agricultural products and then distilling the alcoholic syrup resulting from fermentation. Synthetic alcohol is also produced by converting petroleum-based materials in petrochemical factories and by the hydration (indirect or direct regeneration) of ethylene gas.

A) Natural alcohol (fermentation)

One of the methods of producing alcohol is the natural method, which is carried out by fermenting [2]sugars and then distilling the resulting liquid. Fermentation of sugars by yeast is the oldest chemical process carried out by humans and is still of great importance for the production of ethanol and some other alcohols.[3]

The raw materials for producing alcohol in the natural method can be classified into three categories:

1. Sugary substances

Many fruits and grains naturally contain some sugar. Grapes, raisins, dates, apples, figs, cherries, berries and other sweet fruits are important sources of natural sugar for alcohol production.

2. Starchy compounds

Grains such as barley, rice, corn and ..., vegetables such as sugar beets and potatoes are also starchy compounds and are considered raw materials for the production of alcohol.

3. Cellulosic compounds

Cellulosic compounds such as wood, agricultural waste, forest waste, municipal solid waste, recycled paper, etc. are considered raw materials for the production of alcohol.

The difference between these three categories of the most important raw materials for alcohol production is that sugary raw materials are usually directly converted into alcohol by yeasts, but polysaccharides such as starch and cellulose cannot be directly fermented by yeasts, but must first be converted into simple sugars and then be affected by yeast.[4]

[1] From now on, wherever the word alcohol is used in this text, the ethanol type with the formula OH 5H2C is intended

[2] Fermentation is the process by which yeast organisms break down plant sugars to produce ethanol.

[3] Clausweisermel, Hans-Jürgen Arpe, Industrial Organic Chemistry, p. 193

[4] Aghapour Moghaddam, Reza; Sadat Hosseini, Saheb, Understanding Alcohol at a Glance, p. 59

Raw materials for making alcohol by fermentation		
Cellulosic compounds	Starchy compounds	Sugary compounds
Sugar beet molasses Cane molasses Dates Sweet fruits Watermelon	Cereals (wheat and corn) Potatoes Rice Other root crops	Wood Agricultural waste Forestry waste Municipal solid waste

Table 1-1- Raw materials for preparing alcohol by fermentation

The choice of raw material used in ethanol production depends on various factors. Economic advantage is one of the main factors in the choice of raw material; meaning that different countries in different parts of the world use the more abundant and cheaper agricultural products available to them to produce ethanol:

- In countries such as Brazil (the largest ethanol producer), Cuba, India, and China, the main raw material for alcohol production is sugarcane syrup and molasses.

- In the United States of America (the second largest ethanol producer in the world), it is produced from corn.

- In Canada and Australia, wheat is used.

- In Russia, alcohol is obtained from eucalyptus.

- In some European countries such as France and Belgium and in Iran, the main raw material used by most alcohol factories is sugar beet molasses.[1]

- In some Southeast Asian countries, rice is the main raw material for ethanol production.

- Currently, in Iran, sugar beet molasses or sugarcane bagasse are used to produce fermented alcohol. Molasses is the most important source of cheap hydrocarbons obtained in the sugar production process and contains a mixture of uncrystallized sugars, non-sugar solids remaining from sugar cane or beets, chemicals remaining from the production process and some water.

Of the total alcohol production in the world by fermentation, about 65% is obtained through fermentation of by-products of the sugar industry and another 35% is obtained from the fermentation of other sugary materials such as corn, wheat, dates, etc. So another factor that is effective in choosing the raw material is the use of alcohol. In some countries, such as France, alcohol is produced from wine. Therefore, alcohol, depending on its raw material, can be

[1] Ethanol Journal, Spring 2013, Issue 34, Page 8

extracted from yeast or can be produced from other raw materials. Today, there are different types of alcohol in the world markets that are made from different materials.

The process of producing alcohol in a natural way

The process of producing alcohol in a natural way includes two stages of fermentation and distillation:

1. **Fermentation stage**

Fermentation literally means "to ferment", but in chemistry, fermentation is a phenomenon that causes organic substances to transform or decompose into simpler substances. In other words, fermentation is a process in which organic compounds with large molecules are broken down into compounds with smaller and simpler molecules and decomposed (catabolism).

The fermentation process is carried out by adding yeast to an aqueous solution of sugars, during which carbohydrates are broken down by enzymes into ethanol and carbon dioxide. In addition to creating simpler organic compounds,[1] this process also releases carbon dioxide and energy, and most of this energy is lost as heat.

Therefore, in the first step to produce alcohol, a quantity of natural sugar-containing materials is placed inside a sealed container, and when the oxygen inside the container runs out, conditions are created for the growth of organisms that can live without air and are therefore called "anaerobes". These organisms are able to convert glucose, fructose, sucrose and maltose into alcohol. Yeasts get energy from the sugar in the solution and continue their biological activity until all the sugar is consumed or the ethanol concentration reaches a level where the yeast can no longer survive, because whenever the ethanol concentration reaches a certain level, it poisons the yeast and prevents it from continuing its work.

In such a situation, the resulting solution is an alcoholic solution that, in addition to ethanol, also contains water and other elements.[2] The ethanol obtained at this stage has a low concentration and must be distilled to increase its concentration.

2 . Distillation Stage

Distillation[3] literally means to drip, but in chemistry it means to separate the volatile matter of a substance from its non-volatile matter by heating. Distillation is not a specific practice for extracting alcohol, but is used in many cases. The type of spirits is separated by distillation.

The distillation process is such that the desired substance is placed in water and heated, because the boiling point of spirits is lower than that of water, they evaporate faster and turn into liquid again by passing through a cold pipe, or being placed in a cold container. To separate alcohol from a fermented sugar solution, it is also poured into a container and separated from the water by heating it. In this process, because the boiling point of alcohol is lower than that of water,

[1] McMurray, John, Organic Chemistry, p. 636.

[2] Aghapour Moghaddam, Reza; Sadat Hosseini, Saheb, Understanding Alcohol at a Glance, p. 61

[3] A process in which malt mash is exposed to high temperatures and releases gaseous alcohol molecules that, after condensation, are mixed with water to form the final product.

the alcohol turns into vapor before the water boils and turns into liquid again in the same way. The more this process, called "rectification", is repeated, the purer the alcohol obtained.

Therefore, the distillation process is first carried out to separate the alcohol from the dissolved liquid, and in subsequent stages to increase its purity and separate it from the water it contains. The alcohol obtained in the first distillation is not highly concentrated and is accompanied by some other elements and impurities, but in subsequent stages of distillation and by using alcohol dehydration units, it is possible to obtain alcohol with a purity of 99.8%, that is, absolute and pure alcohol.

The diagram below shows the process of producing alcohol from molasses in one of the alcohol factories in Iran:[1]

[1] *www.ya-razi.com*

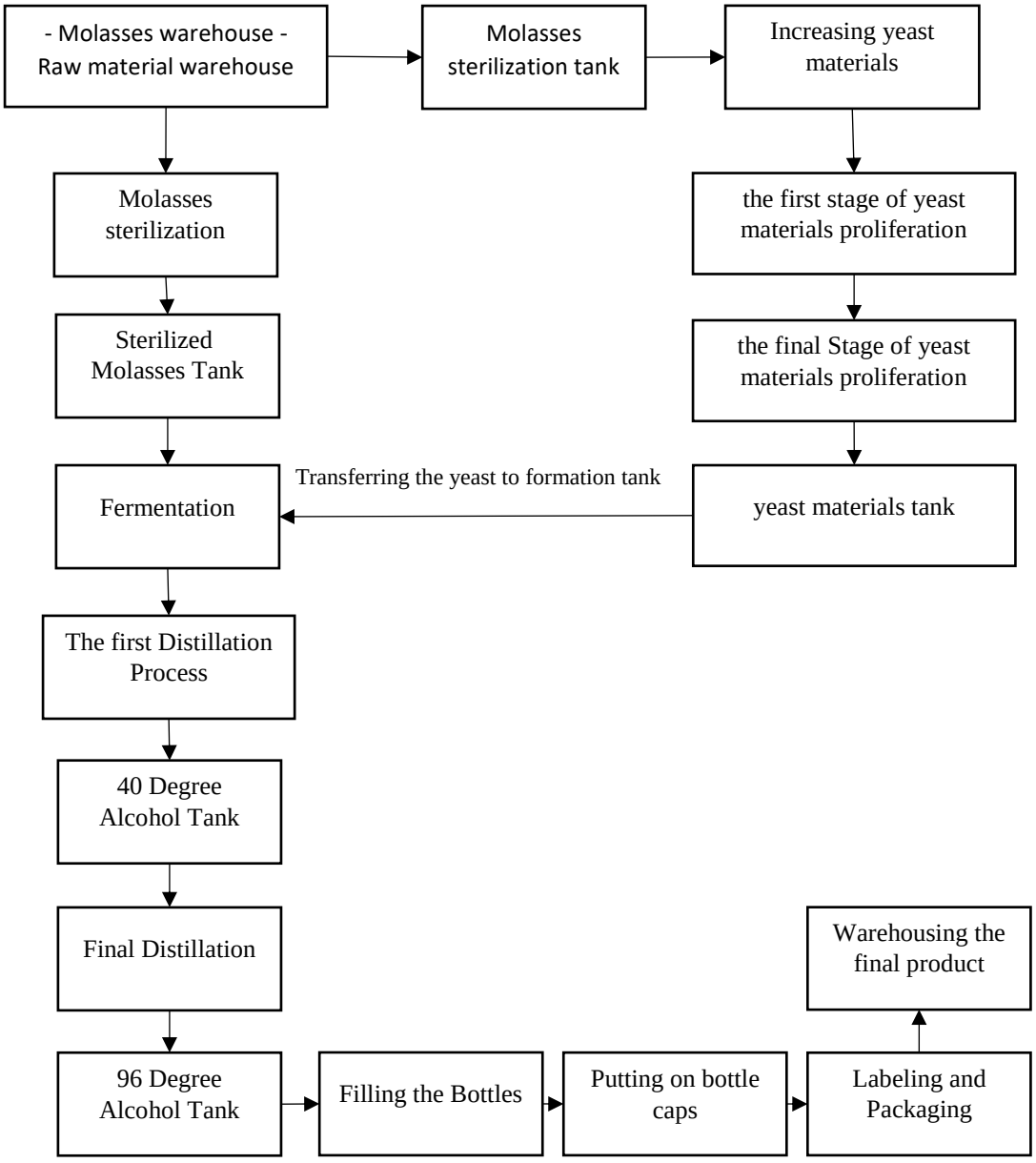

Diagram explanation:

In the alcohol production process, raw molasses is stored in storage tanks after receipt and auxiliary materials are stored in the chemical warehouse. Auxiliary materials are mixed with water in the dissolution tanks and the resulting solution is pumped to the fermentation section according to the production schedule. Raw molasses is also diluted in the dissolution tank and pumped to the fermentation section. Of course, from the second fermenter (where fermentation takes place) onwards, raw molasses is pumped directly into the fermenters without dilution.

Fermentation begins with the dissolution of a certain weight of dry yeast in a special tank and then transferred to the pre-fermenter.[1]

The fermentation process is such that the contents of the pre-fermenter are pumped to the first fermenter and the contents of this fermenter to the second fermenter and so on up to the fifth fermenter, so that the fermenters that operate in the batch-fed processing method become a continuous system.[2]

Accordingly, the alcohol concentration gradually increases during the successive stages of fermentation and finally reaches about 9-10% as malt mash. If the fermentation is carried out under appropriate conditions, more alcohol will be obtained. The appropriate concentration of syrup, the amount of oxygen in the fermentation environment, the amount of heat and the effect of acids are among the factors affecting the amount of alcohol obtained in the fermentation stage.

At the end of the fermentation stage, the contents of the fifth fermenter are pumped to the alcohol mash storage tank. The 9% alcohol or alcohol mash enters the distillation section, which consists of several towers, in order to create greater purity. In the distillation section, there are six tray columns that carry out the process of separating ethanol from other compounds produced during fermentation.[3]

At the beginning of the distillation stage, the sludge and gases of the alcohol mash are collected, and then the alcohol mash solids are separated in the mash tower (stripper)[4] and 37% alcohol is produced. After that, the alcohol is washed in the water tower and some of the impurities that do not dissolve in water are separated from it and then it is transferred to the main tower (rainy fire) and finally 95% alcohol is removed from this tower and then this alcohol enters the methanol tower to separate methanol and then 96.7% alcohol, which has been evaluated and approved by the laboratory, is transferred to the storage tanks.[5]

During this complex process, three types of products are produced: medical alcohol (which usually has a purity of at least 96% by volume and contains impurities below the permissible limits specified in the standards); industrial alcohol (with a purity of 90% by volume and contains impurities not permitted in medical alcohol, which is supplied in the bottle with the addition of dye and turpentine for easy identification from medical alcohol); and alcohol oil, which are stored in separate tanks. Also, very large amounts of carbon dioxide gas are produced, which can be marketed in the form of carbon dioxide gas capsules or dry ice.

B) Synthetic alcohol

Unlike the natural method of producing alcohol by fermenting sugars, in the synthetic method of producing alcohol, this substance is obtained through complex processes from organic raw materials such as oil, natural gas, coal, and biomass. To produce alcohol in this way, a

[1] The yeast used in the industrial process of producing ethanol from molasses is the Baker's yeast or Saccharomyces cerevisiae species.
[2] Fed Batch
[3] Seydi, Ali, Organic Chemistry, p. 168.
[4] Mesh
[5] Alcohol at a Glance, pp. 42-44 and p. 71

substance called acetylene is combined with water in the presence of mercury, and another substance called acetaldehyde or ethanal is obtained. Then, the said substance is combined with hydrogen and ethanol is obtained. Also, another substance called ethylene is combined with water in the presence of sulfuric acid, and ethanol is obtained from it. Both of the said substances (ethylene and acetylene) are petroleum products.

Alcohol production by these methods is very expensive due to the high energy required. In addition, due to the increase in alcohol consumption in the pharmaceutical, medical, food, and health industries and the lack of use of alcohol produced by chemical methods in the aforementioned uses, its production by fermentation has grown significantly compared to chemical methods. Accordingly, most of the alcohol produced in the world (about 93%) is produced by fermentation and only about 7% is produced by artificial methods. Although ethanol produced by natural and artificial methods do not differ in terms of physical and chemical properties, and even better purity levels can be achieved in the artificial method; however, synthetic ethanol is not recommended for some specific uses in the food, pharmaceutical, and cosmetic industries.

Alcohol produced by natural methods cannot be distinguished from its synthetic counterpart in terms of appearance, unless the manufacturer announces how it produced this alcohol. Ethanol production in Iran is only carried out by natural methods.

2-3. Types of alcohol based on alcohol content

Alcohol content refers to the volume of pure alcohol in milliliters per 100 milliliters, usually expressed as a percentage. For example, 90-proof alcohol is alcohol that contains 90 milliliters of pure alcohol per 100 milliliters.[1]

Alcohols can be classified into two groups based on alcohol content: pure alcohols and reduced alcohols:[2]

A) Pure alcohol

Pure alcohol is ethanol without any additives or diluents, the highest concentration and purity of which is related to anhydrous or dehydrated alcohols[3], which are also called absolute alcohol. These types of alcohols are suitable for applications that are sensitive to water. For example, they are widely used in laboratory use or in some pharmaceutical, cosmetic or health products, or as an additive to automobile gasoline. The volumetric purity of anhydrous alcohol should be more than 99.7% (according to Iranian standards, absolute alcohol contains 99.4% to 100% by volume or 99% to 100% by weight of ethanol).

[1] Some alcoholic beverages that contain fortified alcohols are labeled with the term proof instead of percent, a number that represents twice the percentage of alcohol. For example, 100-proof bourbon is 50% alcohol, and 80-proof gin is 40% alcohol.

[2] Denatured Alcohol

[3] Anhydrous

Therefore, the purity of alcohol usually depends on its use. In medical use, 99.5% or 200 proof alcohol, 96% or 192 proof alcohol, or 70% alcohol are usually used, and in industrial use, 90% alcohol is usually used.

Grain alcohol, organic alcohol and wine alcohol are some of the most important pure alcohols in the global market.[1]

Grain alcohol or wheat alcohol (GNS) is an alcohol that is highly purified and produced from grains and has a neutral odor.

Organic alcohol is produced from corn that has been grown organically. This type of alcohol is an ideal raw material for use in the extraction of perfumes and fragrances and herbal medicines, herbal cosmetics and personal care products.

Wine alcohol is another type of special pure alcohol obtained from grapes and is only available in the market as 95%. This type of alcohol is used in the natural products (plant) industries.

B) Reducing alcohol

Reducing alcohol is ethanol to which permitted and reducing substances are added, which causes its purity to be lost and makes it undrinkable.[2] The reduction formula can vary depending on the use of the alcohol and the nature of the reducing substances. Reducing alcohols are usually of two types: special reducing alcohols (SDA)[3] and completely reduced alcohols (CDA)[4].

Special reducing alcohols are ethanol that is reduced for specific applications. Today, for many different uses of alcohol, especially for disinfection, cleaning and degreasing, production of health and cosmetic products, personal hygiene or specific industrial applications, some additives are added to it that are specific to that use.

These alcohols have wide applications including personal hygiene, flavors and fragrances, pharmaceutical uses in hospitals, laboratories and research centers and many industrial uses. There are more than 40 different formulations for the use of special denatured alcohols on the market.

In Iran and many countries, in order to prevent the consumption of 96 or 70 percent alcohol for food, it is denatured with a bittering substance called Denatonium Benzoate and used for health, medical, cosmetic and manufacturing of compound medicines.

Another type of denatured alcohol is fully denatured alcohol, to which one or more denaturing agents are added in large quantities, from 5% up (depending on the use of the alcohol and the nature of the denaturing agents) to eliminate its edibility, its ability to be converted into alcoholic beverages, and even its use for uses other than those originally defined. For example,

[1] Grain Neutral Spirits

[2] Industrial ethanol at 90 degrees is not drinkable without adding a diluent due to its high impurities. Industrial alcohol is diluted by adding saffron dye, turpentine, and other substances to distinguish it from 96 degrees alcohol.

[3] Specially Denatured Alcohol

[4] Completely Denatured Alcohol

by adding 5% or more of gasoline to ethanol, fully denatured ethanol for fuel purposes is obtained. This type of alcohol is for industrial uses such as fuel and alcohol varnish and other industries other than the cosmetic and health industries, and it is denatured with permitted yellow and red dyes and one of the substances turpentine, thymol, methyl ethyl ketone, and acetone according to permitted standards.[1] Due to the use of such denaturants, which are extremely harmful to humans, it cannot be used in the preparation of products for internal use, oral medicines, or health industries.

Redistillation and complete recovery of the reducing agent from completely reduced alcohol is not easily possible, even with factory facilities; therefore, in many countries it does not require a license or supervision. In Iran, pure medical alcohol sold to vinegar factories is completely reduced at the vinegar factory and under the supervision of a technical officer by adding at least 5% vinegar essence. Completely reduced alcohol is also considered an industrial alcohol and is bought and sold without the need for a special license.[2]

2-4. Types of alcohol based on application

Alcohols are divided into two categories based on application: medical alcohols and industrial alcohols:

A) Medical alcohol

Medical alcohol refers to alcohols that are mostly used in medical and disinfectant applications. This type of alcohol is also used in the food, pharmaceutical and health industries (in pure or specially diluted form). The degree of medical alcohol is usually 96 degrees or 99.5 degrees, and in some cases, 70 degrees alcohol is used.[3]

Therefore, the impurities of medical alcohol must be less than the permissible limits specified in the standards, and its quality depends entirely on the amount of impurities in it that remain in it due to incomplete distillation (purification).

The presence of methanol in medical ethanol (as an undesirable impurity) is allowed according to the standard up to 100 mg / liter. However, medical ethanol of the desired quality produced in factories equipped with an additional distillation column specifically for methanol separation is practically free of methanol.

Therefore, medical alcohol, because it is intended for food and medicinal purposes, is free of methanol and other harmful impurities. The only substance added to it to prevent abuse is a bittering substance called denatonium benzoate with the trade name Bitrex, which is added by order of the Ministry of Health.

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[1] Methanol and pyridine are also two of the eighty-one legal compounds as modifiers, the addition of small amounts of which to ethanol makes it unfit for drinking. See Morrison, ibid., p. 245.

[2] Parvin, Pirouz, Ethanol Journal, Winter 2012, Issue 33, pp. 17 and 18

[3] 70% alcohol is actually 96% alcohol diluted to 70% with distilled water. This type of alcohol is not much different from 96% alcohol in terms of its disinfectant properties, but due to its economic advantage, it is usually used in alcohol disinfectant products. For more information, see: Pirouz Parvin, Frequently Asked Questions about 70% Ethyl Alcohol, Ethanol Magazine (Specialized Newsletter of the Alcohol Producers Association), No. 34, Spring 2013, p. 16

B) Industrial alcohol

Industrial alcohol is also a type of ethanol that has only industrial use and is not used for food purposes due to the impurities in it. Industrial alcohol is a toxic substance due to the presence of toxic impurities and also due to its high concentration and is poisonous and deadly before it can cause intoxication in a person.[1]

Of course, there may be exceptions, and some alcohol addicts whose bodies are accustomed to toxins use it instead of alcoholic beverages, but this is very rare and not common, in addition to the fact that in these cases alcohol must be mixed with large amounts of water to be used as a drink.[2] For this reason, industrial alcohol should be used only for industrial purposes (solvent, degreaser, raw material) or as fuel, and its use for health, household and personal purposes is not allowed.

The degree of purity by volume of industrial alcohol is usually 90% and is supplied in the bottle with the addition of dye and turpentine to easily distinguish it from medical alcohol. In some cases, about 5% methanol, 5% pyridine (a toxic substance with a bad smell) and a coloring agent, such as methyl violet, are added to it to differentiate it from medical alcohol and make it easy to recognize. Methanol and pyridine are highly toxic and cannot be separated from ethanol by simple distillation. Therefore, industrial alcohol is ethanol and is essentially no different from medical alcohol. The only difference is the amount of impurities and some additives that are added to industrial alcohol.[3]

Summary and Conclusion

In this chapter, the nature of alcohol and its types were investigated and examined. Scientific studies have shown that there are many alcohols in nature, each of which has different properties and specific uses due to its different chemical structure. The most widely used alcohols are known as methanol and ethanol, and their nature and types were discussed in this chapter. Methanol is not edible due to its toxicity and is only used industrially; however, ethanol has been considered for its jurisprudential effects because it is edible and is also used in various food and pharmaceutical industries. Ethanol - commonly known by the common name alcohol - is produced in two ways: natural (fermentation) and synthetic (chemical). Natural ethanol in alcohol factories is mainly obtained from the fermentation of sugar in some agricultural products (such as sugar beet molasses and sugar cane) and then fractional and multi-stage distillation of the alcoholic syrup resulting from the fermentation, and synthetic ethanol is produced from the conversion of petroleum-based materials in petrochemical factories.

Based on the alcohol content, there are two types of alcohol: pure and reduced, which do not differ in nature and differ only in the purity and concentration of alcohol and its applications.

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[1] In some cases, methanol or industrial ethanol is also referred to as industrial alcohol, but its common use is for ethanol used in industrial purposes.

[2] Saboor Ordabadi, Ahmad, Investigation of Alcohol Products in Terms of Impurity and Sanctity, pp. 93-97

[3] This process is called denaturation in scientific terminology. Distillation and purification of denatured alcohol is very difficult. See: Abul Hasan Sheikh, Organic Chemistry, Vol. 1, p. 134.

Based on the application, two types of alcohol are distinguished from each other: medical and industrial alcohol, with medical alcohol being used more for medical purposes and disinfection applications or in the food, pharmaceutical and health industries - in pure or specially reduced form - and industrial alcohol is a type of ethanol that is used solely for industrial purposes and is not used for food purposes due to the impurities present in it. Today, each of these alcohols has a specific application in various food, pharmaceutical, health, cosmetic, and industrial products and is used directly in their compositions or in the production process of these products. For this reason, the next chapter is dedicated to the thematic study of alcoholic products and some of the most important types of these products are examined.

Chapter Two: Types of Alcoholic Products

Alcoholic products are products that use alcohol in their production process or in their final composition. As previously stated, ethanol is one of the most widely used chemicals in human life, used in the food, pharmaceutical, health and medical industries. Here are the most important products that use alcohol in their production process or in the final product:

1. Cosmetics

One of the most important uses of alcohol is its use in health and beauty products. For example, alcohol is widely used in the production of various types of colognes, perfumes, essential oils and other cosmetic products. The main property that causes alcohol to be used in these areas is its solubility. Alcohol dissolves various types of essential oils (in the manufacture of colognes and perfumes) and oils and waxes (in the manufacture of various types of lipsticks, blushes, mascaras, etc.) and after consumption by the consumer, due to its ability to evaporate at low temperatures, it evaporates and is removed from the environment.

2. Health Products

Alcohol is also widely used in the preparation of some health products. For example, products such as glass cleaners, polishes, and polishes can be mentioned that use alcohol in their preparation. Industrial ethanol is also used in antiperspirant lotions, hand sanitizers, soaps, and shampoos.

3. Pharmaceutical-Medical Products

One of the main uses of alcohol is in the medical field. The most important uses of alcohol in the medical field are:

3-1. Use as a solvent

Today, although other substitute solvents are used instead of ethanol in most medicinal syrups; alcohol is used as a chemical solvent in the manufacture of some medicines such as tinctures or medicinal syrups, and in the preparation of tablet and capsule coatings.[1] Alcohol is the solvent of most medicinal substances found in plants and some chemicals; Therefore, alcohol is used to extract these substances from the plant body or chemical compound.

3-2. Direct use in making medicine

In most cases, alcohol is used to make medicines and is used directly in the manufacture of some medicines. For example, alcohol is widely used in the manufacture of painkillers and sleeping pills. It is also used as an "alcohol serum" in the treatment of alcohol poisoning.

One way to treat severe methanol poisoning is to stop the metabolism of methanol by intravenously injecting a 10% ethanol solution.[2] This treatment prevents further metabolism of the toxic alcohol and removes it from the body before it reaches a dangerous concentration.

[1] Tentures are infusions of plant, mineral, or animal material soaked in alcohol in such a quantity that the alcohol, as a solvent, penetrates all particles of plant or animal tissue or dissolves the mineral.
[2] Katzung, Bertram.J., Basic and Clinical Pharmacology, Vol. 1, p. 482

[1]Therefore, ethanol consumption in such cases has a direct therapeutic aspect, and a small amount of it is effective in treating acute methanol or ethanediol (ethylene glycol = antifreeze) poisoning.

3-3. Use as a preservative

Since alcohol has a preservative role, alcohol is used as a preservative to prolong the shelf life of medicines and prevent their premature spoilage. It is widely used in medical and anatomical laboratories to preserve body parts.[2]

3-4. Use as a disinfectant

Another use of alcohol in medicine is its disinfectant and antiseptic properties. Alcohol has antibacterial and antifungal properties and has also been proven to play a role in inactivating some viruses, which has the widest range of effects and is effective in the shortest contact time, about 15 seconds, and this is what has made alcohol one of the disinfectants.

Of course, alcohol is not the only disinfectant, but the numerous advantages and benefits of alcohol disinfectants have led to the increasing use of these products worldwide. The advantages and benefits of this substance include: non-allergenic, less irritating to the skin and respiratory tract, low toxicity, environmental degradability, leaving no residue, stains, or other effects, no corrosive effect on the surface used, ability to be used for hard surfaces, medical devices, and even body skin with a single formula, ability to be used directly without the need for preparation and dilution, ability to be mixed with other disinfectants, having less odor than some other disinfectants, greater ability to prepare and access (low price), which leads to its widespread use in disinfection and disinfection.

One of the products that has found widespread use today is the use of alcohol pads. Disposable medical alcohol-impregnated pads are used in many cases such as sterilizing injection sites, disinfecting facial acne, insect bites, skin abrasions, and other health uses. This product usually uses 70% ethanol, and in some cases, 70% isopropyl alcohol is also used.

4. Industrial Products :

4-1. Paintmaking

One of the uses of alcohol is in the paint industry. Alcohol is used in this industry as a solvent for dyes and also to provide surface cleaning capabilities.

4-2. Fuel

Another important use of ethanol is as a fuel. Due to its flammability, ethanol is used both in laboratory environments, as a fuel (in an alcohol lamp) and as a fuel for vehicles. Since the combustion of ethyl alcohol usually occurs completely and is not accompanied by the production of soot, this substance can easily be used as a fuel in vehicles. For this reason, its production has recently attracted a lot of attention, because it has shown its potential as an additive to gasoline. Due to its high purity of 99%, fuel alcohol can replace gasoline and prevent

[1] Petersi, Organic Chemistry, Structure and Application, p. 426

[2] Aghapour Moghadam, Reza, Understanding Alcohol from a Scientific, Social, and Economic Perspective, p. 50-52

its import and air pollution. This type of alcohol is extracted from 96% ethanol by the molecular sieve dehydration method [1]for use as fuel alcohol.

4-3. Alcohol oil

Another by-product of the ethanol production industry is fusel oil, which is known as alcohol oil in the alcohol industry and is produced in the alcoholic fermentation stage in fermenters.[2] This substance is separated from bioethanol as an impurity in the distillation stage in the second columns [3]and onwards, after the first column. Fusel oil can be burned to provide part of the energy consumed by ethanol factories.

In recent years, research has also been conducted on the use of this substance as an octane-boosting additive in gasoline or in the production of natural flavors and lubricants. It can also be used in some health and cosmetic industries or in the cellulose leather industry. In Iran, fusel oil is usually transferred as wastewater to the wastewater treatment unit of alcohol factories or is concentrated together with vinasse [4]and used as animal feed.

4-4. Other items

Alcohol is used as a raw material for the production of some products such as ethylene glycol (car antifreeze), ethylene chloride, butadienes, polyesters, etc.

Based on these applications, today many factories and production units such as perfume, cologne and cosmetics factories, foundry factories, industrial solvent manufacturers, cleaners, car and home window cleaners, disinfectants, automotive product manufacturers including gasoline supplements, diesel supplements, octane boosters[5], wet wipe manufacturers, poison manufacturers and resin manufacturers, are buyers of medical and industrial alcohol.

5. Food Products

One of the common uses of alcohol is its use in the production of some food products. The most common use of alcohol in this field is related to alcoholic beverages and some food raw materials, the most important of which are mentioned:

5-1. Alcoholic beverages:

Alcoholic beverages are classified into two groups: distilled and fermented beverages:

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[1] Molecular sieve is a material that is made up of tiny pores of uniform and specific size and is used as an absorbent for gases and liquids.
Peterson, Organic Chemistry, Structure and Application, Vol. 1, p. 427.

[2] A fermenter is a device that provides optimal conditions for the growth of microorganisms such as fungi, bacteria and yeast. Microorganisms will grow and function better and more in these special conditions.

[3] Stripper

[4] Vinasse is the wastewater from the alcohol industry that remains after the distillation of alcohol. In the process of producing alcohol from beet and sugar cane molasses using a concentration system, an organic substance called vinasse remains. This substance is a brown liquid and is widely used in various industries, including livestock and poultry feed production, organic and chemical fertilizer production, food, chemical, and pharmaceutical industries.

[5] Octane Number is a conventional number that indicates the combustion efficiency of a fuel and is conventionally set at 100 for isooctane, which is the best fuel, and zero for normal heptane, which is the worst fuel. One of the important characteristics of gasoline for cars and airplanes is the octane number or the degree of slow combustion. The combustion of gasoline in the engine must be such that it does not cause knock and burns slowly. Additives are used to increase the octane number (slow combustion).

Distilled beverages: These are beverages in which the alcohol in them is first obtained from the fermentation of fruits or grains and then its concentration is increased by distillation. To produce this type of beverage, pure alcohol is diluted to the desired level and by adding various amounts of essential oil and water-soluble dyes, the desired product is obtained.[1]

Whiskey, gin, rum, vodka, brandy and cognac are distilled alcoholic beverages that sometimes have up to 80 degrees of alcohol.[2] For this reason, it is usually not possible for ordinary people to consume large amounts of this type of beverage, and it is necessary to use a small amount of it or to mix it with water or other beverages before eating and use it after dilution. Fermented beverages: These are beverages in which the alcohol in them is obtained through the fermentation process and is not distilled. Among fermented alcoholic beverages, wine and beer are common and conventional beverages:

A) Wine

Wine is an alcoholic beverage that is often obtained from the fermentation of grape juice or other fruits such as apples and dates and is several thousand years old. The different names of wine depend on its raw material. The Arabs in the Arabian Peninsula made various alcoholic beverages and wines from various fruits, even from honey and seeds and millet, and each was known by a special name. For example, Sahba is grape wine, Bata is honey wine or fresh dates, Abira is corn wine, and Nabid is date or grape juice wine. According to some reports, there were about 130 types of wine in the Arabian Peninsula.[3]

In modern literature, when wine is mentioned without mentioning its type, it means grape wine. In the case of other wines, its raw material is always mentioned, such as apple wine, date wine, etc.

Chemically, grapes naturally have the property that they can ferment without adding acid or enzymes, and the sugar in them can be converted into alcohol; while other sugars require the addition of yeast to be converted into alcohol.[4]

Of course, today, wineries eliminate the natural yeast in grapes and add their own yeast to achieve stable and predictable results.[5] Today, the variety of wines is due to the use of grape varieties and the diversity in their production process using different types of yeast.

Some of the most famous wines are:

1. White wine:

It is a type of wine from which the grape skins are removed before fermentation so that the color does not return.

2. Red wine:

[1] Morrison, Organic Chemistry, p. 245.
[2] Daraya, Mohammad, Alcoholic Beverages, Gambling and Their Harmful Effects, p. 192
[3] Aghapour Moghaddam, Reza; Sadat Hosseini, Sahib, Understanding Alcohol at a Glance, p. 133
[4] H. Johnson Vintage, The Story of Wine, pp. 11–6
[5] George Kariuki, Alcohol and its Health Effects, p. 15

If the grape skins are not removed, red wine is obtained. The amount of alcohol in white wine is 38 to 113 mg / liter and in red wine up to 188 mg / liter.[1]

3. Fortified wine:

A wine to which alcohol is added after fermentation to make it more astringent. Its percentage is usually 20 to 25%.

4. Sweet wine:

A wine that is removed before the end of fermentation to leave some sugar in it or that sugar is added to it later.

5. Sparkling wine:

A wine that contains carbon dioxide, which can either be added or made in such a way that the carbon dioxide produced by fermentation is not separated from it. The most famous is champagne.

B) Beer

Beer is another common alcoholic beverage that is obtained from the fermentation of starchy materials (usually barley malt and sometimes a combination of other grains) and a natural preservative called hops is added to it, which is the reason for the bitterness of beer.

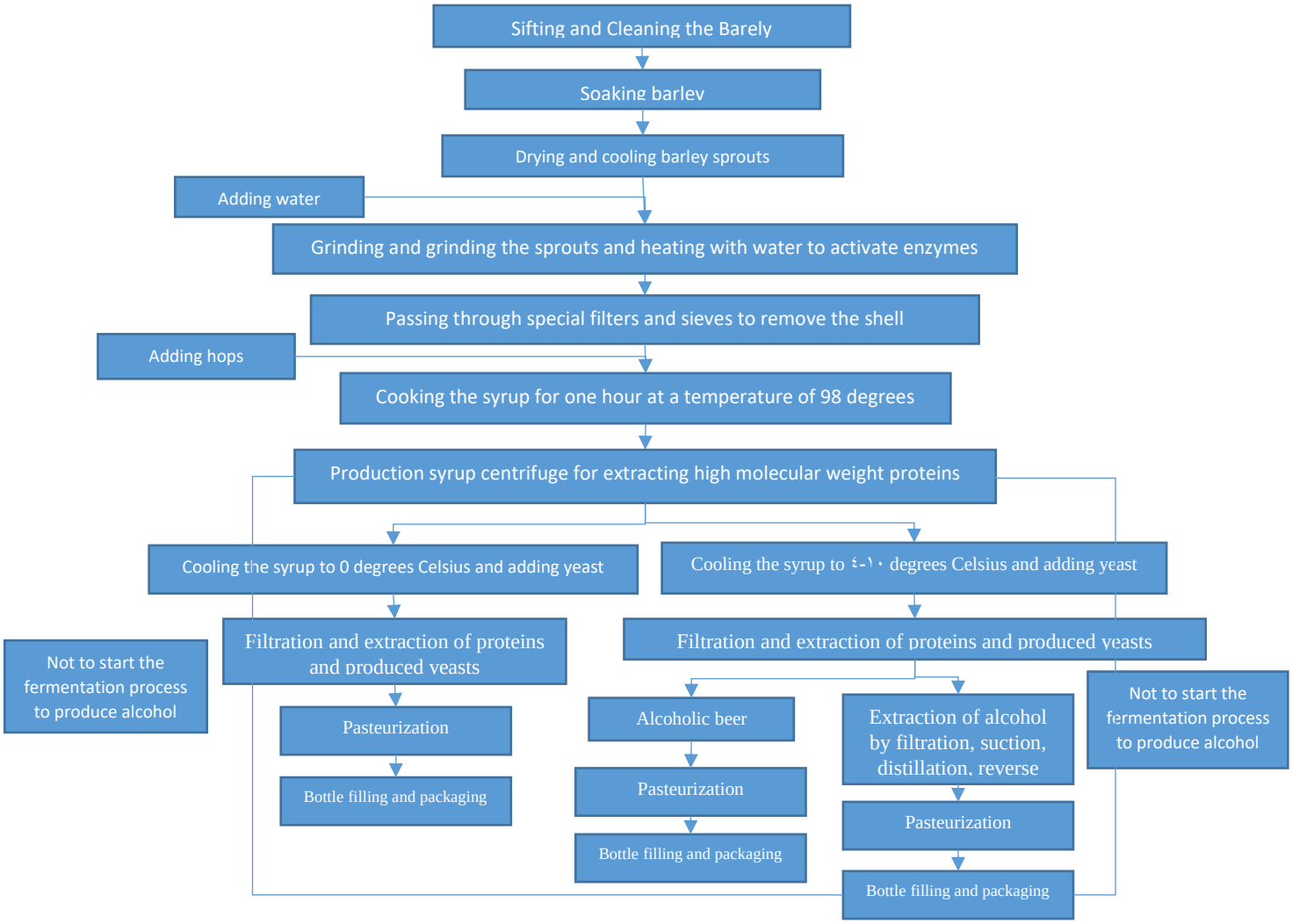
Malt is the sprouted barley that is used after sprouting and drying. When pure and cleaned barley is placed at a certain temperature and humidity, it sprouts between 9 and 11 milliliters and turns into malt. If the malt is cooked with water for 3 hours and 30 minutes at a temperature of 76 degrees Celsius and its dregs are separated, the initial solution for making beer is provided. This solution is transferred to the chiller along with hops and sugar, where it is given a thermal shock to prevent it from becoming alcoholic. This shock causes the yeast that produces alcohol to not tolerate this temperature difference and to be destroyed.

In some countries, to produce beer, they first obtain an alcoholic solution by fermenting barley malt and in order for the final product to be alcohol-free, they separate the alcohol by distillation and passing it through various filters. In this method, a very low percentage of alcohol always remains in the final product. According to European and American standards, beer that contains less than 0.5% alcohol is called alcohol-free and labels such as “non-alcoholic” or “alcohol-free” are used. The alcohol in beer varies between 2% and about 8%, depending on its different brands.

Figure 2-1 shows the stages of production of various alcoholic and non-alcoholic beers.

[1] Azarbadgan, Hossein Ali, Scientific and Jurisprudential Review of Alcohol and Its Products, p. 189

Figure 2-1 Beer production stages



5-2. Food raw materials

Alcohol is also widely used in the production of some food products:

A) Natural

In the production process of many foods in which fermentation plays a fundamental role, some alcohol is produced spontaneously and naturally. For example, in the fermentation of milk in order to produce some dairy products such as kefir, some alcohol is produced spontaneously. In the preparation of bread dough,

a very small amount of natural alcohol is produced.

Of course, the amount of alcohol produced can vary depending on the amount of liquid and sugar in the food, the temperature of the storage environment, the duration of fermentation, the process and the targeted influence on the fermentation process, and the amount of alcohol can be controlled in all these cases. Therefore, fermentation can be carried out in conditions where the alcohol produced is not more than desired or the final product is alcohol-free.

In the traditional production of vinegar, which is obtained by fermenting sugars found in fruits such as apples and grapes, yeasts first convert carbohydrates into alcohol under anaerobic conditions, and under aerobic conditions, Acetobacter comes into action and produces vinegar by consuming alcohol. In fact, this type of vinegar is a two-stage fermentation product, in which in the first stage, yeast converts sugar into ethanol under anaerobic conditions, and in the second stage, ethanol is oxidized to acetic acid under aerobic conditions by bacteria of the genus Acetobacter.

B) Additives

In some food industries, alcohol is not produced on its own, but is added to them from medical alcohol produced by alcohol factories and used as a raw material in these products:

Alcohol is used in the production of products such as powders, essential oils, and coated sweets.

In the production of industrial vinegars, ethanol is used to convert it into vinegar. In this method, acetic acid bacteria are added to alcohol to produce vinegar and air is blown into the product with a pump until all the alcohol is converted into vinegar.

Apart from the above, there are various other products in the food industry that use alcohol in the production process or in their final composition. The amount of alcohol in each of these products varies depending on the type of product and the conditions and goals of its production.

It is worth noting that the alcohol used in pharmaceutical and food products is of the type of edible alcohol, and since this type of alcohol can have intoxicating properties, its use in food products must be carefully controlled so that it does not reach the level of intoxication. In those food products that spontaneously produce some alcohol and undergo fermentation during their production process, the level of alcohol can be controlled by specific mechanisms so that it does not reach the level of scarring. Therefore, if the alcohol content of a product is lower than the level of intoxication, that product will not be intoxicating.

Summary and Conclusion

This chapter discusses the use of alcohol in various edible and non-edible products. The uses of alcohol in human life are so great that it has become a vital and important substance. Alcohol is used in medical, pharmaceutical, industrial, and food and health industries. In medical and pharmaceutical uses, it is used as a chemical solvent, in the manufacture of medicines, as a preservative, and as a disinfectant. In industry, it is widely used as a solvent for raw materials or as a fuel supplement, and in the food industry, it is used in many products such as vinegar, powders, and various essential oils and coated sweets. Alcohol is also used to produce various types of alcoholic beverages (such as wine, beer, and distilled beverages). The sugary properties of these beverages are due to the presence of a certain amount of alcohol - between 5% and 85% - in them. This amount of alcohol varies depending on whether the alcoholic beverages are fermented or distilled. Weak alcoholic beverages such as beer have between 4% and 8% alcohol, and strong distilled beverages such as whiskey have up to 50% alcohol. Therefore, if the alcohol content of a liquid is lower than the sugar content, that liquid will not be intoxicating. Just as in the production process of some foods, a very small amount of alcohol is naturally produced; but none of them are intoxicating.

The question here is what is the alcohol intoxication limit and what percentage or amount of alcohol in food products can make them intoxicating. In other words, what is the alcohol intoxication limit and can a percentage be determined for it?

This is an important question that has not been addressed in research related to "alcohol and alcoholic products"; But the answer to it is very decisive and a solution for many food and pharmaceutical industries that use alcohol in some way in their products and consider themselves obliged to comply with Sharia requirements. It will also be very important for the Islamic government in the field of issuing licenses for the import of alcoholic products. Therefore, in the next chapter, by examining the consequences of alcohol consumption and how it affects humans, the intoxication limit of alcohol and the permissible amount of its use in halal food products will be examined.

Chapter Three: The Mechanism of Alcohol's Effects on the Body and Its Intoxication Limit

As stated in the previous chapter, one of the most common uses of alcohol is its oral consumption. Alcohol in high concentrations is considered a serious cause of poisoning and is not drinkable. Therefore, for oral consumption, its concentration must be reduced and converted into a drinkable liquid.

An important question that we are trying to answer in this chapter is how much alcohol can turn a liquid solution into an intoxicant and have legal effects on it?

To answer this question and determine the alcohol intoxication limit, it is first necessary to carefully examine the metabolism of alcohol, how it affects the body, and the factors involved in its effects.

1. Alcohol metabolism in the body

The absorption of alcohol and its entry into the bloodstream is different from other drinks and foods. As soon as alcohol is consumed, it first enters the bloodstream in small amounts through the mucous membranes of the mouth and lungs and then enters the bloodstream through digestive absorption and reaches the brain and other organs of the body. Some of the alcohol that enters the body enters the bloodstream directly from the stomach, and if the stomach is empty, this process occurs almost immediately. Food, especially fatty foods, slows down this process somewhat. The increased concentration of alcohol in the stomach causes mucus to be secreted and the pyloric valve to close; this action prevents alcohol from entering the small intestine, where there is no significant obstacle to its absorption. In this way, large amounts of alcohol may remain unabsorbed in the stomach for hours, and pyloric spasms can cause nausea and vomiting.

The minimum time to reach the maximum plasma concentration of ethanol is about 30 to 90 minutes, but the effects of alcohol consumption will be apparent within ten minutes.[1]

Alcohol reaches all body tissues after absorption in the blood, and since its dissolution in body water is the same, tissues that have more water receive more alcohol.

As the concentration of alcohol in the blood increases, the effects of poisoning also become apparent, and as it is gradually absorbed and oxidized, the symptoms of poisoning decrease. Usually, a small amount of alcohol is excreted through urine and exhaled air; but approximately 95% of the alcohol consumed is metabolized in the liver, where it is finally converted into water and carbon dioxide and excreted from the body.[2]

[1].http://www.niaaa.nih.gov/alcohol-health/overview-alcohol-consumption

[2] Masterton, Slavinsky, Walfour, Basic Chemistry, p. 651.

2. Mental and behavioral disorders caused by alcohol consumption

In most cases, ethanol consumption has harmful effects on the human body and mind. Scientific research has shown that alcohol consumption has destructive effects on many organs of the body, especially the stomach, liver, heart, and brain. Of these, the liver is usually the most damaged, as it is the main site of alcohol metabolism. [1]

Excessive and continuous consumption of alcohol causes various physical and mental disorders, which are usually described by the term "alcoholism". Disorders such as amnesia, central nervous system restlessness and liver disorders and intellectual impairment, stomach ulcers and psychological dependence are some of the complications of excessive alcohol.[2] Excessive alcohol consumption can also lead to coma or death.[3]

It can be said that among the body's organs, ethanol has the most negative effect on the brain. This effect has two stages:

1.When alcohol reaches the brain with the bloodstream, it first creates a feeling of relaxation by affecting the receptors related to the neurotransmitter GABA (GABA), then it facilitates the inhibitory function of GABA (GABA) by preventing the transmission of messages in the neurotransmitters, and as a result, the person feels more comfortable. This first makes the person more talkative, more sociable, more confident and happier.

2. As the amount of alcohol absorbed by the central nervous system increases, the second stage of intoxication begins. In this stage, the person becomes less able to think, their speech becomes incoherent, their memory becomes impaired, and their behavior may change from calm and happy to excited and aggressive. Finally, the physical effects of alcohol intoxication occur, which include: imbalance and difficulty walking, decreased reaction time, or blurred vision.

Therefore, the trajectory of alcohol's effect on the body is called a two-stage or biphasic substance; because the substance in question initially acts like a stimulant and calms the person, but in the next stage, it acts like a depressant and slows the person down and causes negative emotions. [4]For this reason, ethanol is classified as a central nervous system (CNS) depressant and its effects are similar to the body's response to anesthetic drugs.[5]

Based on the above, the stages of alcohol's effect on the human body can be described as follows:

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[1] McMurray, John, Organic Chemistry, p. 636

[2] Because the study of the physical effects of alcohol on the human body is beyond the scope of this study, only the psychological and stimulating effects of alcohol are mentioned here. For more information on the physical harms of alcohol, see: Organic Chemistry, Structure and Use, p. 426

[3] Masterton, Slavinsky, Walfour, Basic Chemistry, p. 600.

[4] American Psychiatric Association, DSM-5 Psychopathology, p. 6

[5] McMurray, John, Organic Chemistry, p. 636

Stage One: Exhilaration:

When the blood alcohol level is low, it creates a feeling of elation, calmness, and freedom from restraints in the individual, and the individual feels limited joy and happiness. Self-confidence increases, and the person becomes more sociable and says things that he would not normally say.[1]

Stage Two: Excitement:

In this stage, the individual's behavior changes from calm to excitement and aggression.

Stage Three: Confusion:

When the concentration of alcohol in the blood increases, a significant disturbance in sensory and motor functions appears, the person becomes unbalanced, and speech becomes vague and unclear.

Some researchers have divided the state of intoxication into three parts depending on the concentration of alcohol in the blood:

1- Mild intoxication,

2- Obvious intoxication,

3- Complete intoxication.[2]

In all these stages, when a person has recently consumed alcohol and is under its mild or severe influence, it is scientifically said that he has suffered from alcohol poisoning; but in colloquial language it is called a state of intoxication.[3]

3. Alcohol intoxication threshold in food products

Many studies have shown that the occurrence of intoxication in a person who has consumed alcohol is directly related to the amount of alcohol in his blood; meaning that the higher the blood alcohol content (BAC)[4], the more advanced the stages of intoxication will occur in the person.

Therefore, by measuring the amount of alcohol in a person's blood, it is possible to determine how much alcohol he is under the influence of. Naturally, there is a very small amount of

[1] Ahmadvand, Mohammad Ali, Addiction (Etiology and Treatment), p. 39

[2] Al-Barr, Muhammad Ali, Al-Khamr Bin Al-Tibb Wa Al-Fiqh, pp. 89-91; Sabur Ordabadi, Ahmad, A Study of Alcoholic Products in Terms of

[3] American Psychiatric Association, Psychopathology DSM-5, p. 7

[4] blood alcohol Content or blood alcohol Concentraion

alcohol (about 0.002 mg/dl)[1] in human blood, and when this amount increases and reaches a certain level, the first signs of intoxication will occur.[2]

According to some reliable research, the relationship between serum ethanol concentration and its possible harm can be explained based on the following table:[3]

Blood amount	**Probable Harm or Effect**
٢٠ to 30 mg/dL	Capable to control physical actions and decreased intellectual ability
٣٠ to 80 mg/dL	Increased problems in controlling physical and cognitive behaviors
80 to 200 mg/dL	Lack of coordination, errors in judgment, and mood instability
200 to 300 mg/dL	Slow speech and episodes of alcoholic amnesia
Above 300 mg/dL	Vital signs disorder and possibility of death

Table 3-1- Possible losses at different blood concentrations

Some other scientific research has described in more detail the mental and physical disorders caused by alcohol consumption at different blood concentrations:[4]

Disorder	**Behavior**	**Blood alcohol concentration (w/v)**	**Blood alcohol concentration (volume percent)**

[1] Sabur Ordabadi, Ahmad, A Study of Alcoholic Products in Terms of Impurity and Sanctity, p. 31; Aghapour Moghaddam, Reza; Sadat

[2] Blood alcohol levels are measured in different countries based on weight per volume (w/v) or weight per weight (w/w). In North America, it is expressed in grams or milligrams per deciliter.

[3] ٢ .Kaplan and Sadock's Comprehensive Textbook of Psychiatry, seventh edition, 2000, p 953 - 1062

[4] http://www.hokiewellness.vt.edu/Students/alcoholEffects/index.htm

http://flightphysical.com/pilot/alcohol.htm

Subtle effects that can be detected with special tests.	Usually people seem normal.	۱۰ - ۲۹ (mg/dl)	۰/۰۰۱ -۰/۰۲۹
Impaired concentration	Moderate euphoria, comfort, contentment, talkativeness, reduced inhibitions	۳۰ - ۵۹ (mg/dl)	۰/۰۳۰ -۰/۰۵۹
Impaired reasoning, extreme perception, peripheral vision, stunning retrieval	Slowed emotions, decreased sensitivity to pain, euphoria, lack of inhibition, extroversion	۶۰ - ۹۹ (mg/dl)	۰/۰۶۰ -۰/۰۹۹
Impaired reactions, reaction time, control of large stimuli, staggering, stuttering, temporary erectile dysfunction	Excessiveness, violence and aggression, possible nausea and vomiting	۱۰۰ - ۱۹۹ (mg/dl)	۰/۱۰۰ -۰/۱۹۹
Severe stimulus impairment, loss of consciousness, memory impairment	Nausea, vomiting, emotional swings, feeling angry or sad, partial loss of perception, disturbance in emotions, decreased libido, possible stupor and confusion	۲۰۰ - ۲۹۹ (mg/dl)	۰/۲۰۰ -۰/۲۹۹
Impaired bladder function, breathing, balance, heart rate	Confusion, central nervous system slowing, loss of perception, errors in consciousness, low probability of death	۳۰۰ - ۳۹۹(mg/dl)	۰/۳۰۰ -۰/۳۹۹
Breathing disorders, heart rate, alcohol-induced nystagmus	Severe central nervous system depression, coma, possible death	۴۰۰ - ۵۰۰ (mg/dl)	۰/۴۰۰ -۰/۵۰۰

Life	High risk of poisoning and high probability of death	Above ۵۰۰ (mg/dl)	> ۰/۵۰

Table 3-2- The cumulative effects of alcohol

The variable values considered in the above tables for blood levels show that it is not possible to determine a fixed blood concentration to achieve a state of intoxication for all people, because alcohol tolerance is not the same in all people and numerous factors are involved in the effects of alcohol.

Accordingly, even if the level of alcohol in the blood of people is the same, the degree of disorders that arise in them may differ.

According to some research, the relationship between blood alcohol concentration and the disorders caused by it is stated as follows:

1. If the blood alcohol concentration reaches 0.05% or equivalent to 50 milligrams per deciliter (mg/dl), the power of thinking, judgment and skills is weakened.

2. If the blood alcohol concentration reaches 0.1% or equivalent to 100 milligrams per deciliter (mg/dl), voluntary motor actions are clearly impaired.

3. If the blood alcohol concentration reaches 0.2%, or 200 milligrams per deciliter (mg/dl), the function of all motor areas in the brain is impaired, and the areas that monitor emotions are also affected.

4. If the blood alcohol concentration reaches 0.3%, or 300 milligrams per deciliter (mg/dl), the person usually becomes confused or stupefied.

5. If the blood alcohol concentration reaches 0.4%, or 400 milligrams per deciliter (mg/dl) to 0.5%, or 500 milligrams per deciliter (mg/dl), the person goes into a coma.

6. At levels above 0.5% or 500 mg/dl (5000 mg/dl), the primary respiratory and cardiac control centers are also affected and death occurs.[1]

In general, and considering the minimal effects of alcohol on the body, it can be concluded:

If the amount of alcohol in 100 ml of blood contains approximately 20 to 30 mg of ethanol, the first signs of intoxication appear. This amount is equal to a blood alcohol content (BAC) of 0.02% to 0.03%, which is usually intoxicating.

Therefore, the minimum blood alcohol concentration that can cause the first stages of intoxication is 0.02% or 20 mg/dl (20). In most countries, it is illegal to drive with a blood alcohol concentration above 0.1%, or 100 milligrams per deciliter (mg/dl). [2]Even in many

[1] Ahmadvand, Mohammad Ali, Addiction (Etiology and Treatment), p. 48
[2] McMurray, John, Organic Chemistry, p. 636-637

states in the United States, a person is not allowed to drive if their blood alcohol concentration is above 0.08%, or 80 milligrams per deciliter (mg/dl).[1]

An important debate in this regard is how much alcohol consumption can increase the amount of alcohol in the blood to the point of intoxication. In other words, what is the relationship between the amount of alcohol consumed and the blood alcohol content (BAC)?[2]

The importance of this debate in research conducted in Western countries is to determine a limit for alcohol consumption that prevents social abnormalities or harm to others. In other words, in explaining this relationship, they seek to answer the question: "How much alcohol is considered excessive drinking"; But the importance of this discussion for the present study is to clarify the permissible limits for using alcohol in various products or their consumption.

In other words, what amount of alcohol in these products can qualify them as “intoxicants.” This is a fundamental and very relevant question that has not been addressed in the existing research on “alcohol and alcoholic products.”

Since there are many factors involved in the process of absorbing and excreting alcohol from the human body, it is not possible to consider a fixed amount of alcohol consumption for all people and consider it an intoxicating factor. The degree of effect of alcohol is not the same for all people, and each person’s response to alcohol is different. Therefore, consuming a small amount of an alcoholic beverage may be intoxicating for one person; but consuming the same amount may not cause intoxication for another person. Also, consuming a small amount of alcohol at one time can be intoxicating, while consuming the same amount gradually and over a longer period of time may not be intoxicating.

The most important factors that affect the speed at which alcohol is absorbed into the body and causes intoxication are:[3]

1. Volume of consumption:
The more alcohol that enters the body, the greater its volume in the blood will be, because the human liver is on average able to metabolize one standard alcohol (14 grams) or half an ounce of alcohol per hour, and this amount is constant in any situation.[4] Therefore, if a large volume of alcohol is consumed in a short period of time, the liver will not be able to increase its activity, and as a result, the blood alcohol concentration will increase.

[1] Petersey, Organic Chemistry, Structure and Application, p. 426

[2] Alcohol consumption is measured in terms of specific units or standards. A unit of alcohol in the UK is 8 grams or 10 milliliters of alcohol. In the US, a standard drink (SD) is 14 grams or about 17.74 milliliters of pure alcohol. These standards vary from country to country.

[3].https://www.hokiewellness.vt.edu/archive/Students/Alcohol_effects/Intox_factors/index.html

[4] https://www.hokiewellness.vt.edu/archive/Students/Alcohol_effects/index.html
This amount is based on the US standard unit. In some studies, this amount is stated as 8 grams per hour. See: Peter Cooper, Poisoning by Chemical Drugs, translated by Morteza Farrokhsir and Mohammad Khoei, p. 162

2. Alcohol content:
Alcohol content (alcohol concentration) means the volume of pure alcohol contained in an alcoholic beverage (ABV)[1], which is usually indicated by percentage or proof. The higher the percentage by volume of an alcoholic beverage, the more alcohol will enter the blood, and as a result, advanced stages of disorders will occur.

3. Weight of the person:
People who weigh more will reach the point of intoxication more slowly than people who weigh less; Even if they drink the same amount of alcohol at the same speed, because fatter people have a higher water volume, which dilutes the alcohol they consume and reduces its effect.

4. Age of the person:
The same amount of alcohol in older people produces a higher blood alcohol concentration because they have less body water than younger people to dilute the alcohol.[2]

5. Gender of the person:
Women are usually affected by alcohol earlier than men because they usually have more body fat than men, so the concentration of alcohol in their blood is higher than men.[3]

6. Speed of consumption:
The length of time alcohol is consumed also affects the concentration of alcohol in the blood. For example, if a large amount of alcohol is consumed at once, it may be intoxicating, but if the same amount is consumed gradually, it may not reach the concentration of alcohol in the blood to the point of intoxication because it is gradually metabolized by the body.[4]

7. Liver metabolism rate:
The extent to which the body is able to metabolize alcohol is an important factor in the effects of alcohol. Alcohol metabolism is not related to the amount of blood volume and varies from person to person, depending on the individual's genetics (liver and enzyme activity) and under the influence of numerous factors. On average, about 0.15 to 0.20 grams of alcohol per deciliter of human bloodstream is oxidized per hour.[5] This means that the body can metabolize about 15 milligrams of alcohol per deciliter of blood, or a range of 10 to 34 milligrams per deciliter

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[1] ABV (Alcohol by volume) is a standard unit worldwide that indicates how much ethanol is present in a given volume of an alcoholic beverage and is usually expressed as a percentage by volume, meaning how many milliliters of pure ethanol are present in every hundred milliliters of a solution at a temperature of 20 degrees Celsius. For example, if the ABV of an alcoholic beverage of beer with a volume of 284 milliliters is 3.5%, this means that there are about 10 milliliters of pure alcohol in it. 12 ounces (340 ml) of beer or 5 ounces (115 ml) of wine or 1.5 ounces (43 ml) of 80-proof liquor all contain the same amount of alcohol, equivalent to 10 grams of ethanol.

[2] Mohammad Daraya, Alcoholic Beverages, Gambling and Its Harmful Effects, p. 193

[3] George Kariuki, Alcohol and its Health Effects, p. 36
https://www.hokiewellness.vt.edu/archive/Students/Party-positive/estimating-bloog-alcohol-content/index.html

[4] Al-Barr, Muhammad Ali, Al-Khamr between Medicine and Jurisprudence, p. 92

[5] Montgomery, Mark R; Reasor, Mark J, Retrograde extrapolation of blood alcohol data: An applied approach, p. 281–92.

per hour. Therefore, in people whose liver has a higher ability to metabolize alcohol, the concentration of alcohol and its effects will occur later.

8. Consumption history:

People who consume alcohol continuously reach a state of intoxication later than other people. This is because with repeated consumption of alcohol, a kind of tolerance and resistance is created in the liver and other organs of the body to break down and excrete alcohol faster, and alcohol is excreted faster. Therefore, the onset of intoxication in such people occurs later and less frequently, and they require more consumption to reach the stage of intoxication.[1]

Considering the above factors, it can be said:

Alcohol consumption does not have the same and similar effects on all people, and it is not possible to calculate a fixed amount or percentage of alcohol consumed that can cause the first signs of intoxication. In Iranian legal circles or in laws related to the consumption of intoxicants and their limits, there is no specific amount for the level of intoxication of alcohol.[2]

However, in extensive research conducted by Western scientific circles, several formulas have been proposed to calculate the blood alcohol concentration and its relationship to the amount of alcohol consumed. Based on these formulas, several software programs have also been designed that easily calculate the concentration of alcohol in a person's blood.

The most famous and oldest formula proposed to calculate the concentration of alcohol in the blood belongs to Widmark, a Swedish physicist who was presented in the 1920s. In the formula provided by Widmark, six different factors (1. Amount of alcohol consumed, 2. Weight of the person, 3. Total body water volume, 4. Volume of water in the blood, 5. Metabolism, 6. Duration of alcohol consumption) are considered to calculate the estimated blood alcohol concentration.[3]

Although this formula has been the basis for calculating blood alcohol concentration in many scientific studies, it has encountered some problems,[4] and therefore, numerous other formulas have been proposed as its replacement.[5] Although the analysis of each of these formulas is beyond the scope of this study, from their totality, some minimums for the occurrence of intoxication can be stated. According to research by the National Institute on Alcohol Abuse and Alcoholism (NIAAA)[6], consuming four alcoholic beverages for women and five for men

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[1] Akbari, Ali Asghar, Effects of Alcoholic Beverages, Tea and Coffee from the Perspective of Medical Science and Western Scientists, p. 67

[2] In its Opinion No. 6053/7 – 1/10/1373, the Legal Department of the Judiciary, in response to the question of how many degrees of alcohol a liquid must have to be considered intoxicating, replied that; "Article (165) of the Q.M.A. considers drinking intoxicating liquor to be a cause for the hadd, and the criterion for the inclusion of this article is the intoxicating nature of the liquid, and the amount of alcohol that must be in it is not specified in the law. Therefore, if the liquid is intoxicating with any degree of alcohol, it will be subject to the aforementioned article."

[3].Widmark EMP. Principles and applications of medicolegal alcohol determination. English translation of 1932 German edition, Davis Biomedical Publications 1981

[4].Agneta Andersson, Ann-Britt Wiréhn, Christina Ölvander, Diana Stark Ekman, and Preben Bendtsen, Alcohol use among university students in Sweden measured by an electronic screening instrument, vol 9: p 229

[5] www.kenderdinemathstutoring.com.au/.../BAC+formula+questioned+amended.pdf
http://www.hokiewellness.vt.edu/Students/alcoholEffects/estimatingBAC/index.htm

[6] National Institute on Alcohol Abuse and Alcoholism

within a two-hour period can increase their blood alcohol concentration to 0.08%, i.e. complete intoxication.[1]

In most normal adults, consuming one unit of alcohol according to the American standard (equivalent to 14 grams or 17.74 milliliters of ethanol) within a one-hour period usually causes mild intoxication; i.e., it increases the blood alcohol level to 0.017% in men and to 0.02% in women.[2]

This amount of alcohol can be even lower for people with a lower tolerance to it; meaning that consuming 10 to 12 milliliters of alcohol can bring their blood concentration to the point of intoxication. Therefore, with a cautious and minimal look at this issue, we can conclude that consuming about 10 milliliters of alcohol in an hour is not intoxicating for most people and this amount can be considered as the Oscar limit for alcohol.

$$\frac{BAC_{\text{target}} \times \text{masa}_{\text{kg}} \times 1000}{ABV \times 0.789 \times r} = L(\text{L})$$

Summary and Conclusion

This chapter discusses the consequences of alcohol consumption and how it affects human behavior. Pure alcohol is toxic due to its high concentration and cannot be consumed alone; therefore, its concentration must be reduced for oral use. Diluting alcohol with water and other liquids and reaching a certain degree turns it into an intoxicating liquid. The state of intoxication that occurs in humans as a result of alcohol consumption has different stages. The first signs of intoxication in humans are the same state of limited euphoria and euphoria, which is a sign of the effect of alcohol on the human brain. As the concentration of alcohol in the blood increases, mild intoxication turns into clear intoxication and finally into complete intoxication. According to research, intoxication usually occurs when the blood alcohol content (BAC) in 100 milliliters of blood reaches approximately 20 to 50 milligrams; This amount is equal to the amount of alcohol in the blood (BAC) equivalent to 0.02% to 0.05%, which is often intoxicating.

Regarding the relationship between the amount of alcohol consumed and its effect on the human psyche and behavior, it was also concluded that since the response of individuals to alcohol varies depending on factors such as the degree of alcohol consumed, the volume of alcohol consumed, the weight of individuals, gender, and history of consumption and is not the same for all individuals, it is not possible to calculate a fixed amount or percentage of alcohol consumed that can produce the first signs of intoxication. However, by examining the existing research in this field and with a cautious approach to the issue, it can be concluded that

[1] http://www.niaaa.nih.gov/alcohol-health/overview-alcohol-consumption/moderate-binge-drinking

[2] https://www.hokiewellness.vt.edu/archive/Students/Party_positive/estimating_bloog_alcohol_content/index.html

consuming less than 10 ml of alcohol in a period of one hour cannot be intoxicating for most people. Accordingly, the minimum level of alcohol intoxication can be considered 10 ml, and products with an alcohol volume of this amount can be considered as intoxicating products. This article is based on scientific findings; however, it is necessary to see from a jurisprudential and religious perspective how alcohol is used in various alcoholic products and under which jurisprudential heading and concept this chemical falls. Examining the jurisprudential headings and concepts related to “alcohol and alcoholic products” is an important part of the jurisprudential theology of this issue, which is addressed in the next chapter.

Chapter Four: Alcohol and Related Jurisprudential Concepts

Since it was recognized as a new chemical substance, alcohol has not received much attention from jurists due to its limited use; however, today, due to its widespread use in various industrial, food, pharmaceutical and medical sectors, it has become one of the most controversial issues and has attracted the attention of jurists and researchers in the field of jurisprudence. Therefore, due to the novelty of this issue, its Sharia ruling cannot be found explicitly in religious texts (verses and narrations), but rather, its ruling must be inferred from religious texts by utilizing the principles and rules of ijtihad. Some jurists and researchers have cited jurisprudential evidence related to khumr, fiqa and other intoxicants in explaining the ruling on “alcohol and alcoholic products” and have examined its purity and impurity or its hality and sanctity as examples of the aforementioned concepts. Therefore, the concepts of "alcohol", "muskar" and "fiqa" are three jurisprudential titles related to the issue of "alcohol and alcoholic products" that have been cited in the words of Shiite scholars.

In this chapter, considering the knowledge gained so far about the subject of alcohol and how it is used in various products, the relationship and relationship of alcohol with the three mentioned concepts and titles will be examined and this important discussion will be addressed:

Which of these jurisprudential concepts can alcohol be an example of?

Can alcohol be considered an example of Shariah alcohol and the rulings of alcohol be applied to it?

Are alcohol and alcohol-containing products examples of intoxicants?

Can products such as beer and beer be considered the same fiqa known in jurisprudence and Shariah and the ruling of prohibition be imposed on them?

Answering questions such as these, which are of a thematic nature, is of great importance for the present article and can be effective in explaining the Sharia ruling on alcohol and alcoholic products. Accordingly, the present chapter has been written with the aim of applying the aforementioned jurisprudential titles to alcohol and alcoholic products, and without entering into the ruling discussions and jurisprudential foundations related to alcohol and intoxicants, it seeks to examine the conceptualization of the aforementioned titles and their relationship and relationship with alcohol.

1. The concept of "Khamr"

One of the concepts referred to in explaining the ruling on alcohol is the concept of " Khamr". There are different views on the application of this title to alcohol. From the perspective of some researchers and experts, synthetic alcohols obtained from chemical raw materials are not examples of Shariah alcohol; however, fermented alcohols can be discussed in terms of whether they are alcoholic or not, because their raw material is alcohol or other alcoholic beverages.

Dr. Ordabadi, a professor of toxicology, believes that alcohols produced through the fermentation of sugars are actually derived from alcohol and their raw material is Kahmr. Referring to the process of producing fermented alcohol, he believes that in factories, they pour and distill the Khamr in large boilers and distillation devices with a capacity of 2 and 3 tons and above, in another container of the distillation device, the alcohol that is obtained for the first time is approximately 80 to 90 degrees alcohol.[1]

Therefore, fermented alcohols, from his point of view, are the same Khamr vapors that have become liquid.

On this basis, another author states that the raw material in alcohol is sugary substances such as grapes, raisins, etc., which are fermented to produce wine. Then, the wine is poured into special containers and heated, and since the boiling point of alcohol is lower than that of water, it evaporates faster and turns into a gas. Then, the alcohol vapors are directed to pipes in the vicinity of cold air to be distilled and condensed. Finally, the alcohol droplets are directed through the pipe to a second container, and thus the alcohol particles are separated from the wine.[2]

Accordingly, there is a belief that fermented alcohols are obtained from the distillation of khamr, and the solution to its exclusion from the evidence of khamr is to assume its transformation in the distillation process.

Some contemporary jurists have not accepted the above view and have criticized the application of the title khamr to alcohol. Ayatollah Khoei (may Allah have mercy on him) has clarified this in this regard: “From all that we have said in this regard, it is concluded that the substance known as alcohol and spirit, which is obtained from wood and other things, is not impure, because the mystics do not apply the term khamr to it, although - as has been said - it is intoxicating. However, the alcohol that is obtained from khamr and is interpreted as the essence of khamr and is obtained by evaporating khamr and taking its sweat is also not condemned to impurity, because evaporation causes transformation and will require purification... Therefore, the requirement of the rule is the purity of alcohol, because alcohol is not khamr according to the mystics, and in reality it is not khamr because it has been transformed.”[3]

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[1] Sabour Ordabadi, Examination of Alcoholic Products in Terms of Sanctity and Impurity, p. 71

[2] Vahdati Shabiri, Hasan, alcohol and its products in Islamic jurisprudence, pp. 92-93

[3] «و لقد أنتج ما تلوناه علیک فی المقام ان المادة المعروفة بـ «ألکل و اسپرتو» التی یتخذونها من الأخشاب و غیرها لا یمکن الحکم بنجاستها، حیث لا یصدق علیها عنوان الخمر عرفا و ان کانت مسکرة- کما قیل- و أما المتخذة من الخمر المعبر عنها بـ «جوهر الخمر» التی تتحصل بتبخیرها و أخذ عرقها فهی أیضا کسابقتها غیر

From this perspective, the term khamr is not valid for any type of alcohol, whether it is obtained from wood (methanol) or from other sources (ethanol), and the rulings on khamr cannot be applied to them. Even the alcohols of wine, which are interpreted as the "essence of khamr", are truly outside the term khamr, because wine undergoes transformation after distillation and the alcohol obtained from it cannot be an example of khamr. Therefore, all alcohols, regardless of their types, are outside the term khamr. Martyr Sadr also accepted the same view in applying the term khamr to alcohol and believes that the term khamr to methanol and the alcohols commonly used in medicine are not compatible in any way; however, the alcohol of wine, which is used by people of debauchery and immorality, is an example of khamr and has its rulings. In his discussion of the purity and impurity of liquid intoxicants, he clearly distinguished between the types of alcohol by entering into thematic discussions and applying the title of khamr to each of them, writing as follows: "It is obvious that alcohol that is obtained from wood is not khamr... but espresso that is obtained from khamr is not the same as the conventional and common medical alcohol, because medical alcohol is not obtained from khamr. From natural khamr, those types of alcohols are obtained that are common among the people of debauchery and immorality... and they are obtained through distillation and continuous reduction of liquids mixed with alcohol and increasing the concentration of alcohol. The act of distillation does not cause the transformation of the alcohol of wine and its removal from the title of khamr, but rather it is the same concentrated khamr."[1]

Therefore, he carefully distinguishes between conventional medical alcohols and wine alcohol and believes that medical alcohols are not obtained from wine, but are obtained from other substances and the term intoxicant does not apply to them. Only wine alcohol can be an example of wine and have its rulings, because in the process of distilling wine, no transformation takes place, but only its main component, ethanol, is separated. On this basis, the term intoxicant only applies to wine alcohol. Based on the above, it can be said: There is consensus on the non-intoxication of methanol and synthetic ethanol, but there are different views among experts regarding fermented alcohols. Before examining each of these views, it is necessary to first answer the question of what alcohol is from the perspective of Islamic jurisprudence and Sharia. After explaining the concept of alcohol, it is necessary to discuss which types of alcohol are examples of alcohol:

1-1. Concept of Khamr

A) The concept of Khamr in the dictionary:

Khamr has various meanings in the terminology of linguists. For linguists, the main meaning of "Khamr" is to cover and mix, and this meaning is present in all derivatives of this word. [2]For

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محكومةٌ بالنجاسةُ بوجه، لما قدمناه فی محله من ان التبخير يوجب الاستحالةُ و هی تقتضی الطهارةُ... فمقتضی القاعدةُ الحكم بطهارته، لأن «الألكل» لا يسمی عندهم خمرا كما انه ليس بخمر حقيقةُ لفرض استحالته». Al-Tanqih in Sharh al-Urwah al-Wathqi, vol. 2, pp. 101-100

[1] «أما ما كان منه متخذا من الأخشاب فعدم خمريته واضح ... و اما الاسبرتو المتخذ من الخمر فهو أيضا ليس الاسبرتو المتعارف طبيا، فان المتعارف لا يتخذ من الخمر، و انما تتخذ من الخمر الطبيعی الخمور المركزةُ التی يعتادها أهل الفسوق و الفجور ... و بالتقطير يتناقص باستمرار المائع المختلط بالكحول و تكبر نسبةُ الكحول و لا يؤدی ذلک الی الاستحالةُ و خروجه عن كونه خمرا بل هو خمر مركز».Researches in Sharh al-Arwa al-Waghti, vol. 3, pp. 360-362

[2] Ahmad ibn Faris, Mu'jam al-Maq'ays al-Lughah, vol. 2, p. 215; Ahmad ibn Khalil Farahidi, Kitab al-Ayn, vol. 4, p. 262; Raghib Isfahani, Husain, Mufardat al-Fazl al-Qur'an, p. 298; Zamakhshari, Mahmoud, Al-Fa'iq fi Gharib al-Hadith, vol. 1, p. 342; Zamakhshari, Mahmoud, As-Balagha, vol. 1, p. 174; Ibn Athir al-Jazari, Al-Nahiyyah fi

this reason, many linguists believe that the reason why wine is called "al-Khamr" in Arabic is because the consumption of wine causes the mind to be covered and disrupts it.[1]

Various opinions have also been expressed by linguists regarding the substantive definition of "Khamr":

1-Some of them consider this word to be well-known and have not provided a definition for it.[2]

2- Some others have claimed that khamr is only used for alcoholic beverages made from grapes,[3] even Ibn Sayyida claims that the truth of khamr is only used for grape wine and nothing else is called khamr.[4]

3- Some others believe that khamr is used for alcoholic beverages made from grapes and dates.[5]

4- Some others have said that khamr is used only for alcoholic beverages made from grapes or dates and cooked.[6]

5- Some others have reported that any alcoholic beverage is called khamr.[7]

B) The concept of khamr in interpretation:
The commentators also differ in their opinions on the meaning and concept of khamr:

1. Sheikh Tusi believes that most commentators consider khamr to be fermented grape juice, but the majority of scholars have considered all alcoholic beverages to be khamr.[8]

2. Some Shiite commentators such as Tabarsi,[9] Mulla Fathullah Kashani[10] and Allama Tabataba'i[11] also consider the meaning of khumr to be general. Among Sunni commentators,

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Gharib al-Hadith wa Athar, vol. 2, p. 77; Fayumi, Ahmad, Al-Misbah al-Munir, vol. 2, p. 181; Zubaidi, Muhammad, Taj al-Arous, vol. 6, p. 363.

[1] Ibn Darid, Jamrah al-Legha, vol. 1, p. 591; Azhari, Muhammad, Tahzeeb al-Legha, vol. 7, p. 163, quoted by Jaz; Johari, Ismail, Al-Sahah, vol. 2, p. 649; Vocabulary of words of the Qur'an, p. 299; Ali Ibn Ismail Ibn Saydeh, Al-Mahkam wa Al-Muhait al-Azam, vol. 5, p. 185; Nashwaan bin Saeed Hamiri, Shams al-Uloom and the medicine of Kalam al-Arab Man al-Kalum, vol. 3, p. 1913; Mutarzi, Nasser, al-Maghrib in the order of al-Marab, vol. 1, p. 271; Firozabadi, Muhammad, Al-Qamoos Al-Muhait, vol. 2, p. 78; Ibn Manzoor, Lasan al-Arab, vol. 4, p. 255; Fayoumi, al-Masbah al-Munir, vol. 2, p. 182; Madani, Ali Khan, al-Muzad al-Awwal, vol. 7, p. 393.

[2] Ibn Darid, Jamrah al-Legha, vol. 1, p. 591; Azhari, Tahhib al-Laghah, vol. 7, p. 160; Sahib Ibn Abbad, Al-Muhait Fi Al-Laghha, Vol. 4, p. 340; Ahmad bin Faris, Mujam al-Maqais al-Legha, vol. 2, p. 215; Hamiri, Shams al-Uloom and the medicine of Kalam al-Arab Man al-Kalum, vol. 3, p. 1913.

[3] Azdi, Abdullah ibn Muhammad, Kitab al-Maa, vol. 2, p. 421; Al-Maghrib fi Shardul al-Maarabi, vol. 1, p. 271; Ibn Manzur, Lisan al-Arab, vol. 4, p. 255; Firuzabadi, Al-Qamus al-Muhit, vol. 2, p. 78; Madani, At-Tarja' al-Awwal, vol. 7, p. 392.

[4] Ibn Sayyidah, Ali ibn Ismail, Al-Mukhkam wa al-Muhit al-A'zam, vol. 5, p. 185.

[5] Raghib Isfahani, Mufradat al-Aflaq al-Quran, p. 299.

[6] Same, p 299

[7] Azdi, Abdullah ibn Muhammad, Kitab al-Maa, vol. 2, p. 421; Fayumi, Al-Misbah al-Munir, vol. 2, p. 182; Raghib Isfahami, Mufradat al-Aflaq al-Quran, p. 299; Firuzabadi, Al-Qamus al-Muhit, vol. 2, p. 78; Madani, First Edition, Vol. 7, p. 392.

[8] Tusi, Muhammad ibn Hassan, Al-Tabyan, Vol. 2, p. 212.

[9] Tabarsi, Fadl ibn Hassan, Majma' al-Bayan, Vol. 2, p. 557.

[10] Kashani, Mulla Fathullah, Zubdat al-Tafsir, Vol. 1, p. 347.

[11] Tabataba'i, Muhammad Husayn, Al-Mizan, Vol. 2, p. 191; Vol. 6, p. 118

Fakhr al-Razi,[1] Tabari, Baghvi,[2] Neyshaburi,[3] Qushairi,[4] Wahedi Neyshaburi,[5] Mawardi[6]and Ibn al-Arabi[7] also hold this view or have not mentioned any refutation of this view after quoting it, although many of them have also cited hadiths and religious texts (even to prove the literal meaning).

3. Some Sunni scholars such as Abu al-Futuh al-Razi[8], Shaybani[9], Baydawi[10], al-Thalabi[11], Ibn 'Atiyah[12], Qurtubi[13], Zamakhshari[14], Nasafi[15], Abu Huyan[16], al-Jassas[17], Kiahrasi[18] and al-Nahas[19] do not accept the theory of the second group and consider khamr to be only an intoxicating liquid derived from grapes; although many of them have mentioned the reason for calling this liquid khamr as covering the intellect or mixing it with the intellect or fermenting it.

c) The concept of khamr in jurisprudence:

Shiite jurists also differ in their views, as do the linguists, on the meaning of khamr:

1- Some of them consider khamr to be specific to grape wine.

2- Others consider the meaning of khamr to be general and to include any intoxicant. Of course, they themselves are of two groups:

a) The apparent meaning of some is a claim of literal truth.

b) The apparent meaning of some is a claim of religious truth.

Therefore, the opinions of the jurists regarding the legal meaning of khamr can be divided into three groups:

1-1. Khamr in the sense of an intoxicant derived from grapes:
Sheikh Mufid (may Allah have mercy on him) believes in Al-Muqna'ah that the meaning of "khamr," the prohibition of which has been explicitly stated in the Quran, is grape wine, and according to the scholars of linguism, whenever grape juice reaches a level that causes

[1] . Muhammad ibn Omar Fakhr al-Razi, Mafatih al-Ghayb, Vol. 6, p. 397
[2] Muhammad ibn Jarir al-Tabari, Jame' al-Bayan, Vol. 2, p. 208
[3] Nizam al-Din Nishaburi, Tafsir al-Ghara'ib al-Quran, Vol. 1, p. 601
[4] Abdul Karim Qushairi, Lat'if al-Isha'ar, Vol. 1, p. 176.
[5] Nizam al-Din Nishaburi, Tafsir al-Ghara'ib al-Quran, Vol. 1, p. 601
[6] Ali ibn Muhammad Mawardi, Al-Nakt wa al-Ayyun, vol. 1, p. 276.
[7] Muhammad ibn Abdullah Ibn al-Arabi, Ahkam al-Quran, vol. 1, p. 149
[8] Razi, Abu al-Futuh, Rawd al-Jinan, vol. 3, p. 206.
[9] Shaybani, Muhammad ibn Hassan, Nahj al-Bayan, vol. 1, p. 288
[10] Baydawi, Abdullah ibn Omar, Anwar al-Tanzil, vol. 1, p. 138.
[11] Tha'labi, Ahmad ibn Ibrahim, Al-Kashf wa al-Bayan, vol. 2, p. 143.
[12] Ibn 'Atiyah al-Andalusi, Al-Muhriz al-Wujiz, vol. 1, p. 292
[13] Qurtubi, Muhammad ibn Ahmad, Al-Jami' la-Ahkam al-Quran, vol. 3, p. 52.
[14] Zamakhshari, Mahmoud, Al-Kashf, vol. 1, p. 261.
[15] Nasafi, Abdullah ibn Ahmad, Marqard al-Tanzil, vol. 1, p. 173
[16] Abu Huyan, Muhammad ibn Yusuf, Tafsir al-Nahr al-Mard, vol. 1, p. 212
[17] Jassas, Ahmad ibn Ali, Ahkam al-Quran, vol. 4, p. 122
[18] Kiahrasi, Abul Hasan, Al-Akhmat al-Qur'an, vol. 3, p. 98
[19] Nahas, Ahmad bin Muhammad, Arabs of the Qur'an, vol. 1, p. 281.

intoxication – whether it reaches this state spontaneously or as a result of cooking – it makes no difference in the validity of the name khamr.[1]

Sheikh Al-Shari'ah Isfahani, in a detailed discussion on the reality of khamr, also believes that khamr is only the truth about the intoxicant derived from grapes. He rejects the evidence of the generality of khamr. He also denies the religious truth about it.[2]

Martyr Sadr, also believes about the use of the word "khamr" for other intoxicants that khamr is sometimes used for intoxicants derived from grapes and sometimes for liquid intoxicants; but its use in liquid intoxicants may be figurative or verbal or real. Rejecting the third possibility, he believes that both the common understanding and scientific accuracy show that the concept of khamr is only the truth in grape intoxicants and its use in other intoxicants is not real.

Many linguists have mentioned the meaning of khamr only as an intoxicant derived from grapes. From a scientific point of view, if wine is made from something other than grapes, it must first be converted into the same substance derived from grapes and then converted into khamr. In addition, the use of the concept of khamr in numerous narrations indicates the conceptual duality and distinction between khamr and other intoxicants:

a): Narrations indicating impurity in which intoxicant or intoxicant is used in relation to khamr.

b): Narrations that have created a symmetry between the prohibition of khamr and intoxicant.

c): Narrations indicating that khamr is not forbidden because of its name but because of its action and that everything that has the same effect as khamr is forbidden.

d): Narrations that say that God has forbidden khamr in the Book and the Prophet (PBUH) has forbidden other intoxicants.[3]

1-2. Alcohol is a literal truth for any kind of intoxicant

Contrary to the above view, some Shiite jurists believe that alcohol is used in a literal sense to mean all liquid intoxicants, because the purpose of the name alcohol is to cover the mind and cause disorder in it, and since this is also the case with other intoxicants, it causes the ruling of alcohol to be extended to them.

Sheikh Mufid (may Allah have mercy on him) has a phrase in explaining the implication of verse 90 of Surah Al-Ma'idah on the impurity of any intoxicant, which is used to claim the literal truth about alcohol. He writes the following in refuting Abu Hanifa's statement that he considered alcohol as an example of purification:

"Allah, the Exalted, says: Wine, gambling, gambling and gambling are a kind of impurity and are among the works of Satan. So avoid them, perhaps you will be successful. In this verse, He

[1] «و الخمرة المحرمة بنص القرآن هی الشراب من العنب إذا بلغ من الشدة إلی حد یسکر الإنسان من شرب الکثیر منه سواء کان نیا مشمسا أو مطبوخا لا یختلف فی استحقاق سمة الخمر عند أهل اللسان».Mofid, Muhammad bin Muhammad bin Nu'man, al-Maqna'a, p. 798.

[2] Isfahani, Sheikh of Shariah Fathullah, Ifadah al-Qadeer, p. 72

[3] Sadr, Muhammad Baqir, Research on the Explanation of the Authentic Al-Urwah, vol. 3, p. 363.

has clearly ruled on the impurity of alcohol, and its understanding is not hidden from those who have intelligence. Every intoxicant is considered khamr according to the ruling of the people of linguists and the language according to which the Quran and the Sunnah of the Prophet (PBUH) were revealed, because the Prophet (PBUH) said: "Every intoxicant is khamr and every khamr is intoxicant."[1]

In another place, he considers intoxicants to be the same in name as alcohol and writes:

“Whoever drinks anything intoxicating other than wine, the hadd becomes obligatory on him, just as it becomes obligatory on the drinker of alcohol, because alcohol shares the same name and meaning with other intoxicants.”

Therefore, the concept of alcohol is fixed in terms of meaning for any intoxicating liquid, whether it is made from grapes or not. In addition to the above statements, other evidence can be found in some of his statements in the Book of Al-Muqni’ah that define alcohol as the absolute definition of intoxicating drinks.[2]

Muqaddiq Al-Hilli (may Allah have mercy on him) also emphasizes the unity of alcohol and intoxicants and writes:

“And intoxicating drinks are, in our opinion, the same as alcohol in terms of impurity, because alcohol is the same as alcohol, and the ruling of alcohol also applies to it. Because alcohol is called by this name because it covers the intellect, so whatever causes this is in common with alcohol in the name.[3]

After him, many scholars, including Fakhr al-Muhaqqiin[4] and Fadel al-Miqdad[5], have adhered to the same view. Mohaqiq Ardabili also defines alcohol as follows:

“ Khamr is a clear concept and means any intoxicating drink that covers and destroys the intellect. There are narrations for the followers of the Imamiyyah such as this: “Alcohol is a clear concept and means any intoxicating drink that covers and destroys the intellect. The word alcohol is originally from the word “alcohol” and means to cover, and they called intoxicants by this name because of exaggeration.”[6]

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[1] «يقول الله جل اسمه: إِنَّمَا الْخَمْرُ وَ الْمَيْسِرُ وَ الْأَنْصابُ وَ الْأَزْلامُ رِجْسٌ مِنْ عَمَلِ الشَّيْطانِ فَاجْتَنِبُوهُ لَعَلَّكُمْ تُفْلِحُونَ فحكم على الخمر بالنجاسة نصا لايختل فهم معناه على ذوى الألباب و كل مسكر خمر بحكم اللغة التى نزل بها القرآن و السنة الثابتة عن النبى(ص) حيث يقول كل مسكر خمر و كل خمر حرام» Mufid, Muhammad ibn Muhammad ibn Nu'man, Al-Mas'al al-Saghaniyyah, p. 114.

[2] «فمن شرب شيئا من المسكر سوى الخمرة بعينها وجب عليه الحد كما يجب على شاربها كما ذكرناه من اشتراكها فى المعنى و الاسم». Muhammad bin Muhammad bin Nu'man Mofid, Al-Maqna'a, p. 800

[3] و الأنبذة المسكرة عندنا فى التنجيس كالخمر، لان المسكر خمر فيتناوله حكم الخمر. أما انه خمر لان الخمر انما سمى بذلک لكونه يخمر العقل و يستره فما ساواه فى المسمى يساويه فى الاسم».Hali, Jafar bin Hasan, al-Muttabrab, vol. 1, p. 424 .

[4] Hali, Muhammad bin Hasan, Explanation of benefits, vol. 4, p. 155.

[5] Hali, Moqdad bin Abdullah, Kanz al-Irfan, vol. 1, p. 52.

[6] «الخمر معلوم لأنّه عبارة عن كلّ شراب مسكر و مغطّ للعقل و مذهب له، ....و للأصحاب روايات مثل كلّ مسكر خمر، و هو فى الأصل مصدر خمر يخمر: إذا ستره، سمّى به المسكر للمبالغة».Ardebili, Ahmad bin Muhammad, Zubdat al-Bayan, p. 627.

Sheikh Baha'i,[1] Mawli Muhammad Mahdi Naraqi[2], Sayyid Mujahid[3] and Ayatollah Montazeri[4] also agree with this view.

Shahid Awal[5] and Mohaqiq Sani[6] also consider all intoxicants to be khumr, but they do not clarify whether the reason for this is a linguistic situation or a religious truth. Some, such as Shahid Sani[7], Sahib Riyadh[8], Sahib Hashish[9], Sheikh Hassan Kashif al-Ghita[10], and Sheikh Ansari[11], are hesitant between both possibilities and have not accepted either.

1-3. Khamr is the legal truth for any type of intoxicant

A number of jurists such as Sheikh Mufid, Sheikh Tusi, Ibn Hamza, Ibn Idris, Allama Helli, Sahib Al-Maqrid, Sahib Ma'alem, Sahib Al-Zahira, Allama Majlisi, Wahid Behbahani, Kashif Al-Ghita, Mirza Qummi, Mawli Ahmad Naraqi, Sahib Jawaher,[12] do not accept such a view and some of them consider khamr to be the legal truth for any type of intoxicant that is made from grapes. Of course, there is a difference in the words of some of these people, in one discussion they have denied this issue and in another they have accepted it.

Of course, another view that has been put forward in this regard is that khamr is the legal truth for any type of intoxicant; whether it is made from grapes or from something else. Among those whose words seem to indicate the existence of a legal truth about khamr is Sheikh Tusi (may Allah have mercy on him). In the discussion they have presented about alcohol, they believe that the alcohol that all Muslims agree on is forbidden is grape juice that has reached the level of intoxicating, but there is disagreement among Muslims about other things. In their view, all intoxicants are forbidden, and they believe that the reason for this is that they are all alcohol, and then they rely on the Sunnah and consensus to prove it:

"Any drink that is consumed in large quantities is intoxicating, and consuming a little or a lot of it is forbidden, and all of them are examples of alcohol and will be impure and forbidden;

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[1] Karaki, Ali ibn Husayn, East of the Suns, p. 433.
[2] Naraqi, Mawli Muhammad Mahdi, Trustworthy of the Shia, p. 35
[3] Mujahid Tabataba'i, Muhammad, Kitab al-Manahil, p. 274 and 663
[4] Montazeri, Hussein Ali, Studies in Forbidden Profits, vol. 1, p. 448
[5] Amili, Muhammad ibn Makki, Zikr al-Shi'a, vol. 1, p. 75.
[6] Karki, Ali ibn Husayn, Jami' al-Maqassid, vol. 1, p. 138.
[7] Amili, Zayn al-Din ibn Ali, Masalak al-Afham, vol. 12, p. 72
[8] Tabatabai, Ali, Riyadh al-Masal, vol. 1, p. 35
[9] Isfahani, Muhammad Taqi, Tabserat al-Fiqha, vol. 1, p. 226
[10] Najafi, Hassan ibn Ja'far, Anwar al-Fiqahah, Kitab al-Taharah, p. 59
[11] Ansari, Murtaza, Kitab al-Taharah, vol. 5, p. 161
[12] Mufid, Muhammad ibn Muhammad ibn Numan, Al-Muqna'a, p. 798; Tusi, Muhammad ibn Hassan, Al-Mabsut, vol. 8, pp. 59 and 222; Tusi, Muhammad ibn Ali, Al-Wasilah Ily Nil al-Fadhilah, p. 415; Heli, Muhammad ibn Idris, Al-Sara'ir, vol. 3, p. 474; Heli, Hassan ibn Yusuf, Muntahi al-Muttalib, vol. 1, p. 71; Amili, Muhammad ibn Ali, Mardaqar al-Ahkam, vol. 1, p. 63; Amili, Hassan ibn Zayn al-Din, Ma'alem al-Din, vol. 1, p. 185; vol. 2, p. 507; Sabzwari, Muhammad Baqir, Zakharat al-Ma'ad, vol. 1, pp. 129 and 154; Majlisi, Muhammad Baqir, Maladh al-Akhyar, vol. 2, p. 295; Behbahani, Muhammad Baqir, Al-Hashiyyah al-Madaqar al-Ahkam, vol. 1, p. 116; Behbahani, Mohammad Baqir, Masabih al-Musabah, vol. 5, p. 14; Najafi, Ja'far Kashif al-Ghita, Sharh Tahara Tahara Qa'aa al-Ahkam, p. 273; Gilani, Abu al-Qasim, Ghanaim al-Alayam, Vol. 1, p. 424; Naraghi, Ahmed, Document al-Shi'a, Vol. 1, p. 194 and Naraghi, Mohammad Mahdi, Lawa'am al-Ahkam, p. 41; Najafi, Mohammad Hassan, Jawaharlal Kalam, vol.1, p. 209.

the penalty for consuming it is the same as for wine, whether it intoxicates or not; whether it is made from dates or raisins, honey, wheat, barley, or corn. All of them are the same, whether it is cooked or not."[1]

However, elsewhere in the Mabsut, they make a statement that shows that they have not accepted the literal or religious truth about alcohol.[2]

Another person who believes in the existence of a religious truth about alcohol is Sahib al-Hadeeq. He writes:

"What is obtained from studying the news and narrations in this regard is that before the verse prohibiting alcohol was revealed, this word was applied to grape juice by the mystics, and its application to other intoxicants was made in the words of God and the Prophet (PBUH), because it contains the rulings of alcohol. Therefore, the concept of alcohol is a religious truth in the sense of including grape juice and other intoxicants; although the mystics only apply to grape juice."[3]

Therefore, they believe that before the prohibition of khamr in Islam, khamr was the truth regarding the intoxicant derived from grapes (due to the frequent mention of khamr and intoxicant in the narrations) and after that it became the religious truth for all intoxicants.

The words of Fakhr al-Muhaqqiin in explaining the words of Allama also indicate his belief in the religious meaning of khamr.[4]

Fadl al-Miqdad[5] also apparently accepted the religious truth regarding khamr in some of his books, although he himself denied this issue in some of his other works.[6]

In summary, it can be said:

Among Shiite jurists, there are two general views on the meaning of khamr:

1- According to some views, the concept of khamr is reserved only for grape wine.

2- According to another view, any type of intoxicant can truly be called khamr and in deducing its rulings, evidence related to khamr can be relied upon.

The issue raised here is which of these meanings of khamr applies to alcohol. In this regard, it should be said that if we consider khamr in the absolute sense of intoxicant, the discussion of the relationship between alcohol and khamr actually goes back to the relationship between alcohol and intoxicant, which will be examined in the following lines. However, if we consider

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[1] «كلّ شراب أسكر كثيره، فقليله و كثيره حرام،و كلّه خمر، حرام نجس. يُحَد شاربه، سكر أو لم يسكر كالخمر، سواء عمل من تمر أو زبيب أو عسل أو حنطة أو شعير أو ذرة، الكلّ واحد، نقيعه و مطبوخه سواء» Tusi, Muhammad ibn Hasan, Al-Khalaf, vol. 5, p. 475 See also: Tusi, Muhammad ibn Hasan, Al-Mabsut, vol. 8, p. 59

[2] Tusi, Muhammad bin Hassan, Al-Mabusut, vol. 8, p. 222.

[3] «الذى يظهر لى من تتبع الاخبار فى هذا المقام ان الخمر قبل نزول التحريم انما كان يطلق عرفا على عصير العنب و إطلاقه على المعنى الأعم انما وقع فى كلام الله تعالى و كلام رسوله (صلى الله عليه و آله) باعتبار الأحكام التى رتبوها عليه من حرمة أو نجاسة كما عرفت من الأحاديث المتقدمة فهى حقيقة شرعية فى المعنى الأعم و ان كانت عرفا انما تطلق على العصير العنبى».Bahrani, Youssef, al-Hadaiq al-Nadrah, vol. 5, p. 116

[4] Hali, Muhammad bin Hasan, Explanation of benefits, vol. 4, p. 155

[5] Hali, Moqdad bin Abdullah, Kanz al-Irfan, vol. 1, p. 52

[6] Hali, Moqdad bin Abdullah, al-Tanqih al-Dawhafi, vol. 1, p. 47

khamr to mean grape wine, its difference from many alcohols becomes clear, which we will discuss in the following.

1-4. The difference between alcohol and khamr

In the alcohol thematic section, it was explained in detail that there are two common methods of producing alcohol: synthetic and natural (fermentation), and in each of these methods, the raw materials and the process of producing alcohol are different. Therefore, in applying the concept of khamr to alcohol, it is necessary to distinguish between alcohols that are produced synthetically and alcohols that are obtained from the fermentation of sugars, and to examine the ruling of each separately in terms of whether or not they are suitable for the title of khamr.[1]

A) Synthetic Alcohols and the Concept of "Alcohol"

As many jurists have stated, alcohols produced based on chemicals, including methanol and ethanol, certainly cannot be considered as Shariah alcohol, because these types of alcohols are obtained from organic raw materials such as oil, natural gas, coal, and biomass through complex processes and are fundamentally different from Shariah alcohol produced from grape juice.

B) Fermented Alcohol and the Concept of "Alcohol"

Among fermented alcohols, it is necessary to distinguish between wine alcohol and other fermented alcohols. Wine alcohol is alcohol obtained from the fermentation of sugar in grapes and then its distillation. If the sugar in grapes is fermented, the resulting liquid solution is called wine, and after its distillation, the pure alcohol produced is wine alcohol. In this case, from the perspective of some jurists who do not consider the distillation of wine as an example of transformation, the term "alcohol" can be applied to it.[2] However, from the perspective of jurists who consider distillation to be a type of transformation, the concept of alcohol is not valid for it.[3]

However, what is common and widespread in alcohol production throughout the world today is that alcohol is obtained from other sources such as molasses from sugar beets or sugar cane or corn, and producing alcohol from wine is not economically viable.

Therefore, contrary to the view of some researchers who have considered the liquid solution obtained in the fermentation stage to be the same as religious wine and alcohol,[4] it should be said: Alcohols used in medical and industrial uses are not derived from wine due to their raw materials, which are often from molasses from sugar cane or beets, and are not referred to as alcohol in popular usage. Therefore, the jurisprudential definition of "alcohol" cannot be applied to such alcohols - even before distillation. Martyr Sadr believes in a scientific discussion on this matter:

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[1] Khoei, Abul-Qasim, Al-Tanqih fi Sharh al-Urwah al-Wathqi, vol. 2, pp. 101-100; Sadr, Muhammad Baqir, Bahuth fi Sharh al-Urwah al-Wathqi, vol. 3, pp. 362-360

[2] See: Golpaygani, Muhammad Reza, Majma' al-Mas'il, vol. 1, p. 36

[3] Khoei, Abul-Qasim, Al-Tanqih fi Sharh al-Urwah al-Wathqi, vol. 3, p. 169

[4] See: Saboor Ordabadi, Ahmad, Alcohol and Alcohol Products in Terms of Impurity and Sanctity, p. 71; Wahdati Shubayri, Muhammad Hassan, Alcohol and Its Products in Islamic Jurisprudence, pp. 30-31

Alcohols derived from wine and commonly used by people of debauchery and immorality are different from alcohols used in medicine. Alcohol that is commonly used in medicine, unlike wine alcohol, is not derived from khamr and is not considered an example of it.[1]

As a result, it can be said: Common medical and industrial alcohols, whether produced chemically or obtained through the fermentation of sugary substances, are not examples of Shariah khamr and the rulings of khamr do not apply to them; however, wine alcohol, which is obtained from the fermentation of grape juice and then its distillation, if it is not an example of istihla, the title of khamr will apply to it.

2. The concept of "Muskar"

Another concept that is very influential in explaining the ruling on alcohol and its products is the concept of "Muskar". The words of the jurists regarding the application of the title of intoxicant to alcohol are subject to disagreement and dispersion, and it seems that this disagreement is due to their different understanding of the nature of alcohol and the different types and processes of its production. Many jurists consider alcohol to be a deadly poison and believe that none of the types of alcohol are actually intoxicants and that intoxicant rulings cannot be applied to them.[2]

Accepting this view, Martyr Sadr (may Allah have mercy on him) argues that alcohol is an organic compound and the elements carbon and hydrogen are considered its basic elements. Whenever the amount of carbon in this chemical compound exceeds or is less than a certain amount, it increases its toxicity, but if it is in the middle, it creates a weak level of non-fatal toxicity, which is the same as intoxication. In such a case, alcohol will not be fatal due to its toxicity, but in some cases, it will cause death due to excessive consumption and frequent use. On this basis, it can be said that two- and three-component alcohols (such as glycerin) are neither considered deadly poisons nor intoxicants, but single-component alcohols (such as ethanol) will cause toxicity or intoxication depending on the amount of carbon in them.[3]

On this basis, he believes that methanol is a toxic and deadly substance and clarifies:

"Alcohols derived from wood (methanol) are not intoxicants, but are considered deadly poisons... Therefore, such alcohols are not fundamentally intoxicating so that the ruling on their purity is considered an exception to the prohibition of intoxicants, because the state of

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[1] Sadr, Muhammad Baqir, Bahuth fi Sharh al-Urwah al-Wathqi, vol. 3, p. 360

[2] In this regard, see: Bojnourdi, Hassan, Al-Qawwa'id al-Fiqhiyyah, vol. 5, pp. 323-324; Makarem Shirazi, Nasser, Risale-i Ta'zun al-Mas'eel, issue 125;

[3] «فالكحول الثنائی و ما بعده ليس فيه سم و تظهر فيه حلاوة كحلاوة السكر، و ليس فيه إسكار أصلا. و الكحول الآحادی خفيف السميۀ و هو الذی ينشأ منه الإسكار و يشتمل على الفحم، و كلما ازداد الفحم فيه ازدادت سميته. و كما أن زيادۀ الفحم عامل موجب لزيادۀ السميۀ كذلک قلۀ الفحم توجب زيادۀ السميۀ أيضا، باعتبار أنها توجب سيولته الشديدۀ المساعدۀ على انتشاره فی الجسم و تسميمه له، و هذا يعنی أن ما يشتمل على فحم أكثر فی حد ما سم، و ما يشتمل على فحم أقل من حد ما سم أيضا، و المرتبۀ الوسطى تكون مرتبۀ ضعيفۀ من السميۀ غير قاتلۀ و هی الإسكار. و الكحول فی هذه الحالۀ الوسطى لا تقتل بما هی سم و إنما يحدث الموت عند الإفراط فی استعمالها... »

."Research on the description of al-Arwa al-Waghti, vol. 3, pp. 361-360

intoxication is the same weak level of toxicity that is created in monofunctional alcohols, in a state of balance between the ratio of water and carbon."[1]

Regarding ethanol, he also believes that in its pure form, which is not mixed with water or other liquids, its toxicity is at very high levels, and if its alcohol content is reduced by mixing with another substance, it may be called intoxicant. For this reason, he considers all medical alcohols that have been mixed with a certain proportion of water and their alcoholic strength has been reduced to be intoxicating and clarifies:

The alcohols that are commonly and conventionally used in medical fields are not obtained from wine but are extracted from other substances and are undoubtedly intoxicating. The toxicity of these types of alcohols is also due to the fact that in some cases toxins are added to them, and the fact that such alcohols are not commonly used among the wicked also stems from this.[2]

From this perspective, ethanol in its pure and absolute form is not intoxicating, but rather a toxic and deadly substance; however, if its alcohol content is reduced to a certain extent, it can be intoxicating.

In his book "Beyond Jurisprudence", Sayyid Muhammad Sadr (may Allah have mercy on him) also considers both main types of common alcohols, namely ethanol and methanol, to be poisons and does not consider the title of intoxicant to be appropriate for them. He clarifies in this regard:

Both main types of alcohol, namely ethanol and methanol, are poisonous, but the toxicity of methanol is severe and for this reason it is not drinkable... Ethanol is also a poisonous substance; except that its toxicity depends on its not being mixed with other substances or on its being mixed with water in a small proportion and a large amount of it being consumed. In this case, it may not be poisonous, and the experience of many people who drink alcohol in this way shows that alcohol is not poisonous in this state.[3]

Although Ayatollah Khoei (may Allah have mercy on him) did not address the issue and apply the term intoxicant to all types of alcohol, and attributed the intoxicating nature of alcohols derived from non-alcoholic beverages to an unknown belief, he did propose a basis that excludes alcohols from the scope of the jurisprudential evidence of intoxicants, even if they are intoxicating. He writes about this:

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[1] «ان ما يتخذ من الأخشاب ليس مسكرا، بل هو سم قاتل ... و هذا يعنى انه ليس مسكرا ليكون الحكم بطهارته استثناء من حرمة المسكرات لأن الإسكار ليس الا تلك المرتبة الضعيفة من السمية التى تحصل فى الكحول الآحادية عند توازن معين بين السيولة و مقدار الفحم» Researches in Sharh al-Arwa al-Waghti, vol. 3, page 360-362.

[2] «و اما ما هو المتعارف فى المجال الطبى خارجاً فلا يؤخذ من الخمر بل من مواد أخرى، و لا شک فى كونه مسكراً، و فى أن سميته أحياناً ليست الا بسبب اضافة بعض السموم اليه، و ان عدم تعارف شربه عند الفساق نشأ من ذلک». Researches in the description of al-Arwa al-Waghti, vol. 3, page 360

[3] «كلا القسمين الرئيسيين للكحول و هما الأثيلى و المثيلى، كلاهما سام إلّا أن المثيلى شديد السميّة و من هنا لم يكن مشروباً ... و أما الأثيلى، فهو سام أيضا. غير أن ذلک إنما يكون مع عدم خلطه بمواد أخرى كالماء أو خلطه بنسب ضئيلة، مع شربه بكميّة كبيرة، و أما ان كان الخلط بنسب كبيرة من الماء أو غيره، فمن الممكن أن لا يكون ساما و التجارب فى شرب الخمر بالملايين مما يدل على كونه غير سام فى هذه الحال». Sadr, Muhammad, Beyond Jurisprudence, vol. 7, p. 188

"What is not customary and common among people to drink or it is not possible to drink at all - even if it causes intoxication and drunkenness - is outside the scope of the evidence of intoxicants, especially since these types of substances did not exist at the time of the prohibition of alcohol and intoxicants and only emerged in the modern era. Therefore, it would not be unlikely to claim that intoxicants are excluded from such substances. Just as some contemporaries have claimed that the ruling prohibiting the sale of alcohol and intoxicants is excluded from alcohol, and these applications only include common intoxicants that are drinkable, not those that are not normally consumed."[1]

These expressions can be used to indicate that he did not consider types of alcohol to be common intoxicants because they are either not drinkable at all or drinking them is not common and customary, and he considered the evidence of the ruling on intoxicants to be excluded from this substance.

Some other contemporary jurists also believe that alcohol is not intoxicating and believe that alcohol is not an actual intoxicant and does not become intoxicating without mixing with water and reducing its concentration.[2] Therefore, something that is not an actual intoxicant is pure as long as it is not converted into intoxicant.[3] Alcohols that are commonly available in the market are also subject to purification, because they are not considered to be primarily liquid intoxicants.[4]

In contrast to the above views, some other jurists have considered alcohol to be an example of intoxicants and have based the rulings on intoxicants on it; for example, Sayyid Mohsen Hakim (may Allah have mercy on him) in his statement on impure substances considered alcohol to be an example of primarily liquid intoxicants and ruled that it is impure.[5]

In response to the question: Is spiritu the same as alcohol and is it pure? He answered as follows:

“As far as we know, spirit is the same as alcohol, and assuming that it is intoxicating, it is impure; as experts and experts say.”[6]

On the same basis, he believes that alcohols present in some medicines:

“If the lack of alcohol intoxication is not due to the realization of transformation, but rather due to its mixing with the other elements of the medicine and its degree decreasing, it remains impure and whatever it is mixed with – be it a little or a lot – makes it impure.”[7]

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[1] «و أما ما لم يتعارف شربه بين الناس أو لم يمكن شربه أصلاً- و ان كان يوجب الإسكار على تقدير شربه- فهو أمر خارج عن إطلاق المسكر فى الموثقة و لا سيما بلحاظ عدم تحققه فى زمان تحريم الخمر و المسكر لأنه إنما وجد فى الأعصار المتأخرة فدعوى انصراف المسكر عن مثله ليست بمستبعدة. و قد ادعى بعض المعاصرين فى هامش تقريره لبحث شيخنا الأستاذ (قده) ان ما ورد فى المنع عن بيع الخمر و المسكر من الروايات منصرفة عن المادة المعروفة بـ «ألكل» و ان المطلقات انما تشمل المسكرات المتعارفة التى هى قابلة للشرب دون ما لم يتعارف شربه» :Al-Tanqih in Sharh al-Urwah al-Wathqi, vol. 2, p. 98. See also . Sanad al-Urwah al-Wathqi, vol. 2, p. 193.

[2] Fazel Lankarani, Muhammad, Jame' al-Mas'il, Vol. 2, p. 82

[3] Tabrizi, Mirza Javad, Istifta'at Jadid, Vol. 1, p. 27

[4] Tabrizi, Mirza Javad, Sirat al-Najah, Vol. 7, p. 137

[5] Hakim, Mohsen, Minhaj al-Salihin, Vol. 1, p. 149

[6] Hakim, Muhammad Saeed, Murshid al-Mughtarab, p. 172

[7] The same, P 173

Ayatollah Montazeri (may Allah have mercy on him) has also clarified in this regard:

"Alcohol is an intoxicating substance that is present in all alcoholic beverages, including wine, liquor, whiskey, vodka, and the like, in proportion; So, naturally, the intoxicant is primarily a liquid, and if, for example, something is added to it that prevents it from being drunk, the ruling on its impurity still remains.[1]

Considering the above, it can be said: The issue of whether alcohol is intoxicating or not is a controversial issue among Shiite jurists, and there is no consensus on the subject matter of whether alcohol causes intoxication. Examining each of these views requires a conceptual understanding of intoxicants from a jurisprudential perspective:

2-1. Conceptual understanding of Muskar (intoxicants)

Intoxicants in Shiite jurisprudence have specific obligatory and situational rulings. This ruling has been agreed upon and agreed upon that anything that is intoxicating is forbidden to consume, regardless of the substance from which it is derived, because the reason for the prohibition is intoxicant itself, and this reason is present in all intoxicants.[2] Therefore, from the perspective of the obligatory ruling, anything that causes intoxication in a person is forbidden to consume at will, in small or large amounts, and in pure form or mixed with medicines and foods.[3] From the perspective of the ruling on purity and impurity, all drinks that are originally liquids and cause intoxication are impure, according to a well-known saying.[4]

Therefore, recognizing intoxicants and recognizing their examples can play an important role in healthy nutrition and using halal products.

From a jurisprudential perspective, intoxicants are those that can cause a state of intoxication in a person.[5] However, important questions arise:

1- From a religious perspective, what state can be called intoxication and by what internal and external characteristics and behaviors is this state recognized?

2- 2- Is the same scientific meaning of intoxication, which is of two levels, considered in the holy law, and is whatever causes the slightest abnormal state in a person called intoxication, or has the customary view and external appearance become the criterion for the order of the religious ruling?

3- 3- Are the personal circumstances of individuals taken into account in the validity of the title of intoxication, or is the state of the individual considered, and does what is typically intoxicating also have the rule of intoxicating for others?

[1] Montazeri, Hossein Ali, Risaleh al-Istifta'at, Vol. 3, p. 31.

[2] Ardebili, Ahmad bin Muhammad, Majma' al-Faidah wa al-Burhan, Vol. 11, p. 191; Najafi, Muhammad Hassan, Jawaher al-Kalam, Vol. 6, p. 3

[3] Tabatabayi, Ali, Riyad al-Masal, vol. 16, p. 64

[4] Najafi, Mohammad Hassan, Jawaharlal Kalam, vol. 6, p. 2

[5] Hali, Najm al-Din Jafar bin Hasan, Sharia' al-Islam, vol. 4, p. 155

4- 4- Is the state of the weakest individuals considered in determining the typical state, or should the moderate temperament be considered, and what is intoxicating for such temperaments is not considered a religious intoxicant for stronger individuals?

These are important questions that are very necessary and essential to address from the perspective of the present study in order to determine the concept of intoxicating and identify its instances.

In Shiite jurisprudential texts, there is no comprehensive definition or specific criteria for intoxication, and various criteria such as mental decline, intellectual deficiency, lethargy and weakness in the limbs, cheerfulness and euphoria, etc. have been mentioned in the statements of jurists.[1]

Many Shiite jurists believe that the state of intoxication is accompanied by a change in intellect or intellectual deficiency and is accompanied by specific behavioral and psychological symptoms.

Sheikh Mufid (may Allah have mercy on him) defined intoxication as a change in intellect and expressed its symptoms as follows:

"A person considers what he considers ugly and ugly in a state of consciousness to be good, and considers what he considers good in a state of consciousness to be ugly. Therefore, if a person is calm and peaceful in a normal state, but by consuming intoxicants, he gets out of that state and engages in fun and jokes, he is considered drunk."[2]

Sayyid Murtaza also considered forgetfulness and weakness in the limbs accompanied by joy and happiness as signs of intoxication.[3]

From the perspective of some jurists, such as the first martyr, Mawli Ahmad Naraqi, the owner of Riyadh, anything that changes the mind and causes elation, happiness, and self-confidence in the individual is considered intoxicant.[4]

Sheikh Ja'far Kashif al-Ghita also considers intoxication to be a state that initially and independently causes a deficiency in the mind, but then, due to weakness of the heart and body, a state of unconsciousness and unconsciousness occurs.[5]

Some other jurists, without mentioning any signs to recognize intoxication, have left its diagnosis to the custom and have considered the truth of custom to be the criterion for realizing the title of intoxication. After stating some of the signs of intoxication that have been mentioned in the words of the jurists before him, the author of Jawaher believes that in order to understand the meaning of intoxication, one must refer to the custom, and the recognition of the custom is

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[1] Araki, Muhammad Ali, Kitab al-Tahara, vol. 1, p. 588

[٢] «و حد السكر من الشراب تغير العقل و علامة ذلک أن يستقبح الإنسان ما يستحسنه فی حال الصحو و يستحسن ما يستقبحه فيها فإن كان معروفا بالهدی و السكون فی حال صحوه فانحرف مع الشراب و خرج من اللهو و البذلة إلی ما لا يعتاد منه فی حال الصحو من غير تكلف لذلک فهو سكران».The Masked, p. 800

[3] Sharif Murtaza, Ali ibn Husayn, Rasa'il al-Sharif Murtaza, vol. 2, p. 273.

[4] Naraqi, Mawli Ahmad, Al-Hashiyyah ali al-Rawdha al-Bahiyyah, p. 842; Muhammad ibn Makki, Al-Qawwa'i wa al-Fawa'id, vol. 2, p. 73;

[5] Tabataba'i, Ali, Riyadh al-Mas'il, vol. 16, p. 64;

the criterion and difference between intoxicants, narcotics, and sleeping pills, and concepts like that.[1]

Agha Reza Hamedani also cites some of the signs for intoxication and concludes that intoxication is a state similar to madness, but it is more appropriate to defer it to the custom.[2]

The above statements clearly show that the words of the Shiite jurists differ in the meaning of intoxication and the definition of the state of intoxication, and each of them has stated a specific sign for it or has ultimately left its recognition to the custom. Among the later jurists, Vahid Behbahani has a comprehensive statement on the meaning of intoxication and intoxication that is consistent with scientific findings about alcohol and its effects on the human psyche and behavior. In their view, limiting the sign of intoxication to a state in which a person cannot distinguish the sky from the earth or distinguish length from width is contrary to the common understanding and the authority of the linguists, because in some cases, the intellect of the person consuming alcohol is not disturbed except to a slight extent, and his speech and movements are coherent and orderly. Therefore, it is rare for suspicion of intellectual disorder to arise in their case, but nevertheless, this condition is also attributed to his intoxication. Also, wines differ in causing a state of intoxication, and some wines cause very little intoxication.[3]

Referring to the different stages of intoxication, he states:

"Due to the consumption of intoxicating drinks that destroy the intellect, dementia does not occur immediately, but rather the person initially feels a change and transformation, and this state gradually increases until the intellect is completely destroyed. Without a doubt, this change is considered intoxication and is its first weak degree. However, the Holy Lawgiver is not satisfied with eating something that causes even this small amount of intoxication. ... Therefore, the criterion here is not conventional truth, but one must pay attention to the effects of wine and its consequences; even though its effects are weak and probably have the least consequences."[4]

On this basis, they conclude that:

First: Intoxication has levels that vary depending on the type of intoxicant, the state of the consumer, and the amount of consumption. The mere pleasure and euphoria resulting from alcohol consumption is sufficient to constitute intoxication, and any change from a normal state to joy and pleasure is considered intoxication.[5]

Secondly: In the holy law, in order to determine the instance of intoxicants, the weakest state of the individuals in terms of intoxication should be taken into account, because the lawgiver has made intoxication a cause of prohibition and impurity without making a distinction between

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[1] Al-Najfi, Ja'far (Kashif al-Ghita'), Kashf al-Ghita', vol. 2, p. 352

[2] Hamadani, Rida, Misbah al-Faqih, vol. 7, p. 190.

[3] Wahid Behbahani, Muhammad Baqir, Hasiyat al-Majma al-Fada' wa al-Burhan, p. 680; Wahid Behbahani, Muhammad Baqir, Rasa'il al-Fiqhiya, pp. 103-101

[4] «فشارب المسكر الّذی یزیل العقل لا یزول عقله دفعةً واحدةً، بل یحسّ أوّلا بالتغیّر ثمّ لا یزال یزداد حتّی یذهب، و لا شکّ أنّ هذا التغیّر من جملةً السکر و أوّل درجته الضعیفةً، و لا شکّ أنّ الشارع لا یرضی بهذا أیضا ... علی انه غیر خفی أنّ المناط فی المقام لیس الصدق العرفی، بل ما هو أثر الخمر و عاقبتها و إن کان أثرا ضعیفا، و أدنی عاقبةً منها، بل و لو علی سبیل الاحتمال أیضا».Rishale al-Fiqhiyyah, pp. 103-104

[5] Vahid Behbahani, Al-Rashale al-Fiqhiyyah, p. 103; Margin of Majma al-Fedat wa Al-Barhan, p. 681

its strong or weak degree, and this state is created as soon as they drink or drink too much intoxicant for the temperament of all or most of the people who consume it; even if some people have a rare temperament, the ruling on intoxicant is still applicable to them, and God has absolutely forbidden it in order to eradicate the substance of corruption.[1]

Sheikh Al-Shari'a Isfahani also believes in an independent treatise on the rulings on juice, after quoting various definitions from Shiite and Sunni scholars, that intoxicant is anything the consumption of which causes the intellect to be obscured and is accompanied by joy and warming of the body, and that the state of intoxication has different degrees, and the rulings on the Sharia are based on the first degree of intoxication or its precursors.[2]

Many contemporary jurists also accept the same view of the later scholars regarding the degrees of intoxication and believe that the concept of religious intoxication also includes the first mild degree of intoxication, and whenever something is intoxicating to some people, it is also considered intoxicating to others.[3]

Imam Khomeini clarifies in this regard:

"If the lack of intoxication of something is proven in relation to some of the natures of individuals or in relation to some regions or due to addiction to consumption, it is not a proof of its sanctity."[4]

Therefore, from the sum of the words of the declarations of the jurists of the past and the present, and by taking advantage of scientific and customary understanding, we can conclude the following:

First: Intoxication is a complex and multifaceted state that gains intensity and weakness under the influence of various factors, and the various symptoms mentioned in jurisprudential terms for this state indicate the mild and severe degrees of intoxication. The mild stage of intoxication is the euphoria and joy resulting from alcohol consumption, which gradually manifests as the signs and symptoms of complete intoxication appear as the concentration of alcohol in the blood increases. Therefore, whatever causes the slightest change in a person's intellect is considered intoxicating from a jurisprudential perspective.

Secondly: What typically causes intoxication - even if it is mild intoxication - is also considered intoxicating for other temperaments, even if it does not cause intoxication for them. In other words, in the order of intoxicating rulings, personal intoxicating is not the criterion, but rather what is typically intoxicating is considered intoxicating.

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[1] «و الشارع جعل السكر علّة للحرمة و النجاسة من دون فرق بين درجته القويّة و الضعيفة، و ما يعرفه أهل الفن- أو الكلّ- يتحصّل، و ذلک من مجرّد شربه، أو من الإكثار من شربه و لو غاية الإكثار يحدث فی مزاج كلّ من يشرب أو الغالب أو بعض من يشرب، بل و لو كان نادرا، إذ لعلّ كلّ من يشرب مزاجه مزاج النادر، فحرم مطلقا، حسما لمادّة الفساد».Margin of Majma al-Fedat wa Al-Barhan, p. 682

[2] Isfahani, Fathullah, The Revelation of the Almighty in the Rules of the Spirit, pp. 68-69

[3] Bojnourdi, Mohammad Hassan, Al-Qawwa'id al-Fiqhiyah, vol. 5, p. 308

[4] «ما أسكر كثيره دون قليله حرم قليله و كثيره، و لو فرض عدم إسكارها فی بعض الطباع أو بعض الأصقاع أو مع العادة لا يوجب ذلک عدم حرمتها». Imam Khomeini, Ruhollah, Tahrir al-Wasilah, Vol. 2, p. 166:

2-2. The difference between alcohol and Muskar

After the concept of Muskar has been explained in jurisprudence and it has been determined that from a jurisprudential point of view, anything that causes even mild degrees of intoxication is considered Muslar, it is possible to determine its examples and determine whether alcohol is also considered an example of Muskar or not. As Sheikh Al-Shari'a Isfahani has clarified, in cases where there is certainty that a substance is intoxicant, its Shariah rulings also apply, but in doubtful cases, the ruling that something is Muskar is subject to Shariah prohibition or must be proven by experience and repeated use.[1]

In terms of Shariah prohibition, the names of some Muskar that were common and widespread in the era of legislation have been mentioned in the language of the legislator and their intoxicant status has been clarified. For example, in some narrations, five types of Muskars are mentioned, namely "asir", "naqi'", "bit'a", "marz" and "nabidh", which are obtained from grapes, raisins, honey, barley and dates, respectively, and each of them is called khamr.[2] In argumentative jurisprudential texts, there have been many jurisprudential discussions about whether or not some liquids, such as grape juice and other fruits, are Muskar.[3] However, alcohol is one of the cases where its intoxicating or not is not mentioned in the language of the Sharia, and it is necessary to examine, based on customary experience and scientific findings, which types of alcohol and under what conditions can cause intoxication in humans.

Mohammad Hassan Bojnourdi, one of the contemporary jurists, also clarifies:

"Determining whether or not something is Muskar or not is not one of the duties of a jurist, but in such cases one should refer to experts and experts."[4]

Using the information provided in the alcohol thematic section, we can conclude the following:

1- Among the types of alcohol, methanol is not intoxicating in any way, and its consumption not only does not cause euphoria and euphoria, but is the first degree of intoxication; rather, its properties are such that consuming even the smallest amount of it leads to very serious and undesirable side effects such as blindness and death.

2- Although ethanol is the raw material for intoxicants and the main ingredient of alcoholic beverages, its industrial type (yellow alcohol or 90 degrees) is a toxic substance that is neither actually nor potentially intoxicating due to the presence of impurities exceeding the standard, and due to the organic compounds and substances other than water and alcohol found in it.

3- Pure ethanol (96 degrees) is also not drinkable on its own due to its high concentration and in order for it to be intoxicating, it must be mixed with other drinks in a certain proportion to become intoxicating. In other words, it is not intoxicating on its own and does not become so

[1] Isfahani, Fathullah, Efazat al-Qadeer fi ahkam al-Asir, pp. 68-69

[2] Ardebili, Ahmad ibn Muhammad, Majma' al-Faidah wa al-Burhan, vol. 11, pp. 191-190

[3] Najafi, Muhammad Hassan, Jawaher al-Kalam, vol. 6, pp. 13-38; Sadr, Muhammad Baqir, Bahuth fi Sharh al-Urwah al-Wathqi, vol. 3, pp. 444-369

[4] «ليست هذه المسألة من المسائل الفقهيّة، و ليس معرفتها من وظيفة الفقيه بما هو فقيه، بل لا بدّ و أن يرجع فيها إلى أهل الخبرة فى هذا الفن» ,Bojnourdi Mohammad Hassan, Al-Qawwa'id al-Fiqhiyah, Vol. 5, pp. 323-324

unless it is mixed with other substances such as water or other liquids and its concentration is reduced.[1]

Therefore, pure or absolute ethanol is also a toxic substance from a scientific and customary experience perspective that requires a certain amount of it to be mixed with other substances for edible consumption and the realization of the Oscar. For this reason, in addition to considering non-edible alcohols such as methanol and industrial ethanol as pure, the famous jurists have also considered the consumption of edible alcohols as permissible if its amount in the combination of other products does not reach the Oscar level.[2]

Accordingly, in the case of food or pharmaceutical products that produce some alcohol during their production process or have some alcohol added to them from the outside environment, it can be said that if the amount of alcohol in them is a certain amount, such products will not be intoxicating. From this perspective, three categories of alcoholic products can be distinguished:

1. In some products, the amount of alcohol is so small that no matter how much of that product is used, it will not cause intoxication.

2. In some other products, the amount of alcohol is so large that its alcohol concentration increases greatly and its consumption causes poisoning and undesirable side effects, and intoxication does not occur.

3. In some other alcoholic products, there is a proportional amount of alcohol that its consumption causes mild or severe intoxication.

Of the above products, only the third category is considered intoxicating, and products whose alcohol concentration is not at the Oscar level are not considered intoxicating. However, what is of double importance here is determining the Oscar level of alcohol. The question of what level of alcohol should be in alcoholic products so that they are not considered intoxicating and the consumption of that product is permissible from the Islamic perspective is a very important question that requires reference to scientific findings to answer.

Of course, some jurists have also stated the limit of alcohol consumption by referring to experts. For example, Sayyid Muhammad Sadr believes that food and medicine products that use alcohol are forbidden to be consumed except under two conditions:

1. The alcohol used in the production process of these products must eventually evaporate and no significant amount of it remains.

2. The alcohol that remains in the final product must not exceed one and a half percent of the total food and medicine. However, this amount of alcohol or less is considered to be consumed in food and medicine and is commonly associated with non-existence.[3]

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[1] Sabur Ordabadi, Ahmad, Alcohol and Alcoholic Products in Terms of Impurity and Sanctity, pp. 56-58 and p. 90; Azarbadgan, Hossein Ali, "Scientific and Jurisprudential Study of Alcohol and Its Products", p. 250

[2] Khoei, Abul-Qasim, Sirat-ul-Najah, vol. 1, pp. 31, p. 394; Tabrizi, Mirza Javad, Istifta'at-e-Jadeed, vol. 1, p. 27; Makarem Shirazi, Nasser, Istifta'at-e-Jadeed, vol. 1, pp. 31-32; Safi Golpayegani, Lotfollah, Jami' al-Ahkam, vol. 1, p. 47

[3] Sadr, Muhammad, Ma'ara' al-Fiqh, vol. 7, pp. 209-208

Ayatollah Sistani also believes that if the percentage of alcohol in some foods or medicines is insignificant (two percent or less), there is no problem in consuming them. For this reason, he does not consider it permissible to consume medicines that contain ten percent alcohol, but he considers it permissible to consume the said medicine if it is diluted to the extent that its alcohol percentage reaches two percent.[1]

Although the determination of these values for the alcohol limit has been proposed in the fatwas of some jurists, it seems to be not free from ambiguity and its scientific basis has not been determined, because the percentage unit does not express a fixed number and amount and its amount changes with different volumes. For this reason, the amount of alcohol in alcoholic products is usually indicated on the product container as a percentage by volume (ABV), and in this way, the amount of alcohol that enters the body as a result of consuming that product can be easily determined.[2]

Obviously, 2% alcohol in a liter, which is equal to 20 ml of ethanol, is not the same as 2% alcohol in a 250 ml volume, which is equal to 5 ml. Therefore, it cannot be absolutely stated that products with 2% alcohol are not intoxicating, but the level of intoxication of an alcoholic beverage depends on the weight or volume of alcohol contained in it, and this may also happen in beverages with 1% alcohol. For example, one liter of 1% alcoholic beverage contains 10 ml of alcohol, and if the weakest person consumes it at once, it can cause intoxication. Therefore, even 1% alcohol, if consumed in large quantities, can be intoxicating for some people.

Accordingly, it is better to consider the volume of alcohol consumed as a fixed number - not as a percentage - as the alcohol limit in accordance with scientific findings and distinguish examples of intoxicants from others. As stated in the previous chapter, consuming 10 milliliters of alcohol within an hour can cause the first degree of intoxication for the weakest of individuals. Therefore, any product that contains this amount of alcohol will be classified as intoxicating and will be subject to the Shariah rulings on intoxicants as stated by the jurists.

3. The concept of "fiqqa"

Another religious concept that can be thematically examined in relation to "alcohol and alcoholic products" is the concept of "fiqqa".[3] As mentioned in the discussion of types of alcoholic products, today one of the most important fermented alcoholic beverages is beer, which usually has an alcohol percentage of 4% and causes mild intoxication. Other products, especially in Islamic countries, are produced under the name of beer and dulce, which are alcohol-free or have a low percentage of alcohol. The issue that is raised here and has been consulted by jurists in many cases is the issue of the relationship of products such as beer, beer and dulce with fiqqa. In order to relate these concepts, it is necessary to first explain the concept

[1] Hakim, Abdul Hadi Muhammad Taqi, Jurisprudence for Expatriates: According to the Fatwas of Sayyid al-Sistani, pp. 76 and 152. See also the official website of Ayatollah Sistani at the following address: http://www.sistani.org/persian/qa/0799

[2] In the international food industry, the accepted standard for non-alcoholic beverages is 0.5%, meaning that in the food industry of European and American countries, beverages that contain a maximum of 0.5% alcohol when distributed are classified as non-alcoholic beverages.

[3] Najafi, Muhammad Hassan, Jawaher al-Kalam, Vol. 6, p. 38

of fiqqa in jurisprudence and then clarify their relationship with fiqqa with sufficient knowledge of new products and products.

3-1. Conceptualization of Fiqaa

Fiqaa is one of the drinks that there is consensus in Shiite jurisprudence on its prohibition and is listed among the impurities. The ruling on the prohibition of Fiqqaa is not in doubt, but identifying its subject requires an explanation of the concept of Fiqqaa and the conditions for its realization. Many questions have been raised in this regard:

1- From what material is Fiqqaa obtained; does it have to be obtained from barley for the name Fiqqaa to be true or is Fiqqaa also produced from other materials such as wheat?

2- Is it necessary for a liquid obtained from barley or any other material to boil and boil for the concept of Fiqqaa to be true or is it not limited to this and Fiqqaa is realized before boiling?

3- Is the condition of scar involved in the realization of the subject or does the concept of Fiqqaa also apply without scar?

Many jurists have engaged in such thematic discussions, but there is a great deal of disagreement in their words and interpretations.

From the perspective of linguists, Fiqqa' is a type of drink that is made from barley and is called Fiqqa' because of the foam that forms on it.[1]

Some jurists believe that Fiqqaa is also made from materials other than barley. Sayyid Murtaza, while narrating the narrations of the prohibition of Fiqqaa through Sunnis, refers to some sayings in this regard that Fiqqaa is the same as "Ghabira" or "Sakrka" and is made from some grains such as wheat, barley, corn, etc. [2]Some later jurists also do not consider Fiqqaa to be exclusive to beer and believe that if it is made from anything other than barley, it is Fiqqaa and has the same ruling. Shahid Awal states as follows:

"In the past, Fiqqaa was often made from barley and was made in a way that caused boiling and bubbling, but today it is also made from raisins."[3]

Shahid Sani also states that if it is made from anything other than barley and has a bubbling and is called Fiqqaa, it has the same ruling as Fiqqaa; Because the prohibition of fiqa' is included in the name, whether it is made from barley or from other than barley.[4]

Sheikh Ja'far Kashif al-Ghita also considers fiqa' to be a special drink that is often made from barley, but sometimes it is also made from wheat, raisins, and other things.[5]

[1] Ibn Manzoor, Lasan al-Arab, vol. 8, p. 256; Hamiri, Shams al-Uloom and Dawa Kalam al-Arab Man Al-Kloom, vol. 8, p. 5231; Farahidi, Al-Ain, p. 176

[2] Sharif Mortaza, Ali bin Hossein, al-Intisar fi Infradat al-Amamiyya, p. 419

[3] Ameli, Muhammad bin Makki, Rasa'il al-Shaheed al-Awwal, p. 272

[4] Ameli, Zain al-Din bin Ali, Al-Ruzha al-Bahiyeh, vol. 7, pp. 332-323 and Ruz al-Jinan, vol. 1, p. 440

[5] Najafi, Ja'far (Kashf al-Ghita) Kashf al-Ghita, vol. 2, p. 352

In contrast to the above view, some jurists believe that the concept of fiqa' is specific to a liquid that is made from barley under certain conditions. For example, Allamah Hilli, in response to an inquiry about the subject and nature of fiqa', replied as follows:

"The basis for the prohibition of fiqa' is the narration narrated from the Prophet (PBUH) that he forbade the consumption of "Ghibira", and that is the same drink made from barley."[1]

Another researcher also clarifies that fiqa' is made only from barley, and that what is made from raisins is not fiqa', even if the name fiqa' applies to it.[2]

Agha Reza Hamedani, citing the fact that the common and predominant type of Fiqqaa is that which is taken from barley, believes that the applications of the news and narrations of the prohibition of Fiqqaa are subject to common and conventional individuals and are questionable in the case of other substances.[3]

Ayatollah Khoei has argued in this regard that there is a consensus among jurists that Fiqqaa is truly used in the case of beer, but there is a difference of opinion in the case of non-beer, and this is actually a difference in the breadth and narrowness of the issue, and there is no choice but to be content with the certainty in this regard, as is the case in all cases between the period of the minority and the majority.[4] Accordingly, many contemporary jurists also agree on the concept of Fiqqaa, that only a liquid taken from barley is considered Fiqqaa.[5]

Regarding the condition of scar and intoxication of Fiqqaa, there are also different interpretations in jurisprudential texts. Many jurists believe that Fiqqaa is not intoxicating and the evidence for its prohibition is the numerous narrations that have clarified its prohibition. [6]Sheikh Mufid, Sayyid Murtaza and some other jurists have said: This substance is forbidden due to some side effects such as spoiling the temperament and causing sudden death and other corruptions that God knows, and although it does not cause intoxication, it is inherently forbidden like forbidden things such as pork.[7]

However, as Allama Majlisi has stated, the apparent explanation given in the narrations is that the reason for its prohibition is due to its intoxicating properties.[8] After quoting the words of some jurists about Fiqqaa not being intoxicating, he says that the validity of the term Fiqqaa for non-intoxicating substances seems unlikely. In addition, in some narrations, Fiqqaa has

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[1] Allameh Hali, Hasan bin Yusuf, Ajuba al-Masail al-Mahnaiyyah, pp. 80-81

[2] Karki, Ali bin Hossein, Jame Al-Maqased, vol. 1, p. 162 and Al-Rashee, vol. 3, p. 216

[3] Hamedani, Reza, Misbah al-Faqih, Vol. 7, p. 230

[4] «لأنهم بعد اتفاقهم على ان الشراب المتخذ من ماء الشعير فقاع حقيقةً اختلفوا فى ان المتخذ من غيره أيضا، كذلک أو انه خارج عن حقيقته فهو من الاختلاف فى سعة الموضوع و ضيقه، و لا مناص معه من الاكتفاء بالمقدار المتيقن- و هو المتخذ من ماء الشعير- كما هو الحال فى جميع الموارد التى يدور فيها الأمر بين الأقل و الأكثر» Khoi, Abu al-Qasim, Al-Tanqih fi Sharh al-Arwa al-Waghti, vol. 2, p. 138

[5] Tabatabaei Yazdi, Al-Arwa Al-Wathqi, vol. 1, p. 71; Vahid Khorasani, Minhaj al-Salehin, vol. 2, p. 120; Sistani, Ali, Minhaj al-Salehin, vol. 1, p. 139

[6] Ibn Hamza, al-Wasila, p. 365; Ravandi, Fiqh al-Qur'an, vol. 2, p. 284; Mohaghegh Hali, Shar'i al-Islam, vol. 4, p. 156; Ahmad bin Muhammad Hali, Al-Muhdez al-Bara', vol. 5, p. 79

[7] Mofid, Muhammad bin Muhammad, Al-Maqna, p. 800; Syed Morteza, Rasail, vol. 1, pp. 100-99 and p. 160; Allameh Hali, Ajuba al-Masal al-Mahnaiyyah, pp. 80-81

[8] Majlesi, Mohammad Bagher, Bihar al-Anwar, vol. 63, p. 496

been interpreted as "unknown alcohol" or alcohol that people consider to be of little value, and this in itself is evidence that Fiqqaa is considered an intoxicant.[1]

Some contemporary jurists, in the consensus between two different views on whether or not Fiqqaa is intoxicating, have stated that the lack of intoxication in Fiqqaa means clear intoxication and the degree of mental impairment, which Sunnis have applied the concept of "sukr" to. Therefore, the statement of jurists who do not consider Fiqqaa to be intoxicating is not absolute, but refers to this clear degree of intoxication, and the intention is that Fiqqaa, like khumr, does not cause clear intoxication that leads to mental impairment. However, intoxicating means euphoria and ecstasy, which are the first and mildest degrees of intoxication, are present in Fiqqaa, [2]and for this reason Fiqqaa is considered an intoxicant. For this reason, some Shiite jurists have divided Fiqqaa into two types, halal and haram, and have ruled that if beer does not boil on its own and is not intoxicating, it is halal, and if it boils and is intoxicating - even if the intoxication is mild - Fiqqaa will be haram.[3]

Therefore, in the jurisprudential definition of Fiqqaa, we can say: Beer that boils spontaneously is mildly intoxicating and is called Fiqqaa.[4]

3-2. The difference between beer and fiqqa'

After the concept of fiqqa' has been clarified from the perspective of jurisprudence, its relationship and proportion with products such as beer can be determined. By understanding the subject of alcoholic beers that are common and widespread and contain about 4% alcohol, we can say: This type of beer - even if consumed in large quantities - causes intoxication and will definitely be an example of fiqqa', which is forbidden,[5] because the process of producing such beers is such that after adding yeast and starting the alcoholic fermentation process, an amount of alcohol that is at the level of Oscar is produced and the final product can contain alcohol. In some cases, when the goal of the producer is to produce alcohol-free beer, they extract the alcohol in the environment through various methods such as filtration, suction, distillation, etc. and present an alcohol-free product. In this method, since alcoholic beer, which is forbidden, has been produced from the beginning, this type of alcohol-free beer will also not be consumed due to impurity.

Therefore, only those beer products that have not started the fermentation process or the percentage of alcohol in them is not at the level of scar will be excluded from the concept of fuqaa. As stated in jurisprudential discussions, boiling and the scar that results from it are the conditions for realizing the concept of fiqqa, and without it, the term fiqaa will not be correct.

On this basis, it can be said:

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[1] Kalini, Abu Jaafar Muhammad bin Yaqoob, Kafi, vol. 6, p. 422

[2] Esfahani, Fathullah, Afazah al-Qadir, pp. 135-137; Sanad Bahrani,

[3] Bahrani, Yusuf bin Ahmad, al-Hadaiq al-Nadrah, vol. 5, p. 120; Golpaygani, Mohammad Reza, Kitab al-Tahara, p. 295

[4] Sadr, Muhammad Baqir, Researches in Sharh al-Arwa al-Wathqi, vol. 3, p. 451; Mousavi Ardabili, Abdul Karim, Jurisprudence of Boundaries and Ta'azirat, vol. 2, p. 554; Rouhani, Mohammad Sadiq, Fiqh al-Sadiq (AS), vol. 3, p. 333

[5] Sadr, Muhammad, Beyond Jurisprudence, vol. 7, p. 205

The beer drink that was prescribed for some patients in the field of ancient medicine has a substantial difference from the forbidden beer. The aspect of this difference is mentioned in some narrations, boiling and scarification. For example, in the Sahih of Ibn Abi Umayr of the ceremonies, it is narrated that beer was prepared for the Seventh Imam (a.s.) in his house. Ibn Abi Umayr says: But beer was prepared for that Imam that did not boil. Also, in the authentic book of Uthman ibn Isa, which narrates the correspondence of Abdullah ibn Muhammad Razi with Imam Jawad (a.s.), the difference between beer and other types of beer is mentioned and special containers for producing beer are emphasized[1]. Apparently, this emphasis of the Imam (a.s.) is because the process of producing beer does not lead to boiling and alcoholic fermentation.[2]

Accordingly, many jurists have also distinguished between medical beer and beer. [3]Some jurists, such as Ibn Junayd, describe the method of producing halal beer as taking the barley extract or whatever the sorghum is made from and placing it in a container that does not produce the sorghum or any other intoxicant, does not boil spontaneously, or does not contain anything that causes it to boil. In such circumstances, there is no problem in drinking it.[4]

Sheikh Ja'far Kashif al-Ghita writes about the difference between medical beer and fiqa':

"The beer that doctors prescribe for treatment is not fiqa', because consuming beer results in a kind of weakness that does not reach the level of intoxication and drunkenness, and intoxication and drunkenness are not realized in beer."[5]

Martyr Sadr also considers the difference between medical beer and fiqa' to be its lack of scarring and clarifies:

"What distinguishes fiqa' from medical beer is the spontaneous boiling of fiqa', which causes its scarring. Therefore, the criterion is that if beer is not intoxicating, it cannot be ruled to be impure, neither in terms of the natural evidence of intoxication nor in terms of the narrations about fiqa'."[6]

Ayatollah Khoei, in describing the nature of medical beer, writes:

"This type of beer is obtained by adding some water to barley and boiling it, and then taking the barley beer and using it. This type of beer is different from the special quality beer they produce."[7]

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[1] Tusi, Muhammad bin Hassan, Tahdhib al-Akhbar, vol. 9, p. 126

[2] Najafi, Hassan bin Jafar, Anwar al-Faqaha - Kitab al-Tahara p. 368;

[3] Najafi, Mohammad Hassan, Jawaharlal Kalam, vol. 6, p. 40; Hamdani, Reza, Misbah al-Faqih, vol. 7, p. 233; Tabatabaei Yazdi, Al-Arwa Al-Wathqi, vol. 1, p. 71

[4] . Tousi, Muhammad bin Hasan, Al-Rashay al-Ashhar, p. 265

[5] و ليس ماء الشعير الذى يتعاطاه الأطبّاء للدواء منه؛ لأنّ الظاهر أنّه يحصل منه فتور لا يبلغ حد السكر، و ليس ذلک فى ماء الشعير». Najafi, Jafar, Kashf al-Ghita, vol. 2, p. 352

[6] «و الظاهر ان ما يميز الفقاع عن ماء الشعير الطبى هو الغليان بنفسه المساوق لصيرورته مسكرا و هذا هو الضابط فاذا لم يكن ماء الشعير مسكرا فلا يوجب للحكم بنجاسته لا بلحاظ أدلةّ نجاسةّ طبيعى المسكر و لا بلحاظ الروايات الخاصةّ المتقدمةّ فى الفقاع». Sadr, Muhammad Baqir, Researches in the Commentary of al-Arwa al-Wathqi, vol. 3, p. 452

[7] Khoi, Abu al-Qasim, Revisions in Sharh al-Arwa al-Wathqi, vol. 2, p. 139

In general, the words of the jurists can be used in this regard, that medical beer is before boiling and the appearance of scar, but faqaa is accompanied by boiling and boiling, followed by scar.[1]

Summary and Conclusion

This chapter discussed the relationship between alcohol and some jurisprudential titles such as khamr, muskar, and fuqaa. There are different views on the application of khamr to some types of alcohol such as fermented alcohol; however, considering the jurisprudential concept of khamr and with a subject knowledge of the types of alcohol and their production process, it can be said:

Alcohols that are produced based on chemicals, including methanol and ethanol, definitely cannot be considered as sharia khamr, and they are essentially different from it. In the case of wine alcohol obtained from the distillation of khamr, those jurists who do not accept the realization of transformation in the distillation process consider the title khamr applicable to it; however, in the case of common medical and industrial alcohols, due to their raw material being from other than grapes, the jurisprudential definition of "khamr" is not applicable to such alcohols - even before distillation.

If we consider the jurisprudential meaning of khamr to include any intoxicating liquid, whether grape or non-grape, the application of the term intoxicant to alcohol is debatable and different views have been mentioned on this matter. The concept of intoxication and intoxication in Shiite jurisprudence is a dubious and multifaceted concept, the mildest of which is the state of euphoria and joy resulting from the consumption of intoxicants. According to this meaning of intoxication, it can be said that methanol and industrial ethanol are neither intoxicants nor do they cause undesirable effects other than intoxication. Pure or absolute ethanol is also, from a scientific and customary experience, a toxic substance that requires a certain amount of it to be mixed with other substances for edible consumption and the realization of its effects. Therefore, although pure or absolute ethanol forms the raw material of alcoholic beverages, it is not actually considered an intoxicant. Another jurisprudential title that was examined related to alcohol and alcoholic products is the title "Fiqa". From a jurisprudential perspective, faqaa is a drink derived from barley that causes mild intoxication, and this factor distinguishes it from some common drinks such as seltzer, non-alcoholic beer, and medical beer. What distinguishes these products from faqaa is that they are not fermented, and the fermentation process in these products is carried out in such a way that the final product is either alcohol-free or its alcohol is not at the level of intoxication (sakhar).

[1] Golpaygani, Mohammad Reza, Kitab al-Tahara, p. 295

Chapter Five: Final Results

1. There are different types of alcohol that can be classified according to their chemical structure, production method, application and purity. In terms of chemical structure, there are different types of alcohol, the two most common types of which are methanol and ethanol. The common alcohol that is used in medical, pharmaceutical and food industries and in the production of some cosmetic and hygiene products is ethanol, and methanol or wood alcohol is a toxic substance that is harmful to humans when present in such products.

2. In terms of production method, there are two natural (fermentation) and synthetic (chemical) methods for producing ethanol. Ethanol obtained artificially is obtained from petroleum-based materials and is no different from natural ethanol in appearance. In the natural method, which is the dominant method in alcohol production in the world, ethanol is obtained from the fermentation of sugar materials. Ethanol in Iran is mainly obtained from sugar beet molasses or sugar cane.

3. In terms of the use of alcohol, alcohols are divided into two types: medical and industrial. Medical alcohol refers to ethanol whose impurities are within standard limits and is therefore mainly used in the medical, pharmaceutical, health and some food industries; however, industrial alcohol is ethanol that is mostly used in industry due to its impurities and has uses other than the above. Medical alcohol is usually 96%, but industrial alcohol is 90% and is distinguished from medical alcohol by a colored substance. In some cases, methanol and synthetic ethanol are also called industrial alcohol, which is not a very common term and it is necessary to be careful in explaining the Islamic ruling on alcohol.

4. Based on the alcohol content, there are two types of alcohol: pure and adulterated, which do not differ in nature and differ only in the purity and concentration of alcohol and its applications.

5. Ethanol, which is a drinkable alcohol, is used in many edible and non-edible products. In medical and pharmaceutical applications, it is used as a chemical solvent, in the manufacture of medicines, as a preservative and as a disinfectant. In industry, it is widely used as a solvent for raw materials or as a fuel supplement, and in the food industry, it is used in many products such as vinegar, powders and various essential oils and coated sweets. Alcohol is also used to produce various types of alcoholic beverages (such as wine, beer and distilled beverages). The sugary properties of these beverages are due to the presence of a certain amount of alcohol in them. This amount of alcohol varies depending on whether the alcoholic beverages are fermented or distilled.

6. If the amount of alcohol in the ingredients of a product is a certain amount, it has intoxicating properties and its consumption will cause intoxication. If the amount of alcohol in alcoholic products is less than a certain amount, it will not have intoxicating properties, and if it is more

than a certain amount, it is toxic due to its high concentration and cannot be consumed alone; Therefore, for edible purposes, its concentration must be reduced to a certain extent.

From this perspective, three categories of alcoholic products can be distinguished:

a) In some products, the amount of alcohol is so small that no matter how much of that product is consumed, it does not cause intoxication.

b) In some other products, the amount of alcohol is so large that its alcohol concentration increases greatly and its consumption causes poisoning and undesirable side effects, but intoxication does not occur.

c) In some other alcoholic products, there is a proportional amount of alcohol, the consumption of which causes mild or severe intoxication.

6. Determining the alcohol limit for alcoholic products is one of the important results of this research, which is considered an innovation compared to other related research. The importance of this issue in the production of alcoholic products or their import is considerable. The question of many industry owners is what is the permissible limit for using alcohol in different products; in other words, what amount of alcohol in these products can fulfill the title of "intoxicant" for them.

In order to determine the alcohol limit and intoxication, it should be known that there are different stages and degrees of intoxication. The first signs of intoxication in humans are the same state of limited joy and euphoria, which is a sign of the effect of alcohol on the human brain. Research shows that the emergence of intoxication in a person who has consumed alcohol is directly related to the amount of alcohol in his blood; meaning that the more the amount of alcohol in the blood (BAC) increases, the more advanced stages of intoxication occur in the person. Therefore, the alcohol intoxication limit can be obtained by measuring the concentration of alcohol in the blood.

According to research, intoxication typically occurs when the blood alcohol content (BAC) in 100 milliliters of blood reaches approximately 20 to 50 milligrams; this is equivalent to a blood alcohol content (BAC) of 0.02% to 0.05%, which is often intoxicating.

7. Just as the relationship between blood alcohol concentration and intoxication is not the same and constant in different individuals, there is no constant relationship between alcohol consumption volume (ABV) and blood alcohol concentration (BAC). This means that a person may reach the threshold of intoxication or its more severe stages by consuming a certain amount of alcohol; but another person may not reach the threshold of intoxication or experience its milder stages by consuming the same amount of alcohol. Therefore, since numerous factors are involved in the process of absorbing and excreting alcohol from the human body, a fixed amount of alcohol consumption cannot be considered for all individuals and considered a factor in intoxication. In Iranian legal circles or in laws that exist regarding the consumption of intoxicants and their limits, a specific amount for the intoxication limit of alcohol has not been stated; however, in extensive research conducted by Western scientific circles, several formulas

have been proposed to calculate blood alcohol concentration and its relationship with the amount of alcohol consumed.

By examining the existing research in this field and taking a cautious approach to the issue, it can be concluded that consuming less than 10 milliliters of alcohol in an hour cannot be intoxicating for most people. Accordingly, the minimum level of alcohol intoxication can be considered as 10 milliliters, and products with an alcohol content of this amount or more can be considered as intoxicating products.

8. In jurisprudential studies, the Sharia ruling on alcohol and alcoholic products can be explained by referring to titles such as "khamr", "muskar" and "fuqa". Regarding the concept of khamr, there are two general views among jurists: According to some opinions, the concept of khamr is reserved only for grape wine; but according to another opinion, any type of intoxicant can truly be called khamr and inferring its rulings, evidence related to khamr can be cited.

In applying the concept of "khamr" to alcohol, it should be said: If we consider khamr in the absolute sense of intoxicant, the discussion of the relationship between alcohol and khamr actually goes back to the relationship between alcohol and intoxicant; but if we consider khamr to mean grape wine, its difference with many alcohols becomes clear. Common medical and industrial alcohols, whether produced chemically or obtained through the fermentation of sugary substances, are not examples of religious khamr and the rulings of khamr do not apply to them; but the alcohol of wine, which is obtained from the fermentation of grape juice and then its distillation, if it is not an example of transformation, the title of khamr will apply to it.

9. If we consider the jurisprudential meaning of khamr to include any intoxicating liquid, whether grape or non-grape, the application of the title "muskar" to alcohol is debatable and can be examined, and different views have been mentioned in this regard. Jurisprudential studies show that the concept of intoxication and drunkenness in Shiite jurisprudence is a dubious and two-tiered concept, the mildest of which is the state of euphoria and joy resulting from the consumption of intoxicants, and any product that causes the slightest degree of intoxication for the weakest of people will absolutely be considered intoxicating for others. Accordingly, and by utilizing scientific findings and subject matter knowledge, it can be said that methanol and industrial ethanol are not intoxicating, and their consumption causes undesirable side effects other than intoxication. Pure or absolute ethanol is also, from a scientific point of view and customary experience, a toxic substance that requires a certain amount of it to be mixed with other substances for edible consumption and the realization of its effects. In other words, although pure or absolute ethanol forms the raw material of alcoholic beverages, it is not actually considered an intoxicant.

Therefore, in the case of common alcohols, the result of thematic research is that such alcohols, whether produced naturally or artificially, are specifically outside the scope of the Sharia evidence for alcohol and intoxicants and do not fall under any of the Sharia concepts of “alcohol” or “intoxicants.”

10. Alcoholic products, such as some food and pharmaceutical products that contain alcohol in their final product, will not be considered intoxicants as long as the amount of alcohol in them

does not reach the intoxication limit. In this regard, it makes no difference whether the alcohol in the product is obtained naturally and during the production process or whether alcohol is added to it from outside. From a jurisprudential perspective, the intoxication limit of alcohol is determined by taking into account the weakest individuals in terms of the effects of alcohol and the mildest degrees of intoxication. Accordingly, anything that causes mild intoxication for the weakest individuals will be considered intoxicants.

11. Another jurisprudential title that was examined related to alcohol and alcoholic products is the title of "Faqaa". From a jurisprudential perspective, Faqaa is a beverage derived from barley that causes mild intoxication, and this factor distinguishes it from some common beverages such as seltzer, non-alcoholic beer, and medical beer. The distinguishing feature of these products from Faqaa is their lack of scarification, and the fermentation process in these products is carried out in such a way that the final product is either alcohol-free or its alcohol is not at the level of intoxication (sukr).

The above are some of the most important achievements and results of this research, which was conducted with the aim of the jurisprudential thematic study of alcohol and its products.

After conducting thematic research on alcohol and alcoholic products, some new jurisprudential questions and issues have been raised in this regard, which need to be addressed in jurisprudential research. Some of these questions are as follows:

1. In the method of producing alcohol from wine, first the sugar in the raw material, such as grapes, is converted into alcohol under suitable environmental conditions, and after the fermentation process is completed, alcohol with a higher degree is obtained by distillation. Are the successive distillations that ultimately produce pure alcohol considered an example of the transformation of yeast into alcohol?

2. . From a medical point of view, the stages of alcohol's effect on the human body are described in three stages:

   First stage: invigoration; Second stage: excitement; Third stage: confusion

   Certainly, the second and third stages are considered to be examples of intoxication from a conventional and medical perspective. However, in the first stage, which is invigoration, there are no specific signs of dementia or behavioral impairment. Now, if a certain amount of pure alcohol (not alcoholic beverages) is mixed with food, medicine, or water to such an extent that its alcohol content does not reach a level that disrupts outward behavior, but rather only creates a state of normal joy and cheerfulness in the person, what is the ruling on this? Can such a state also be called a state of intoxication and drunkenness from a religious perspective and be considered one of the minimum levels of intoxication?

   3. Assuming that such a state is not considered "intoxication" from a jurisprudential perspective, is it still permissible if the consumption of this amount of pure alcohol is the beginning of the body's addiction to alcohol? (It should be noted that the human body gradually becomes resistant to it as a result of alcohol consumption, and over time, a greater amount of alcohol is needed to create a state of joy and happiness.)

4. The state of intoxication, in addition to being two-tiered, is also relative; this means that the degree of alcohol's effect is not the same for all people and each person's response to alcohol is different. For this reason, consuming a certain amount of alcohol may cause intoxication for one person, but consuming the same amount may not cause intoxication for another person, because various factors such as the person's weight, age, gender, speed of consumption, the degree of alcohol breakdown in the liver, history of consumption, etc. are effective in this regard. Accordingly, from a jurisprudential perspective, can the limit of intoxication be considered fixed and a certain amount of alcohol be specified as the limit of intoxication for all individuals, or is this a personal issue and if a liquid does not cause intoxication for an individual, there is no problem in consuming it, although its consumption may be intoxicating for other individuals with distinct characteristics? (To be more precise, it has been said that "all intoxicants are forbidden, is intoxicating a kind of criterion or is it a personal intoxicant)

5. Assuming that a specific limit for intoxication can be considered for all individuals, what is the criterion for determining it? Should the type of individuals be considered and a degree of alcohol that is intoxicating for most ordinary individuals be taken as the criterion and limit of intoxication, or should the amount of intoxicating for the weakest and most sensitive individuals be taken as the criterion?

6. Does the validity of the title "intoxicant" for something be related to its drinkability? That is, if something is not drinkable but is intoxicating through injection or inhalation, etc., is it considered an intoxicant from a jurisprudential perspective?

The above questions are new branches that have been obtained after the subject of alcohol and alcoholic products and since they have a legal and jurisprudential aspect, they have not been examined in detail in this work. All the efforts of the authors have been to explain only the dimensions and aspects of the subject involved in the Sharia ruling on alcohol and alcoholic products, without entering into legal discussions, and to thoroughly review the various forms and branches of this issue. It is hoped that the results of this research can help researchers and scholars in the field of jurisprudence and jurisprudence in explaining the Sharia rulings on this issue and that its errors and shortcomings can be eliminated with the valuable suggestions and opinions of professors and readers.

Appendix No. 1: Fatwas related to alcohol and alcoholic products

1. Ruling on alcohol

There are three different views among the fatwas of jurists regarding the ruling on alcohol in terms of purity and impurity: Some jurists believe that all types of alcohol - both medical and industrial - are pure. Another group of jurists, without being certain about the nature of alcohol, have expressed its general ruling as follows: If the example is a liquid intoxicant, it is impure, and otherwise, it is condemned to purity. A few jurists also believe that alcohol is a primary example of a liquid intoxicant and is impure. Some of the fatwas in this regard are as follows:

Imam Khomeini (may Allah have mercy on him): Industrial alcohol is pure if a person does not know that it was made from intoxicating and depressant liquids.[1]

Ayatollah Araki (may Allah have mercy on him): Alcohol is pure. If a person does not know, it is made from something that is intoxicating and intoxicating.[2]

Great Ayatollahs Golpaygani (RA) and Safi Golpaygani: If a person does not know that it is intoxicating or does not know that it was initially made from something that intoxicates the soul, it is pure.[3]

Great Ayatollahs Khoei (RA), Tabrizi (RA) and Sistani: All types of alcohol that is extracted from wood and other objects are pure.[4]

Ayatollah Vahid Khorasani: All types of industrial alcohol that is used to paint doors and windows, tables and chairs, and other uses are pure.[5]

Ayatollah Bahjat (may Allah have mercy on him): Industrial alcohol used to paint doors, windows, tables, chairs, and the like is pure if a person does not know that it was made from something that is intoxicating and liquid by itself.[6]

Ayatollah Fadel Lankarani (may Allah have mercy on him): White and medical alcohol, which is pure alcohol and has medical uses, is pure. Unless it is derived from wine and ficus, in which case it is impure. Also, other cleaning materials that are derivatives of alcohol and are used in medical centers are pure. Also, industrial alcohol, which is the same white alcohol with the addition of some toxic substances and has industrial uses, is pure. Eau de cologne and other industrial materials that contain alcohol are also pure.[7]

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[1] Imam Khomeini, Risale-i Tassif al-Mas'il, p. 303, issue 108

[2] Mohammad Ali Araki, Istifta'at, p. 8, q. 4 and Tassif al-Mas'il, p. 23, issue 111

[3] Mohammad Reza Golpayegani and Lotfollah Safi Golpayegani, margin of the Risale-i Tassif al-Mas'il of Imam Khomeini (RA), vol. 1, p. 80

[4] Abul Qasem Khoei, Minhaj al-Salihin, vol. 1, p. 109, issue 405 and Mirza Javad Tabrizi, Minhaj al-Salihin, vol. 1, p. 113, issue 405; Sayyid Ali Sistani, Minhaj al-Salihin, Vol. 1, p. 138, issue 405

[5] Husayn Wahid Khorasani, Risalat Tasnim al-Masayel, p. 22, issue 113

[6] Muhammad Taqi Bahjat, Risalat Tasnim al-Masayel, p. 28, issue 116

[7] Muhammad Fadel Lankarani, Risalat Tasnim al-Masayel, p. 22, issue 118

Alcohol is impure if it is obtained from an intoxicating liquid. Medical and industrial alcohol, which is used for medical purposes, painting, etc., is pure if the person does not know that it was made from an intoxicating liquid.[1]

Ayatollah Makarem Shirazi: Medical and industrial alcohol that a person does not know is made from something intoxicating is pure. Likewise, colognes, perfumes, and medicines that are mixed with medical or industrial alcohol. Alcohols that are inherently inedible or have a toxic aspect are not impure, but if they are diluted and become a drink or intoxicant, drinking them is forbidden, and as a precaution, they are considered impure.[2]

Ayatollah Sobhani: Industrial alcohol that is used to paint doors, tables, chairs, and the like, if a person does not know that they were made from something intoxicating and volatile, is pure. However, eating it is forbidden. Alcohols that are inherently inedible and are considered a type of poison are not impure, but if they are diluted with water and become drinkable, they are considered impure, and drinking them is forbidden.[3]

Ayatollah Shubairy Zanjani: Industrial alcohol used to paint doors, tables, chairs, and the like is pure if a person does not know whether it is intoxicating or not.[4]

Ayatollah Montazeri (may Allah have mercy on him): Alcohols used to disinfect after injections are pure if they do not contain intoxicating liquids, otherwise they are impure.[5]

Industrial and chemical alcohols are pure until we are certain of their impurity.[6]

Ayatollah Mousavi Ardebili: Industrial alcohol used to paint doors, tables, chairs, and the like is pure if a person does not know whether it was made from an intoxicating liquid or not.

If alcohol is obtained from oil, which is a liquid and viscous substance, it is pure if it is not intoxicating.[7]

Buying and selling alcohol:

Some contemporary jurists have also issued a fatwa regarding the production and buying and selling of alcohol, which is as follows:

The Supreme Leader: There is no problem in trading in intoxicants that are not produced for the purpose of smoking; such as medical alcohol (white alcohol) and industrial alcohol, if it is for purposes other than smoking. For example, trading industrial alcohol for polishing wood or dissolving varnish, or white alcohol for disinfecting injections, etc. And if it is for the purpose of smoking, it is invalid and forbidden.[8]

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[1] Muhammad Fadel Lankarani, Rulings on Physicians and Patients, p. 200
[2] Nasser Makarem Shirazi, Treatise on the Explanation of Issues, p. 37, pp. 124 and 125
[3] Jafar Sobhani, Treatise on the Explanation of Issues, p. 128, pp. 95 and 96
[4] Musa Shabair Zanjani, Treatise on the Explanation of Issues, p. 29, pp. 113
[5] Hossein Ali Montazeri, Medical Precepts, p. 25
[6] Ibid., p. 161
[7] Abdul Karim Mousavi Ardebili, Treatise on the Explanation of Issues, p. 22
[8] http://farsi.khamenei.ir/news-content?id=27813/

Ayatollah Mousavi Ardebili (RA): It is permissible to buy and sell industrial alcohol and other alcohols that are used in industry and medicine and have rational benefits, even if they are at the highest level of intoxication.[1]

Ayatollah Montazeri (RA): Producing alcohol is permissible if it is not for the purpose of using it in intoxicating drinks, but for other rational purposes such as using it to paint doors and wood, or for its use as fuel or for use in injections and removing harmful contaminants and other benefits of the rational community, and there is no problem with buying and selling it if it is in line with these purposes; even if it is at the highest level of intoxicating.[2]

There is also a substance in medical alcohols called "atlik", that is, the same substance that is present in 5% of beer, 30% in arrack, and 60 to 70% in vodka and whiskey, but since it is not used for eating, buying and selling it is definitely permissible and there is no problem with storing it.[3]

Ayatollah Muhammad Saeed Hakim: Although selling alcohol and any intoxicant is absolutely forbidden, and the money for it is also forbidden; However, its production is not forbidden if it is for purposes other than drinking.[4]

2. Ruling on Alcoholic Products

2-1. Alcoholic Beverages

Imam Khomeini (RA): Wine and any intoxicant that flows on its own are impure.[5]

Faqqa' is impure. Barley water is pure. Barley water is water that is taken from barley for its medicinal properties.[6]

Great verses of Khoi (RA) and Tabrizi (RA): Wine and wine that is intoxicating are impure, and as an obligatory precaution, anything that intoxicates a person, even if it flows on its own, is also impure.[7]

F◦qaa, which is a special drink made from barley, is impure, but beer, which doctors recommend, is not impure.[8]

Ayatollah Sistani: Wine is impure, and as a matter of obligatory precaution, anything that is intoxicating and flows by itself is impure.[9]

[1] Abdul Karim Mousavi Ardebili, Jurisprudence of Limitations and Restrictions, vol. 2, p. 665
[2] Hossein Ali Montazeri, Studies in the Forbidden Earnings, Vol. 1, p. 454
[3] Hossein Ali Montazeri, Fundamentals of the Jurisprudence of the Islamic State, Vol. 8, p. 367
[4] Mohammad Saeed Tabatabaei Hakim, Murshid al-Mughtarib, p. 308
[5] Imam Khomeini, Risale-i Tasnim al-Mas'il, Issue 107
[6] Ibid., Issue 111
[7] Abul-Qasim Khoei, Minhaj al-Salihin, Vol. 1, p. 109, Issue 405; Mirza Jawad Tabrizi, Minhaj al-Salihin, Vol. 1, p. 113, Issue 405
[8] Abul-Qasim Khoei, Ibid., Vol. 1, p. 109, Issue 407; Mirza Jawad Tabrizi, Ibid., Vol. 1, p. 114, Issue 407
[9] Sayyid Ali Sistani, Minhaj al-Salihin, Vol. 1, p. 138, Issue 405

Fiqaa, which is often made from barley and causes a slight degree of intoxication, is forbidden, and as a matter of obligatory precaution, it is impure. As for beer, which does not cause any intoxication, it is pure and permissible.[1]

All foods that contain alcohol are pure, and if the amount of alcohol in them is insignificant, for example, two percent, it is permissible to eat them.[2]

Ayatollah Wahid Khorasani: Wine and intoxicating wine are impure, and other than these two, liquid intoxicants - except for fiqqa' - should be avoided as a recommended precaution.[3]

Fiqqa', which is obtained from barley and is called beer, is impure, but water that is obtained from barley on the advice of a doctor and is called (ma' al-sha'ir) is pure.[4]

The great verses of Gulpaygani (may Allah have mercy on him) and Safi Gulpaygani: Anything that is intoxicating and flows by itself is impure.[5]

Fiqqa', which is a special drink and is usually obtained from barley, is impure; but if it is obtained from something other than barley, its sanctity and impurity are matters of concern; unless it is intoxicating.[6]

Ayatollah Bahjat (may Allah have mercy on him): Wine and anything that intoxicates a person in excess, if it is a liquid by itself, is impure and is forbidden to eat, even if it is small or its intoxicating effect is slight.[7]

According to the scholars, the wine that is usually obtained from barley and is called beer is impure and is forbidden to eat, but the water that is obtained from barley on the advice of a doctor and is called ma'al-sha'ir is pure.[8]

Ayatollah Makarem Shirazi: Wine and any liquid that intoxicates a person is impure, based on obligatory precaution.[9]

By wine is meant any intoxicating liquid, and beer is also one of the alcoholic beverages, even drinking a drop of wine or less is forbidden.[10]

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[1] Seyyed Ali Sistani, ibid., vol. 1, p. 139, issue 408; Imam Khomeini's Explanation of the Mahshi Issues, vol. 1, p. 81

[2] Hakim, Abdul Hadi Muhammad Taqi, Jurisprudence for the Expatriates: According to the Fatwas of Sayyid al-Sistani, p. 76

[3] Hossein Wahid Khorasani, Risale-i Tasnim al-Mas'il, p. 22, issue 112

[4] Ibid., p. 23, issue 116

[5] Mohammad Reza Golpaygani, Hidayat al-Ibad, vol. 1, p. 110, issue 547; Lotfollah Safi Golpaygani, Hidayat al-Ibad, vol. 1, p. 93, issue 547

[6] Mohammad Reza Golpaygani, ibid., vol. 1, p. 110, issue 549; Lotfollah Safi Golpaygani, ibid., vol. 1, p. 94, issue 549

[7] Mohammad Taqi Bahjat, Risale-i Tasnim al-Mas'il, p. 28, issue 115

[8] Ibid., p. 28, issue 119

[9] Nasser Makarem Shirazi, Risale-i Tasnim al-Mas'il, p. 37, issue 123

[10] Ibid., p. 441, issue 2265

The alcoholic beverage made from barley, called "beer," is forbidden and is like wine in terms of impurity, but the water made from barley for its medicinal properties, called "barley water," is not intoxicating at all, and is pure and permissible.

The fermented beer, also called "lordo-beer," is in the form of a round ball for medical use, and is neither intoxicating nor liquid. It is pure and permissible.[1]

Ayatollah Fadil Lankarani (may Allah have mercy on him): Wine and anything that intoxicates a person, if it flows by itself, are impure.[2]

The water that is taken from barley and is called barley water is impure, but the water that is taken from barley on the advice of a doctor and is called barley water is pure.[3]

Ayatollah Subhani: Wine and anything that intoxicates a person if it flows on its own is impure.[4]

Alcoholic beverages that are taken from barley and are called barley water are impure, but the water that is taken from barley on the advice of a doctor and is called barley water is pure.[5]

Ayatollah Shubayri Zanjani: Wine and anything that intoxicates a person if it flows on its own is impure, and if a large amount of it is intoxicating, a small amount of it is also impure.[6]

The beer that is made from barley and is called "beer" is impure, but the water that is made from barley on the orders of doctors and is called "barley water" is pure.[7]

Ayatollah Mousavi Ardebili (may Allah have mercy on him): Wine and anything that makes a person drunk, if it flows on its own, is impure, even if it has been solidified by means, and if it does not flow, like marijuana and hashish, even if something is poured into it to make it flow, it is pure.[8]

Ayatollah Montazeri (may Allah have mercy on him): Barley water is pure, but the beer (barley water) that is intoxicating is forbidden and impure.[9]

2-2. Medicinal and health uses of alcohol

Ayatollah Sistani: If the treatment of severe diseases that are not normally tolerable is limited to the use of forbidden substances, there is no problem, and it seems that there is no difference between wine and other intoxicants and other forbidden substances; of course, the issue of wine is different, and even if all skilled and religious doctors agree on such a method of treatment, the sick person should not treat himself with it; unless he is at risk of death by abandoning it.[10]

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[1] Ibid., p. 38, issues 128 and 129
[2] Muhammad Fadel Lankarani, Risale-i Tasnim al-Mas'il, p. 22, issue 117
[3] Ibid., p. 22, issue 121
[4] Jafar Sobhani, Risale-i Tasnim al-Mas’il, p. 128, issue 94
[5] Ibid., p. 129, issue 99
[6] Musa Shabair Zanjani, Risale-i Tasnim al-Mas’il, p. 29, issue 112
[7] Ibid., p. 29, issue 116
[8] Abdul Karim Mousavi Ardebili, Risale-i Tasnim al-Mas’il, p. 22
[9] Hossein Ali Montazeri, Ahkam al-Mezzeki, p. 162
[10] Sayyid Ali Sistani, Minhaj al-Salihin, vol. 3, p. 309

Otherwise, he should be patient with the severity of the disease until God heals him in accordance with his piety.

Ayatollah Montazeri (may Allah have mercy on him): Treatment with forbidden things - such as drinking wine and alcohol - is not permissible; unless the treatment is limited to them, in which case, the amount necessary should be limited.[1]

External medicines, whether liquids (such as syrups) or solids (such as tablets), as well as perfumes, soaps, and powders that are suspected of containing intoxicating alcohol or impurities, are subject to purification and halal until it is certain that such substances are present.[2]

Ayatollah Fadel Lankarani (may Allah have mercy on him): Treatment with forbidden things such as wine and alcohol is not permissible, unless the treatment is limited to them, in which case, the amount needed should be limited.[3]

Substances used for disinfection in injections, dressings, etc. are pure if they are not prepared from intoxicating liquids or impure objects.[4]

The disinfectant liquid used during an injection is pure, even if it contains alcohol. However, if intoxicating alcohol has been used or if the injection site becomes contaminated with blood, the site must be rinsed with water.[5]

Ayatollah Mousavi Ardebili (may Allah have mercy on him): There is no problem with using perfumes or colognes as long as a person does not know that they are made from something that is mentally intoxicating.[6]

[1] Hossein Ali Montazeri, Ahkam al-Mezzeki, p. 161
[2] Ibid., p. 162
[3] Mohammad Fazel Lankarani, Rules of Physicians and Patients, p. 53
[4] Ibid., p. 201
[5] Ibid., p. 211
[6] Abdul Karim Mousavi Ardebili, Treatise on the Explanation of Issues, p. 22

Appendix No. 2: Opinions of Sunni jurists on intoxicating alcoholic beverages:

There are two well-known opinions on this matter that jurists have mentioned.

First View:

According to the opinion of most jurists

Regarding the Sharia rulings related to alcoholic beverages:

Most Islamic jurists (i.e. Imam Malik, Imam Shafi'i, Imam Ahmad, and also Imam Muhammad from the Hanafi school of jurisprudence) believe that all types of liquid intoxicants are included in what the Quran calls "alcohol" and therefore, the same ruling as alcohol applies to any liquid intoxicant. Therefore, they believe:

• All liquid intoxicants are forbidden and therefore any use of them is not permissible.

• All liquid intoxicants are impure and even if a drop of them falls on clothes or food, etc., they also become impure.

• Buying, selling, or conducting any type of transaction involving any liquid intoxicant is completely forbidden.

Note: Most scholars have given the same ruling as above regarding alcohol.

Second View:

Based on the view of Hanafi jurists

Regarding the Sharia rulings related to alcoholic beverages:

Two categories of intoxicating alcohols

According to the Hanafi school of thought (according to the views of Imam Abu Hanifa and Imam Abu Yusuf), there are two types of liquid intoxicants that are subject to different Sharia rulings. Accordingly, intoxicating alcohol will also be of two types, the details of which are as follows:

First category:

Shariah rulings related to alcohol derived from grapes or dates:

Alcohol derived from grapes and dates is exactly the same as khamr in terms of Sharia rulings. Therefore, most scholars (including Hanafi jurists) agree that all the Sharia rulings related to khamr apply equally to this type of liquid intoxicant (ethyl alcohol derived from grapes and dates).

Second Category:

Shariah Rulings Regarding Alcohols Derived from Sources Other Than Grapes and Dates:

According to the Hanafi School (according to the opinion of Imam Abu Hanifa and Imam Abu Yusuf), alcohol derived from any intoxicating liquid other than the four main alcoholic beverages (khamr, tala, naqi' al-tamar and naqi' al-zubeeb) - such as alcohol derived from molasses, wheat, barley, etc. - will have the following Shariah rulings:

Halal/Haram: The use of alcohol derived from sources other than grapes and dates is not haram if it is used for a purpose or necessity permitted by Shariah and in small quantities that do not lead to intoxication. However, its excessive use to the extent that it leads to intoxication will be haram.

Pure/Impurity: Alcohol derived from sources other than grapes and dates is not impure.

Buying and selling: Buying, selling or trading alcohol derived from sources other than grapes and dates is permissible as long as it is done for a purpose or necessity permitted by Sharia. Selling it for an unauthorized purpose is forbidden.

Sharia ruling on the use of alcohol in various industries:

Let it be clear that with the progress and development of science and technology, there are now countless uses for alcohol. In the following pages, we have mentioned a few industries as examples. Other industries should refer to experts or reputable Sharia organizations for information on the ruling on the use of alcohol in their specific industry.

Use of alcohol in the food industry:

• The use of ethyl alcohol derived from grapes or dates is not permitted in any product in the food industry.

• Ethyl alcohol obtained from sources other than dates and grapes can be used in industrial uses, provided that it does not lead to any poisoning.

• The use of ethyl alcohol derived from sources other than grapes and dates, even in industrial uses, is not permitted if it leads to intoxication or is likely to lead to it.

Use of alcohol in the chemical industry and food flavorings:

• The use of any chemical and food flavorings containing ethyl alcohol derived from grapes or dates is not permitted.

• Ethyl alcohol derived from sources other than grapes and dates, which is used in chemical and food flavorings, may only be used in quantities that do not lead to poisoning and are not likely to lead to poisoning.

• The use of chemical and food flavorings containing ethyl alcohol from sources other than grapes and dates that lead to poisoning or are likely to lead to poisoning is not permitted.

Use of alcohol in the beverage/soft drink industry:

• The use of ethyl alcohol, regardless of its source of extraction, is not permitted in any way in beverages that are specifically produced for the purpose of intoxication.

• The use of ethyl alcohol derived from sources other than grapes and dates in beverages that are not produced for intoxication is permitted as long as the amount of ethanol used does not lead to intoxication.

• The use of ethyl alcohol derived from sources other than grapes and dates in beverages in an amount that leads to intoxication or is likely to lead to intoxication is not permitted.

Use of alcohol in pharmacy:

• The use of ethyl alcohol derived from grapes or dates is prohibited in pharmacy.

The conditions and rulings of the Sharia regarding “treatment with forbidden” will apply if it is done.

• The use of ethyl alcohol derived from sources other than dates and grapes in the pharmaceutical industry is permitted if needed and only to the extent of meeting that need.

Use of alcohol in the cosmetics and personal care products industry:

• The use of ethyl alcohol derived from grapes and dates is not permitted in the cosmetics and personal care products industry.

• The use of ethyl alcohol derived from sources other than grapes and dates in the cosmetics and personal care products industry is permitted only if it is for external use.

Use - For example: perfumes, hand sanitizers, body lotions and other personal care products.

• If there is a possibility of intoxication through the external application of any cosmetic product, it is not permissible to use ethyl alcohol, even from sources other than grapes and dates.

Use of alcohol in detergents, paints, varnishes, air fresheners, etc.

• The use of ethyl alcohol derived from grapes or dates in detergents, paints, varnishes, air fresheners, etc. is not permitted.

• If the ethyl alcohol is derived from sources other than grapes or dates, the use of such detergents, paints, varnishes, air fresheners, etc. is permitted. (18)

SMIC Standard 24

4-1-10 Some food additives (usually food colorings) and other added chemicals require a solvent for dissolution. The use of alcohol is permitted under the following conditions:

a- Food additives (usually food colorings) and other added chemicals that cannot be dissolved in any other solvent that does not cause intoxication,

b- Alcohol must be used in the minimum amount necessary to dissolve the chemicals,

c- For a person consuming alcohol, the amount should not be intoxicating (less than 0.05% blood alcohol concentration), meaning that the alcohol limit should not exceed 0.5% w/v or w/w of the final product.

Note 1- BAC is the blood alcohol concentration, measured in grams per 100 ml.

Note 2- Alcohol should not be derived from grapes or dates.?

1- The term “alcohol” wherever used in this document refers to ethyl alcohol (ethanol). If one of the Islamic sects permits the consumption of ethyl alcohol, then the name ethyl alcohol must be clearly stated by the manufacturer on the product label along with its source. Isopropyl alcohol may be used instead of ethyl alcohol.

- Blood Alcohol Concentration (BAC)

MUI Fatwa (Islamic Legal Opinion) for Materials and Production Process (No. 4/2003)

Khamr Anything that is intoxicating is considered khamr (alcoholic beverage). Beverages that contain at least 1% ethanol are considered khamr. Beverages that fall into the khamr category are impure. Beverages produced through a fermentation process and contain less than 1% ethanol are not considered khamr, but their consumption is prohibited.

Ethanol produced by a non-khamr industry is not impure (pure).

The use of pure ethanol produced by a non-khamr industry is:

It is permissible (permissible), if it is not detected in the final product.

It is forbidden (haram), if it is detected in the final product.

The use of ethanol produced by the khamr industry in the production of food is prohibited.

Resolution of the International Islamic Fiqh Academy: Resolution No. 210 (6/22)

The Council of the International Islamic Fiqh Academy, affiliated with the Organization of Islamic Cooperation, convened in its twenty-second session in the State of Kuwait, from 2-5 Jumada al-Thani 1436 AH, corresponding to 22-25 March 2015 CE.

Resolved the following:

Alcohol is not considered ritually impure according to Islamic law, based on the previously established principle that all things are inherently pure, whether the alcohol is pure or diluted with water. Therefore, there is no legal impediment to using alcohol medically as a disinfectant for skin (wounds) and instruments, and as a germicide, or to using perfumes (such as cologne) that utilize alcohol as a solvent for volatile aromatic substances, or to using creams containing alcohol. This does not apply to wine, as its use is prohibited.

% *Alcohol Permitted In Foods*

Country	% Alcohol
Malaysia (JAKIM)	0.5 (ingredient) and 0 in the final product
Indonesia (MUI)	1.0 (In ingredients) and 0 en the final product
Singapore (MUIS)	0.01

JAKIM = Department Of Islamic Development Malaysia

MUI = Majelis Ulama Indonesia

MUIS = Majlis Ugama Islam Singapura

Appendix Three: Calculations

A- With a drink with ABV = 0.5% (i.e. half a percent ethyl alcohol)

We use the same body mass distribution model: men r = 0.70, women r = 0.60. Target BAC = 0.02% = 0.0002. Let's look at the basic formula:

• Formula for the volume of drink required (ml):

L(mL) = [BAC_target × mass_kg × 1000] / [ABV × 0.789 × r]

• With ABV = 0.005 (i.e. 0.5%), substituting:

L(mL) = (0.0002 × mass_kg × 1000) / (0.005 × 0.789 × r)

= (0.2 × mass_kg) / (0.003945 × r)

≈ (50.63 × mass_kg) / r (This estimate is approximate and fits the kg values listed) Results for weights of 50, 60, 70, 80 kg:

• For men (r = 0.70):

Weight 50 kg: L ≈ (0.0002 × 50 × 1000) / (0.005 × 0.789 × 0.70)

≈ 10 / (0.0027615)

≈ 3622 mL

 50 kg: L ≈ 10 / (0.005×0.789×0.70) = 10 / (0.00276015) ≈ 3620 mL

 60 kg: L ≈ 12 / (0.005×0.789×0.70) = 12 / 0.00276015 ≈ 4350 mL

 70 kg: L ≈ 14 / 0.00276015 ≈ 5070 mL

 80 kg: L ≈ 16 / 0.00276015 ≈ 5790 mL

B- Calculations with a drink with ABV = 1% (i.e. one percent ethyl alcohol)

$$\frac{BAC_{\text{target}} \times \text{masa}_{\text{kg}} \times 1000}{ABV \times 0.789 \times r} = L(\text{L})$$

Target BAC: 0.0002=0.02%

Bevarage ABV: 1% (0.01)

Ethanol Density: 0.789 g/mL

Body mass distribution ratio in men(r): ~0.70 , in women:~0.60

Table for calculating the volume of drink required (for one time use, ABV = 1%)

Body Weight (Kg)	Men - r=0.70	Women- r=0.60
50	L1.81	L 2.11
60	L 2.17	L 2.54

C- Calculations with a 2% alcohol drink:

If the ABV of the drink is 2%, the volume of drink required to reach the target BAC is 0.02 g/dL. The calculations are as follows:

Fixed assumptions:

• BAC_target = 0.02 g/dL

• Body_Water_Constant for men = 0.58

• Body_Water_Constant for women = 0.49

• Density_Ethanol = 0.789 g/mL

• Units: Alcohol_grams in grams, V_ml in milliliters

Calculation code:

• Alcohol_grams = BAC_target × (Body_Water_Constant × Weight_kg) × 100

• V_ml (for ABV = p%) = Alcohol_grams / ((p/100) × 0.789)

With ABV = 2% (recommended: p = 2)

Specific equation:

• V_ml = Alcohol_grams / (0.02 × 0.789) = Alcohol_grams / 0.01578

But we still need to calculate Alcohol_grams with Weight and Gender.

D- Calculation table for 40 kg weight:

Sure. For 40 kg weight, the calculation is done with the same model and assumptions as before. This time only for 40 kg weight and with the desired ABV of 2%.

Fixed Assumptions:

• BAC_target = 0.02 g/dL

• Body_Water_Constant:

 Male = 0.58

 Female = 0.49

• Density_Ethanol = 0.789 g/mL

• ABV = 2% (p = 2)

Calculations:

• Alcohol_grams = BAC_target × (Body_Water_Constant × Weight_kg) × 100

• Volume_ml = Alcohol_grams / (ABV/100 × 0.789) = Alcohol_grams / 0.01578

Results for Weight_kg = 40

 Male:

o Alcohol_grams = 0.02 × (0.58 × 40) × 100 = 0.02 × 23.2 × 100 = 46.4 g

o Volume_ml = 46.4 / 0.01578 ≈ 2942 mL ≈ 2.94 liters

• Female:

o Alcohol_grams = 0.02 × (0.49 × 40) × 100 = 0.02 × 19.6 × 100 = 39.2 g

o Volume_ml = 39.2 / 0.01578 ≈ 2486 mL ≈ 2.49 liters

Summary:

• Weight 40 kg

• Male: ~2.94 liters of drink with ABV 2%

• Female: ~2.49 liters of drink with ABV 2%

E- Calculation table for weights 50, 60, 70, 80 kg:

1. Weight 50 kg

• Male:

o Alcohol_grams = 0.02 × (0.58 × 50) × 100 = 0.02 × 29 × 100 = 58 g

o V_ml = 58 / 0.01578 ≈ 3673 mL ≈ 3.67 L

• Female:

o Alcohol_grams = 0.02 × (0.49 × 50) × 100 = 0.02 × 24.5 × 100 = 49 g

o V_ml = 49 / 0.01578 ≈ 3105 mL ≈ 3.11 L

2. Weight 60 kg

• Male:

o Alcohol_grams = 0.02 × (0.58 × 60) × 100 = 0.02 × 34.8 × 100 = 69.6 g

o V_ml ≈ 69.6 / 0.01578 ≈ 4410 mL ≈ 4.41L

• Female:

o Alcohol_grams = 0.02 × (0.49 × 60) × 100 = 0.02 × 29.4 × 100 = 58.8 g

o V_ml ≈ 58.8 / 0.01578 ≈ 3730 mL ≈ 3.73 L

3. Weight 70 kg

• Male:

o Alcohol_grams = 0.02 × (0.58 × 70) × 100 = 0.02 × 40.6 × 100 = 81.2 g

o V_ml ≈ 81.2 / 0.01578 ≈ 5140 mL ≈ 5.14 L

Woman:

o Alcohol_grams = 0.02 × (0.49 × 70) × 100 = 0.02 × 34.3 × 100 = 68.6 g

o V_ml ≈ 68.6 / 0.01578 ≈ 4350 mL ≈ 4.35 L

4. Weight 80 kg

Man:

o Alcohol_grams = 0.02 × (0.58 × 80) × 100 = 0.02 × 46.4 × 100 = 92.8 g

o V_ml ≈ 92.8 / 0.01578 ≈ 5880 mL ≈ 5.88 L

• woman:

o Alcohol_grams = 0.02 × (0.49 × 80) × 100 = 0.02 × 39.2 × 100 = 78.4 g

o V_ml ≈ 78.4 / 0.01578 ≈ 4960 mL ≈ 4.96 L

Quick summary (relatively crude with ABV = 2%):

• 50 kg weight: male≈3.67 L, female≈3.11 L

• 60 kg weight: male≈4.41 L, female≈3.73 L

• 70 kg weight: male≈5.14 L, female≈4.35 L

• 80 kg weight: male≈5.88 L, female≈4.96

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