Studies on the flavor and quality of chinese white noodle

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ABSTRACT

This thesis is consists of five sections. In the first section, Solid phase micro-extraction fibers (CarboxenTM / polydimethylsiloxane; CAR / PDMS and Polydimethylsiloxane / Divinylbenzene; PDMS / DVB) were used to isolate volatile compounds from boiled Chinese white noodle and milled Chinese white noodle to determine the best absorption time and temperature for the absorption of the volatile compounds from noodles. The absorbed volatile compounds were quantified and identified by GC and GC-MS, respectively. Twenty-six volatile compounds were identified from noodles. Hexanal was found to be the predominant volatile compound in both of boiled and milled noodles. The best absorption time for the volatile compounds in boiled noodle by CAR/PDMS and PDMS/DVB solid phase micro-extraction fibers were found to be 60 and 50 minutes, respectively. The best absorption time and temperature for the volatile compounds in milled noodle by the CAR/PDMS and PDMS/DVB solid phase micro-extraction fibers was found to be 50 ℃ for 60 minutes and 50 ℃ for 50 minutes, respectively. In the second part section, three kinds of Chinese white noodles were purchased from the local market. They were divided into the good flavor noodle, the bad flavor noodle, and rancid noodle by panels. The proxrimate composition of these three noodles did not differ significantly, except the crude lipid content, the composition of fatty acids, and the activity of lipid-related enzymes. From the results of enzyme activity analysis, it was found that the rancid noodle had higher activity of lipoxygenase and hydroperoxide lyase which both reported to close relating to lipid oxidation and formation of rancid type volatile compounds. Forty-seven volatile compounds were identified from the commercial noodles. Most of these volatile compounds were reported to be generated from the lipid oxidation. The highest amount of volatile compounds, especially hexanal was found in the rancid noodle In the third section, twenty wheat flours from different milled streams were used for comparing the general composition and the activities of the enzymes related to lipid oxidation. The results showed that wheat flours from C4, C6, and C7 had higher content of the crude lipid and ash and higher activities of lipid oxidation related enzymes. In the fourth section, three kinds of water (i.e., Tap water, underground water, and deionized water) were used to tempering wheat grains and then made into wheat flour. The hardness and the content of various ions were compared. Undergroud water was found to form higher hardness of samples. There were no significant differences among the levels of Fe, Mn, Cu, and Zn ions in different samples. Only tap water could be detected with chlorine residue among three kinds of water used. The wheat flour tempering by underground water contented higher activities in lipoxygenase, hydroperoxide lyase, and peroxidase. In the fifth section, three kinds of water (i.e., tap water, underground water, and deionized water) were used to temper wheat grains and then made into wheat flours. The flours were used to prepare Chinese white noodles. The noodles were stored at 42℃ for six weeks. The general composition, sensory properties, and the activities of lipid oxidation related enzymes of the stored noodles were analyzed. The results showed that after six weeks ’ storage the noodle tempered by deionized water had higher flavor and overall preference. The lipoxygenase activity in the noodle tempered by groundwater was found to increase with the increasing of storage time. Activities of hydroperoxide lyase and peroxidase in the noodles tempered by all three kinds of water used were also found to increase with the increasing of storage time.

Keywords : Chinese white noodle ; mill streams ; tempering ; volatile compounds

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