Thesis Title	Roles of Microorganism in the Traditional Process of Fish Sauce Fermentation : Flavor and Aroma
Name	Jeerapun Worapong
Degree	Master of Science (Microbiology)
Thesis Supervisory Committee	Chaufah Thongthai, Ph. D. Kachorn Charoensiri, Sc. D. Saiyavit Varavinit, Dr. Ing.
Date of Graduation	4 May B.E. 2538 (1995)

ABSTRACT

Qualitative analysis on the specific aroma of traditionally fermented Thai fish sauce (Nampla) in the present studies is an endeavor to follow and characterize its developing pattern through the course of fermentation. Volatile compounds of each of eight samples were collected by steam distillation under a reduced pressure of 60 mmHg. at 60-70 C and the distillates were fractionated into four fractions, acidic, basic, neutral and phenolic by diethyl ether extractions. Each fraction was analyzed by using gas chromatography and the comparison of standard retention times. The result indicated that the separated volatile compounds of Thai fish sauce increased with the age of fermentation from three days to four months, i.e., 150 and 228, respectively. After that it slightly decreased (to 213) in nine month fermented specimen but decreased markedly (to 40) if being kept in further cold storage at 4 C for nine months. While the number of detectable volatile compounds between vats of four months were highly variable, i.e. ,191 and 95 as compare to 228, those from the two commercial fish sauce (Chonburi and Rayong) were less variable but markedly lower, i. e. , at 32 and 27 respectively. Because of the limitation

in the separating methods and the shortage of reference standard compounds, the identified compounds included only 12 acids, 2 carbonyl, 4 hydrocarbons, 10 alcohols, 2 nitrogen compounds, 6 esters, 1 phenol and dioxane. n-Butanoic acid, phenylacetic acid, propionic acid, isopentanoic acid, n-pentanoic acid, benzoic acid and indole were found in most samples which possibly contributed to the agreeable aroma in fish sauce whereas three high boiling point and less pleasant volatile constituents which included heptane, benzyl alcohol and phenol, also appeared in all specimens might have lesser influence in aroma. This study also confirmed the unique presence of pivalic acid in Thai fish sauce reported by Sanceda et al. in 1986. While ethyl acetate was present at four months and nine months of fermentation, its disappearance in both commercial specimens could be apparent rather than real owing to the method of extraction. Diethyl oxalate appeared sporadically in one four month sample and in a Rayong commercial sauce. Surprisingly, isopropanal and ethanol were found in one vat of four months specimen. The long term storage of specimen at 4 C for 9 months resulted in the loss of some low carbon volatile compounds such as acetic acid, propionic acid, isobutanoic acid, pivalic acid, n-heptanoic acid, n-octanoic acid, ethyl acetate and bis-(2-ethyl)hexyl phthalate from the 9 month-fermented fish sauce specimen where as a new volatile compound, 2-methyl pentane, appeared. The result also demonstrated that low boiling point volatile compound e.g. dodecane (internal standard) at concentration 2.67×10^{-3} % could not be recovered by the present method of distillation and extraction, since the added dodecane failed to reappear in the gas chromatograms. The present method of distillation at reduced pressure led to loss of certain low boiling point volatile compounds but will detect more volatile compound with relatively higher boiling points.