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Discussion on Potential Harmful Substances in Liquor

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Abstract

In recent years, more and more inferior liquor appeared on the market. Liquor producers pay more and more attention to the food safety of liquor. In this paper, the harm of some harmful substances in liquor, the method of detection and the strategy of reducing the content were described, which provided a reference for the safety evaluation of liquor.

Keywords

Liquor; Harmful substances; Detection; Control strategy.

1. Introduction

In the process of liquor production, due to the influence of raw materials, equipment and production technology, it is inevitable to produce some harmful substances, which will cause a series of liquor safety problems. Liquor food safety is related to consumer health. It is necessary to take a series of measures to reduce harmful substances.

2. Fusel Oil

2.1. Hazards of Fusel Oil

In the process of liquor production, if the content of fusel oil in liquor is too high, it is harmful to human body. When fusel oil enters human body, can restrain the nerve center of the person, make a person headache dizzy, lose the symptom such as volition.

2.2. Detection Method

Gas chromatography was used. The specific process is that the evaporated sample can pass through the mobile phase into the chromatographic column, and then determine the content of fusel oil in liquor by capillary column. This method is widely used and has high accuracy.

2.3. Reduction Strategy

In the process of liquor production, the amount of food and water should be reduced to reduce the production of higher alcohols. In addition, the content of higher alcohols can be reduced by increasing the curvature.

3. Cyanide

3.1. Harm

Cyanide is a highly toxic substance that in very small amounts can be deadly and can reduce crop yields. Cyanide injury to the human body is entered the human body, a very short time will cause headache, discomfort, palpitations and other symptoms.

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3.2. Detection Method

According to the relevant regulations of the state, the cyanide (in HCN) of distilled liquor and its preparation made from grain as raw materials shall not exceed 8.0mg/L (the index shall be converted to 100% alcohol) [1]. Spectrophotometric method was used to detect cyanide in liquor.

3.3. Reduction Strategy

When selecting brewing materials, avoid materials that may contain cyanide as much as possible to reduce the cyanide content at the source. The raw material is put in the vent and the cyanide content is reduced by using its volatile property. If the content of cyanide in liquor is too high, the method of dilution can be adopted. Generally, the cyanide content of luzhou-flavor liquor is very low.

4. Methanol

Methanol is volatile, soluble in water, flammable, toxic and other main properties, is also one of the important components in liquor production.

4.1. Harm

Methanol is also called wood alcohol. The metabolites of methanol in the body are formaldehyde and formic acid, among which formaldehydeplays the role of protein condensation. Formic acid is highly corrosive, and its toxicity is 30 times and 4 times greater than that of methanol, causing greater harm to human body [2].

4.2. Detection Method

High performance liquid chromatography (HPLC), which USES high pressure to supplement some small particles to the chromatographic column and then USES a more sensitive detection equipment to translate the chromatographic map into radio signals, it can detect the content of the detected substance more accurately.

4.3. Reduction Strategy

In the process of steaming wine, using low pressure to increase the volume of air as far as possible. If using batch cooking, it should put off steam exhaust, in order to facilitate methanol in liquid discharge [3]. In addition, attention should be paid to the cultivation of microorganisms in the pit to reduce the production of methanol.

5. Lead

Lead is a highly toxic metal, so it can be harmful to the body, such as nerves, blood cells, kidneys, cardiovascular and endocrine systems, and can cause lead poisoning in excessive amounts.

5.1. Harm

When lead enters the body, it will damage the nervous system and digestive system, resulting in dizziness, weakness, dizziness, drowsiness, insomnia, anemia, low immunity, irregular menstruation and other symptoms. Excessive lead will lead to death [1].

5.2. Detection Method

According to the "determination of lead in food safety national standard" gb5009.12-2017, graphite furnace atomic absorption spectrometry is adopted to detect lead content in liquor [4]. This method can eliminate the interference of co-existing metal ions and is a fast and effective detection method.

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5.3. Reduction Strategy

Lead-free metal should be used to contain alcohol or production equipment to reduce lead content. In addition, liquor production management should be strengthened to avoid the pollution caused by acid producing bacteria. For wines with high lead content, gypsum can be used to remove the lead.

6. Mn

Manganese is one of the essential trace elements in normal metabolism of human body. Excess manganese enters the body and causes chronic poisoning.

6.1. Harm

If the content of manganese in liquor exceeds the standard level, it can lead to central nervous system disorders, showing symptoms such as dizziness, drowsiness, memory loss and mental malaise.

6.2. Detection Method

According to the characteristics of manganese, the method of water bath evaporation and ammonium persulfate spectrophotometry were used to detect manganese.

6.3. Reduction Strategy

Carry out strict cleaning of the metal carried on the winemaking equipment such as wine cans, wine pipes and wine pumps ,to reduce the content of manganese.

7. Plasticizer

Also known as o-benzodiester compounds.

7.1. Harm

Long-term consumption of plasticizer can lead to shorter children's genitals, also affect development, and affect fetal and infant hormone secretion, leading to early puberty in children.

7.2. Detection Method

It was detected by gas chromatography-mass spectrometry.

7.3. Reduction Strategy

Liquor producers must produce liquor in strict accordance with national standards. At the same time, increase investment in science and technology and the development of non-toxic alternatives.

8. Crops

Pesticide residues are the general term for trace pesticides, toxic metabolites, degraded substances and impurities left in organisms, harvesters, soil, water and the atmosphere after the use of pesticides that have not been decomposed in a certain period of time [1].

8.1. Harm

Pesticide residues in the human body long-term accumulation, retention will also cause a variety of chronic diseases, such as cardiovascular and cerebrovascular diseases, diabetes, liver disease, cancer and so on.

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8.2. Detection Method

According to the national standards, there are two methods for the detection of agricultural residues in food: capillary column gc electron capture detector method and packed column gc electron capture detector method [1].

8.3. Reduction Strategy

Strictly control the selection of raw materials, trying not to use feishui to irrigate the farmland as much as possible, and then promote efficient and low-toxic pesticides. At the same time, the storage of raw materials should also be strictly regulated, and toxic substances and raw materials should not be placed in the same place. Materials should not be kept too long.

9. Aldehydes

9.1. Harm

The most toxic formaldehyde is formaldehyde, a small amount of which can cause death. Poisoning causes symptoms such as coughing, chest pain, burning, dizziness and vomiting. Other aldehydes in aldehydes are also harmful to humans.

9.2. Detection Method

The aldehydes were detected by gas chromatography.

9.3. Reduction Strategy

In the process of steaming wine, the temperature of wine flow should be strictly controlled. In addition, in the use of materials to use less chaff, rice hull.

10. Aflatoxin

10.1. Harm

Aflatoxin is highly toxic and can easily be found in dried fruits, food and soil.

10.2. Detection Method

High performance liquid chromatography (HPLC) was used to determine the fluidity of a liquid (such as acetonitrile or methanol, water or buffer solution mixed in appropriate proportions), the samples obtained after extraction and purification were derivated and separated by HPLC, and then determined by a fluorescence detector. Toxin content in samples can be detected at a certain wavelength, and specific contents of G1, G2, B1 and B2 in samples can be accurately calculated and analyzed according to the measured peak height or peak area [5].

10.3. Reduction Strategy

The storage and transportation of liquor raw materials are strictly controlled, the temperature and moisture of raw materials are strictly controlled, and the content of aflatoxin can be reduced only through strict monitoring of each link.

11. Other Substances

In addition to the above substances, there are lots of harmful substances in liquor, such as unexpected situation, produced by toxic substances in the process of brewing.

12. The Conclusion

The detection and treatment of harmful substances in liquor is an important link in liquor production, an important guarantee to improve liquor quality, and an important guarantee to

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meet the needs of consumers. It plays an important role in improving the sustainable development of liquor industry.

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