Study on Microorganisms in the Fermentation Process of Potato Buckwheat Liquor Wine Fermented Grains

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Abstract: In the traditional solid liquor brewing process, microorganisms play a vital role in the production, quality and flavor of liquor. Based on the fragrance type, this paper summarizes the main research situations of the three major fragrance types of Luzhou-flavor, sauce-flavor and fragrance, and the wine cellar in the production process of other flavor-type liquors, which is helpful for understanding liquor from the perspective of microorganisms. The nature of fermentation.

1. Introduction

Liquor is a traditional distilled liquor in China. It uses grain and other raw materials as raw materials, and uses distiller's yeast, active dry yeast and saccharifying enzyme as saccharification starters. It is distilled, saccharified, fermented, distilled, stored and blended to form distilled liquor with brandy. Whiskey, Odek (vodka), rum, and gin are listed as the world's six major distilled spirits. Due to different brewing materials, types of saccharification starter, production process and natural environment, China's liquors have different flavors and styles. Currently, there are 12 kinds of flavors, namely, strong flavor, sauce flavor and fragrance. Type, Fengxiang, rice, sesame, fragrant, special, medicinal, musk, old white and fragrant. The stability, reproduction and metabolism of microbial communities in wine cellars play an important role in the formation of Chinese liquor flavor. The wine cellar micro-ecological system is formed and changed in the long-term anaerobic fermentation process. The composition of microbial communities in the early, middle and late stages of wine cellar fermentation is obviously different; the microbial community structure of different cellars is different. It can be seen that Chinese liquor, as a unique fermented food of the Chinese nation, has a unique charm and faces many problems. In recent years, with the continuous infiltration of emerging technologies such as genetics and informatics in the fermentation industry, the popularization of computer-related software applications, molecular level, cell level, and community level, the research methods at different levels in the liquor industry, liquor and wine cellar Microecology research has developed rapidly. Therefore, it is a new research perspective to evaluate the level of wine cellar fermentation from different fermentation time, the number distribution of various microorganisms in different interface wine cellars, and the ratio of each other.

2. Microbial analysis of wine cellar

The number of aerobic bacteria, yeasts and molds increased sharply in the early stage of fermentation, and decreased sharply after 5 days of fermentation. The facultative anaerobic bacteria had a sharp increase in the early stage of fermentation, and then decreased sharply; After 5 to 15 days of fermentation, the number of yeasts predominates; after 15 days of fermentation, facultative anaerobic bacteria predominate. As the fermentation progressed, the temperature of the wine cellar slowly increased at a rate close to 1 °C/d in the first half of the month, and then slowly decreased after maintaining the maximum temperature for a period of time; the moisture content was 44 days before the fermentation. The gradual upward trend and then slowed down; the acidity did not change significantly in the first 34 days of fermentation, and increased rapidly after 34 days; the starch content gradually decreased; the residual sugar content in the early stage of fermentation was

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gradually decreased, after 8 days The residual sugar content was basically stable; the alcohol content increased rapidly in the early stage of fermentation, and showed a slow downward trend after 23 days. As the fermentation progressed forward, the trends of various alcohols varied, and n-propanol did not change significantly in fermentation. n-butanol only appeared in the early stage of fermentation, but not in the late stage; isoamyl alcohol was in fermentation. The first 5 days increased significantly and then stabilized; isobutanol was detected only after 34 days of fermentation; the total amount of fusel oil increased significantly in the first 5 days of fermentation, and then stabilized; esters In the early stage of fermentation, only ethyl butyrate and ethyl lactate were detected. After 34 days of fermentation, ethyl hexanoate and ethyl acetate were detected successively. During the whole fermentation process, the content of various esters was Ethyl lactate was the main content, and the content of ethyl lactate decreased first and then increased. It decreased rapidly 5 days before fermentation, then gradually increased, and the growth rate increased in the middle and late stages of fermentation. Same as ethyl lactate.

3. Analysis of Microbial Fermentation Mechanism of Luzhou-flavor Liquor

In the early stage of fermentation, there is a large amount of oxygen in the Dianchi Lake. In addition, the content of organic acids and alcohol in the wine cellar is relatively low, and aerobic bacteria, yeast, mold and other aerobic growth microorganisms have rapidly proliferated. The fusel oil is mainly produced during this period. Due to the metabolic heat production during microbial growth, a rapid increase in the temperature inside the sputum is promoted. As the fermentation progressed forward, the oxygen in the sputum was quickly exhausted, and aerobic bacteria and molds quickly died. The fermentation is carried out for 2 to 15 days, and the yeast is fermented for 2 to 5 days after fermentation. Then, with the gradual increase of alcohol content in the wine cellar, a large number of yeasts with poor environmental tolerance occur. Melt out. A large amount of heat is generated during the main fermentation period of the alcohol, which promotes a rapid increase in the temperature of the wine cellar. In the middle and late stages of fermentation, the Dianchi cellar was in an anaerobic environment, and the metabolic activity of the lactic acid bacteria began to be active, producing a large amount of lactic acid, which promoted the rapid increase of the acidity of the wine cellar. At this stage, the content of acid and ethanol in the wine cellar is very high, and the esterification reaction of acid alcohol is accelerated, and a large amount of ester substances mainly composed of ethyl lactate are formed. In addition, we sampled and analyzed the dregs in the middle layer of Dianchi Lake. The results showed that the content of caproic acid, butyric acid and their corresponding ethyl hexanoate and ethyl butyrate in the middle layer were higher than those in the middle layer. The middle center of the same period. Ethyl hexanoate and ethyl butyrate can be produced by esterification of hexanoic acid and butyric acid with ethanol, respectively, which proves that the formation of hexanoic acid and butyric acid and the corresponding ester substances is closely related to functional microorganisms derived from mash.

In the past, people talked about increasing their own milk, mainly because of excessive acid production by lactic acid bacteria during fermentation. The metabolism of caproic acid produced by caproic acid was inhibited, resulting in the imbalance of lactic acid and caproic acid and their corresponding ethyl esters in the wine, which led to the loss of aroma. The typical style of white wine. However, the important role of lactic acid bacteria in the production of Luzhou-flavor liquor can not be ignored. In the middle and late stages of fermentation, the lactic acid bacteria in the dregs occupy the main position of the microorganisms, and a large amount of lactic acid is produced through metabolic activities, effectively inhibiting some of the bacteria. Metabolic activity. Lactic acid produced by the metabolism of lactic acid bacteria and ethyl lactate derived from lactic acid are the most important microbial metabolites in the wine cellar except ethanol. Through distillation, part of lactic acid and ethyl lactate enter the wine body. They are present in proper proportion with other ingredients, which can enhance the thick feeling of the wine body. It is an important material basis for the formation of Luzhou-flavor liquor style.

The composition of the microbes and their interactions affect the dynamic changes of the microbes in the wine cellar. The structure and changes of the microorganisms in the fermentation

process of the wine cellar can be studied to better understand the growth law and mechanism of the microbial microorganisms. It is of great significance to control the production of liquor, carry out quality and safety monitoring, and improve product quality. The molecular sequencing technology developed in recent years can measure tens of thousands of DNA sequences, and can quickly classify microorganisms at the species and genus level. The information is comprehensive and efficient, and it is suitable for the analysis of microbial environmental samples. Composition and dynamics provide a powerful means. For example, the DGGE fingerprint can be used to observe the changes of microbial colonies, and the image analysis software is used to calculate the diversity index and cluster analysis of microbial communities. Now, DGGE is used to compare the microbial community structure in different locations of koji and wine cellar, the difference of microbial community during fermentation of different types of white wine, and the changes of bacteria and fungi in the fermentation process of white wine. The analysis is related to the physical and chemical parameters of microbial growth environment and the quality of liquor. The relationship between key flavor substances changes. qPCR can also accurately quantify the type and quantity of microorganisms, and has broad application prospects in the research of liquor brewing microorganisms. However, the qPCR technology is relatively high, and it is still in the exploration stage in the research of liquor brewing microorganisms. qPCR provides a useful exploration in the study of white wine brewing microorganisms. Understanding the types and quantities of microorganisms in different fermentation periods is of great significance for controlling liquor production and improving the quality of liquor. Microbial community structure determines its ecological function. The high stability of community structure is an important factor to realize ecological function. Community structure change is an important aspect to mark environmental changes. Therefore, by analyzing the population structure and diversity of the target environment microbial community and studying its dynamic changes, it can provide a reliable basis for optimizing community structure, regulating community function, discovering new important microbial resources, and evaluating microbial ecological functions. The deep practical significance of production will surely promote China's traditional liquor industry to a new level. With the development of modern high-tech, the introduction of genetic engineering, fermentation engineering and other theories, the essence of micro-organisms in liquor production will be presented to the public. The key use of micro-organisms will improve the quality of liquor and better promote liquor. development of.

4. Conclusion

As a unique multi-strain solid state static natural fermentation technology of Chinese people, liquor has its unique charm and has high theoretical and practical value for the study of microorganisms. However, the research on liquor microbes is mostly in the traditional physiological and biochemical stage. To truly understand the microbial nature of liquor, we must rely on advanced theories and advanced methods, such as the introduction of micro-ecology, metabolic engineering, bioengineering, fermentation engineering. Such theory and molecular biology methods can better promote the development of liquor and improve the quality of liquor production. We need to effectively control the lactic acid bacteria in production, control the acid ester produced by its metabolism within a reasonable range, and make positive contributions to the fermentation of wine production and the formation of the final body style.

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