Processing of Whole Mulberry Wine with Micro Wet Milling System

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Background

Mulberry or Kuwano-mi belongs to the *Moraceae* family. It is widely distributed in Asia and well-known on its significantly nutritional qualities. Due to its fragile structure and low stability in the storage, it is usually processed as freezing food. Another possibility is to commercialize its fermented product. However the nutrition in mulberry's pomace and seeds is lost in the traditional wine processing because it only uses squeezing juice to ferment, on the other hand, the root and seeds of mulberry are difficult to remove.

Objectives

Micro Wet Milling System (MWM) which can degrade raw material into smaller particles by stone milling is used to produce whole mulberry wine in order to keep full nutrition with good sensory or taste. The milling and fermentation characteristics of mulberry are investigated for the new wine processing with MWM system.

Materials and Methods

The harvested mulberries (Shimane-ken,2014) are stored in a freezer and thawed in the use. *Saccharomyces Cerevisiaes* (Spain,2013) is chosen as wine fermentation yeast.

1. Milling characteristics: Demonstrate the effect of the mixing time for the mixer (Cuisinart SBC-1000) and the feeding rate for MWM system on the particle size of degraded mulberry.

2. Fermentation characteristics: By use of milled mulberry with MWM system as raw materials. The effect of dilution ratio on alcoholic (GC-Gas Chromatography-Shimazu GC14B), Brix% (Atago 2340 HSR-500 Hand-Held Refractometer), and particle size are observed. (SALD-Laser Diffraction Particle Size Analyzer). Sterilization at 60ºC for 10 min before fermentation was conducted. Due to the high viscosity of mulberry the dilution is given at 2,3,4 fold by distilled water.

Results

Milling experiment result shows that the smallest particle size by use of mixing is 107μm and the following MWM system reduces to 31μm. The polyphenol content of the MWM treated mulberry is 170.8mg/100g.

Fermentation experiment result shows that the alcohol content between 2,3,4 fold of dilutions are 11.1%, 11.6% and 12.2%. The brix% content between these dilutions are 9.3%, 8.5% and 8.1%.

Discussion

MWM system can make smaller particle size as 31μm when feeding rate is 14g/min by use of stone mill. The changing of particle size between mulberry slurry and wine is 31μm and 27.3μm. The other result shows that MWM system can make higher polyphenol content (170.8mg/100g) compared with mixing only (153.4mg/100g).

Fermentation result shows that the alcohol content is increasing with the decreasing of Brix content. And there is no significant differences of alcohol content between 2,3,4 dilution ratios. As a future work in graduate school, It is planed to do the sensory test of mulberry wine.

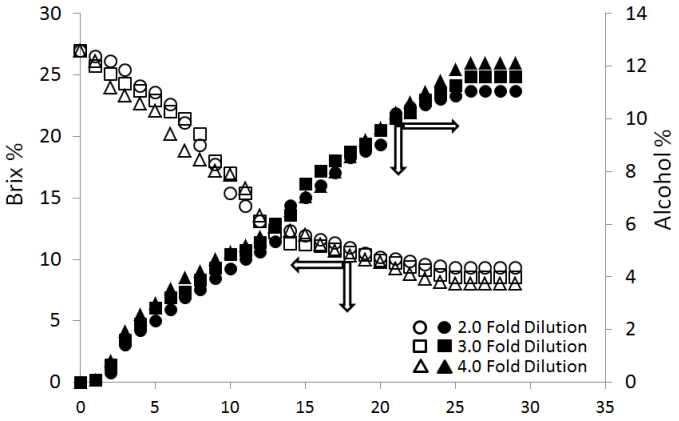

Fig. Alcohol% and brix% content of mulberry wine.