

Prem Siri Rotsatchakul 2009: Aroma-Active Compounds in Thai Chili Paste (Nam Phrik Phao) and Their Changes in Spray-Dried Powders. Doctor of Philosophy (Food Science), Major Field: Food Science, Department of Food Science and Technology. Thesis Advisor: Associate Professor Siree Chaiseri, Ph.D. 192 pages.

Three types of Thai chili pastes (CP) were prepared, consisting of an unheated CP (UH-CP), a CP heated at 100 °C for 25 min (H25-CP), and a CP excessively heated for 50 min (H50-CP). The aroma-active compounds in the CPs were investigated by two gas chromatography-olfactometry methods: dynamic headspace dilution analysis (DHDA) and aroma extract dilution analysis (AEDA). The result from DHDA indicated that methanethiol, dimethyl sulfide, 2-methylpropanal and allyl mercaptan were the predominant headspace odorants of CPs and these compounds increased with heating time. The result from AEDA showed that 2-vinyl-4*H*-1,3-dithiin and diallyl trisulfide had the highest log₃FD factors in H25-CP. In addition, 3-ethyl-2,5-dimethyl pyrazine and 3-hydroxy-4,5-dimethyl-2(5*H*)-furanone (sotolon) were indicated as potent odorants in basic and acidic fractions of H25-CP, respectively. On the basis of their high FD factors by both GCO methods, the predominant odorants in all CPs were 3-vinyl-4*H*-1,2-dithiin, allyl methyl disulfide, and allyl methyl trisulfide. Furthermore, dimethyl trisulfide and diallyl disulfide had the highest odor-activity values in H25-CP, suggesting that these were also aroma-active compounds in H25-CP. The effect of different combination of maltodextrin DE 18.5 (MD) and gum arabic (GA) carrier materials on the flavor release and flavor retention of chili paste oil (CPO) during storage at 50 °C and 68% RH for 5 weeks were evaluated. The three samples with MD/GA ratios of 1:2, 1:1 and 2:1 w/w were prepared by spray drying. The MD/GA (1:2) sample showed the highest content of the total oil and the encapsulation efficiency of microencapsulated spray-dried CPO powders. Dynamic headspace analysis was applied to determine the rate of release of volatiles from the microencapsulated powders. The combination containing higher proportions of GA provided lower amounts of the release of selected volatiles in the headspace. Better total flavor retentions of detected volatiles at the initial time and after 5 weeks of storage were obtained for a MD/GA ratio of 1:2. The result from quantitative descriptive analysis (QDA) revealed that the aroma intensities of some selected attributes were slightly decreased in each sample at the end of storage time. It can be assumed that spray-dried CPO powders could retain the most aroma intensities during storage time for 5 weeks.

Student's signature

Thesis Advisor's signature