

Method of producing accelerated age whiskey

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Abstract

Accelerated age whiskey having amber color, aroma and flavor similar to matured whiskey was produced in a short period of time of less than a month in comparison to at least 3 years, which is the minimal period of time needed to produce matured whiskey. A control experiment was carried out in the same manner as the method of preparing accelerated age whiskey but with use of spring water instead of beer-like liquid.

Keywords: whiskey, accelerated age, alcohol, control

Introduction

Traditionally, the production of mature aged alcoholic beverages suitable for human consumption, such as whiskey, includes the steps of fermentation and distillation followed by aging in wooden barrels that are usually made from white oak at ambient conditions for a substantial period of time, e.g., at least 3 years and typically 5-8, 12, 15 and 18 years.

Distillation is carried out in stills made from copper. The capacity, shape, height and length of the still influence the physical process of separation of the spirits from the water. If a distillery has to replace the still, it will get a still with the similar capacity and shape, in order to maintain constant quality of the whisky. The quality of the whiskey depends partially on the copper surface being in contact with the liquids during the distillation process. The liquor is aged in oak barrels for several years while reacting with the charred wood and therefore the longer the aging period (and the reaction time) the finer the liquor. The barrels are usually stored in bonded warehouses that may be temperature controlled thereby requiring valuable storage space for long periods of time. Storing large volumes of alcoholic beverages in oak barrels for long periods of time requires large storage area and it is thus

very expensive. In addition, white oak is becoming scarce and therefore the oak barrels are also expensive.

Accelerated aging of, e.g., whiskey, can lead to substantial reduction in the production and handling costs of the product.

Processes for producing alcoholic beverages by accelerated aging are described in the literature, e.g., in US patents 3,787,587, 4,173,656, 6,132,788, 6,344,226, 6,506,430, 6,703,060 and 6,869,630.

Method of producing accelerated age whiskey

A simple, economic and convenient method of producing alcoholic drinks such as accelerated age whiskey having substantially similar characteristics of aroma, flavor and color in comparison to oak aged alcoholic drinks such as matured whiskey is described herein. The method described herein of producing accelerated age whiskey comprises the following steps:

- a) fermenting barley to obtain a beer-like liquid;
- b) preparing baked oak wood pieces;
- c) distilling the beer-like liquid of step a) and collecting a distillate;
- d) optionally adding ethanol to increase the relative alcohol content;
- e) refluxing the distillate, which optionally contains additional alcohol, over baked oak wood pieces for a time period sufficient to obtain accelerated age whiskey;
- f) filtering off the solids to obtain the filtered accelerated age whiskey; and
- g) storing the obtained accelerated age whiskey in glass bottles.

Surprisingly, the obtained accelerated age whiskey has substantially the same characteristics of aroma, flavor and color as oak aged whiskey. The total time period needed for production of the accelerated age whiskey, produced by the method disclosed herein until it is bottled, is about 23-24 days.

Basil leaves were used to improve the flavor. Fresh basil leaves can contain, e.g., 3-4 mg of copper per 100 g of leaves.

Spring water taken directly from the Matta spring flow was used to prepare the beer-like liquid. It is not imperative to use spring water but it can be assumed that using spring water may improve the flavor of the produced beer-like liquid. The spring is located in the village of Matta in Israel.

The quantity of alcohol in the distillate is dependent on the alcohol content and volume of the beer-like liquid as well as on the capacity and shape of distillation apparatus and the distillation conditions. A control sample, prepared in the same manner as the sample of accelerated age whiskey but with using water instead of a distillate of beer-like liquid, led to a liquid having a similar color of whiskey but without the distinctive aroma and flavor of whiskey.

Example 1- Fermentation of barley

The equipment used in this procedure was sanitized with an aqueous quaternary ammonium solution containing copper salts. 10 ml of said solution were mixed with 10 liters of water. After sanitization with said aqueous quaternary ammonium solution, the equipment was rinsed well with water to remove unwanted residues. 10 liters of fresh, cold spring water (taken from the spring located in Matta, Israel) were filled into a cooking pot and heated to a temperature of about 70°C. About 2 kg of ground barley, packed in a permeable bag, were soaked in the hot water for 1/2 hour during which time the bag was moved from time to time inside the pot at a constant temperature of about 70°C. Then, the bag was pulled out and extra water was drained back into the pot. The mixture in the pot was heated to boiling and the pot was left aside to cool. After few minutes about 1.1 Kg of malt extract were added and the mixture was heated to boiling. Whole dry hop was added and boiling was maintained for additional 1 hour. Then, the mixture was rapidly cooled down to 40°C using an ice-water bath. The liquid mixture was decanted into a sanitized 25-liter fermentation plastic vessel, (leaving the solids in the pot) and water was added to a total volume of 20 liters. 12 g of yeast were uniformly spread over the liquid mixture. The fermentation vessel was covered with lid equipped with a breather pipe filled with water to enable release of excess carbon dioxide during fermentation in order to avoid over pressure inside fermentation vessel. The fermentation vessel was left aside for a week in the cellar to enable fermentation. Then, 150 g of dextrose monohydrate were mixed with 500 ml of hot water for 10 minutes to afford complete dissolution. The obtained clear solution was cooled down to ambient temperature and poured into the fermentation vessel. The mixture was vigorously mixed for few minutes and left aside for additional two weeks to allow maturation. A dark brown highly carbonated rich in flavor beer-like liquid was obtained containing about 7% alcohol.

Example 2 – Preparation of baked oak wood pieces

A branch of oak bush (*Quercus calliprinos*) that grows in the Judah area in Israel was cut and chopped to afford pieces having average measurements of (1-1.5)³ cm. About 50 g of the oak bush pieces were baked in an oven at 200°C for about half an hour, cooled and placed in a closed glass vessel.

Example 3 – Distillation and reflux over baked oak pieces

400 ml of the beer-like liquid were placed in a 1 liter round-bottom flask equipped with a distillation column and few distillation stones were added. 5 fresh basil leaves were added to the flask to enhance the beverage's flavor. An oil bath was connected in order to heat the liquid gradually and cooling was maintained by passing cold water inside the distillation column from an ice-water bath using a water pump. The main distillation fraction was collected at initial temperature of 92-93°C to afford about 120 ml of colorless liquid. The distillate was placed in a clean 1 liter round-bottom flask and 10 pieces of baked oak wood were added followed by adding 35 ml of 95% ethanol food grade. A clean

distillation column was connected vertically to the flask in order to enable reflux and the mixture was refluxed for about half an hour.

The obtained refluxed liquid was left aside to cool down to ambient temperature to afford about 155 ml of an alcoholic beverage having amber color and aroma and flavor similar to matured whiskey.

The obtained accelerated age whiskey, which contained about 40% alcohol, was filtered off via a filter paper and poured into a glass bottle.

The accelerated age whiskey, produced as described hereinabove, was not tested for detection of traces of impurities, such as methanol, in the liquid.

Example 4 – Control preparation and testing

120 ml of fresh, cold spring water were placed in a clean 1 liter round-bottom flask and 10 pieces of baked oak wood were added followed by adding 35 ml of 95% ethanol food grade. A clean distillation column was connected vertically to the flask in order to enable reflux and the mixture was refluxed for about half an hour. The obtained refluxed liquid was left aside to cool down to ambient temperature to afford about 155 ml of liquid having amber color similar to matured whiskey. The obtained control liquid was filtered off via a filter paper and poured into a glass bottle. The liquid did have the aroma and flavor of whiskey.

Example 5 – long term storing

Several batches of the accelerated age whiskey, produced as described hereinabove, were filled in 1 liter empty glass bottles and sealed with metal cocks and stored. The liquids were stored as is, without the addition of any preservative. After a time interval of about 7.5 years, the bottles were opened and the liquid was examined and tasted. All the samples retained their original aroma, color, flavor and transparency characteristics.

Table 1 below includes characteristic data on the accelerated age whiskey as tested right after production and about 7.5 years after production.

Table 1. Characteristic values

Characteristics	Right after production	About 7.5 years after production
Aroma	Similar to matured whiskey	Retained
Color	Amber, similar to matured whiskey	Retained
Flavor	Similar to matured whiskey	Retained
Transparency	Good	Good

References

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