ABSTRACT

Pla-ra is a Thai traditional fermented fish product that is commonly consumed, especially in Northeastern region of Thailand. It is also exported to other countries. Pla-ra is a low cost proteinaceous food and has a high nutritional value. It contains essential amino acids, vitamins, and minerals. Recently, pla-ra is widely produced in many regions, at home or in small factories. The methodologies and knowledge associated with the production were handed down from generation to generation within local communities. This resulted in a variation of product quality, especially flavor which is an important factor for consumer acceptance.

In this study, volatile flavor compounds in six commercial pla-ra samples were analyzed using gas-chromatography-mass-spectrometry (GC-MS) and gas-chromatography-olfactrometry (GCO). Solid and liquid parts of two pla-ra samples were extracted separately by direct solvent extraction (DSE) technique. The types of volatiles detected from both parts of each sample were slightly different. Twenty compounds were detected in both samples, comprising acids of the highest proportion. Dynamic headspace sampling (DHS) technique was also used to analyze the volatiles only from actual samples. In DHS analysis of four pla-ra samples, twenty-nine of volatile compounds were detected in all samples, comprising acids and alcohols distributed in high proportion. Two of those four pla-ra samples were characterized by their odor activity using GCO. Alcohols and esters were the major compounds possessing perceivable odors. Six of eleven volatile compounds detected in all six pla-ra samples were odor-active compounds, including 1-butanol, ethyl hexanoate, acetic acid, butanoic acid, 3-methyl butanoic acid, and 4-methyl pentanoic acid. These compounds could be described as fruity-sweet, pungent, putrid, fishy, sour, and rancid odor attributes. Ability of bacterial strains, i.e., Staphylococcus piscifermentans and Tetragenococcus halophilus, isolated from pla-ra, to the production of volatile flavor compounds was investigated. The results suggested that S. piscifermentans apparently played a role in the formation of 1-butanol and 3-methyl-1-butanol, while T. halophilus apparently played a role in the formation of 2-methyl-1-butanol, 3-methyl-1-butanol, and acetoin.

KEY WORDS: FERMENTED FISH/ VOLATILE FLAVOR COMPOUNDS/ GAS CHROMATOGRAPHY-MASS SPECTROMETRY

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