Study on the Flavor and Qualdy of Polypropylene Bottled Orange Juice and mulberry Juice during Storage

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ABSTRACT

Recently, polyethylene (PP) bottled fresh juice has been getting popular in Taiwan. The aim of this thesis is focused on the study of effects of heating process and storage of sweeten or un-sweeten orange juice or mulberry juice on the overall quality and flavor components. The researches in this thesis can be separated into five sections. In the first section, sweeten orange or mulberry juice was pasteurized in a tubular heating apparatus at 85 °C and then filled and sealed in the PP bottles and further hold in a 80 °C water bath for six minutes. The PP bottled juice was then stored at a 4 or 37 °C constant temperature oven for different periods. Quality parameters, including soluble solid content, acid content, pH, vitamin C content, anthocyanin content, and color, of the tested juice before and after pasteurizing and in different storage periods was investigated. After pasteurization, vitamin C content of sweeten orange juice decreased at the level around 7.66 %. After storing at 37 °C for 21 days, vitamin C content of sweeten orange juice were decreased significantly, and both of L value and b value decreased, whereas a value was increased. After pasteurization, anthocyanin content of sweeten mulberry juice increased at the level around 17.67 %, whereas after 21 days ’ storage the anthocyanin content of mulberry juice decrease significantly. After storing at 4 °C for 140 days, vitamin C content of sweeten orange juice decreased significantly, and L, a, and b values were found all decreased. After storing at 4 °C for 140 days, anthocyanin content of sweeten mulberry juice decreased significantly. In the second section of this thesis, changes in the concentration and composition of volatile compounds of sweeten orange and mulberry juice was studied. Before pasteurization, the concentration of limonene in sweeten orange juice was around 24250 ppb, and the concentration of limonene in sweeten orange juice decreased at the level of 27.36 % after pasteurization. After storing at 37 °C for 15 days, limonene in sweeten orange juice decreased to 7426 ppb, whereas the content of alpha-terpineol increased from 137 ppb to 590 ppb. The concentration of most aldehydes and hydrocarbons in sweeten orange juice decreased with the increasing of storage time. After pasteurizing, the content of isoamyl alcohol decreased from 269 ppb to 2 ppb, and the content of 3-penten-2-ol decreased from 161 ppb to 11 ppb. The concentration of most aldehydes and hydrocarbons in sweeten mulberry juice decreased with the increasing of storage time. In the third section of this thesis, flavor, color, and overall preference of sweeten orange and mulberry juice during storage at 37 °C or 4 °C for different periods were evaluated. After storing at 37 °C for 21 days, the flavor score of sweeten orange juice dropped from 6.6 to 4.0, the color score dropped from 7.4 to 5.7, and overall preference score dropped from 6.7 to 4.2. The sensory test result suggested that the storage dateline should not longer than 12 days for sweeten orange juice when stored at 37 °C. After storing at 37 °C for 21 days, the flavor score of sweeten mulberry juice dropped from 5.9 to 4.0, the color score dropped from 7.0 to 5.7, and overall preference score dropped from 6.4 to 3.8. The sensory test result suggested that the storage dateline should not longer than 9 days for sweeten mulberry juice when stored at 37 °C. After storing at 4 °C for 140 days, the flavor score of sweeten orange juice dropped from 6.9 to 4.7, the color score dropped from 6.9 to 5.2, and overall preference score dropped from 7.9 to 4.8. The sensory test result suggested that the storage dateline should not longer than 112 days for sweeten orange juice when stored at 4 °C. After storing at 4 °C for 140 days, the flavor score of sweeten mulberry juice dropped from 6.3 to 5.0, the color score dropped from 6.9 to 5.3, and overall preference score dropped from 6.7 to 5.0. The sensory test result suggested that the storage dateline should not longer than 140 days for sweeten mulberry juice when stored at 4 °C In the fourth section, un-sweeten orange or mulberry juice was pasteurized in a tubular heating apparatus at 85 °C and then filled and sealed in the PP bottles and further hold in a 80 °C water bath for six minutes. The PP bottled juice was then stored at a 37 °C constant temperature oven for different periods. Quality parameters, including soluble solid content, acid content, pH, vitamin C content, anthocyanin content, and color, of the tested juice before and after pasteurizing and in different storage periods was investigated. After pasteurization, vitamin C content of un-sweeten orange juice decreased at the level around 54.3 %. After storing at 37 °C for 21 days, vitamin C content of un-sweeten orange juice decreased significantly, and both of L value and b value decreased, whereas a value increased. After pasteurization, anthocyanin content of un-sweeten mulberry juice decreased from 23.64 mg/100 mL juice to 16.26 mL/100 mL juice. After 21 days ’ storage, the anthocyanin content of mulberry juice decrease significantly. After storing at 37 °C for 21 days of un-sweeten mulberry juice, both of L value and b value decreased. In the fifth section of this thesis, changes in the concentration and composition of volatile compounds of un-sweeten orange and mulberry juice were studied. Before pasteurization, valence and limonene were found to be the major volatile compounds in un-sweeten orange juice. Pasteurization and storage at 37 °C caused the concentration of them and some other terpene compounds decreased significantly. The concentration of total esters in un-sweeten mulberry juice was around 4984 ppb and dropped to 894 ppb after

pasteurization and store at 37 ℃ for 15 days. The major terpene compounds in un-sweeten mulberry juice was found to be limonene. The concentration of limonene and other terpene compounds in un-sweeten mulberry juice was found to decrease significantly after pasteurization and storage at 37 ℃ for 15 days.

Keywords : mulberry

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