J Aquac Res Development 2017, 8:8 (Suppl)
DOI: 10.4172/2155-9546-C1-018

A novel method for rapid quantitative evaluating formaldehyde in squid based on electronic nose

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Unfortunately, a severely situation happens incessantly in some countries that squids in the market are soaked in formaldehyde aqueous solution to preserve the squid appearance and extend the shelf-life, which hinders the survival and development of squid industry. Various countries in the world not only provided the maximum usage and residue limits of formaldehyde content in squid, but also developed various determination methods including spectrophotometry, electrochemistry and chromatography. Although those methods are reliable and accurate, high expenses, and time-consuming complicated pre-treatment processes would hinder them for rapid determination. The aim of this study was to establish a rapid and quantitative detection method of formaldehyde in squid based on electronic nose for screening massive samples. Identification of volatile compounds in squid with different formaldehyde content by electronic nose were mainly depended on eight sensors. Besides, the diversities of volatile constituents in squids with increasing contents of aldehydes and aromatic compounds were validated by GC-MS results. Moreover, to build a qualitative discrimination model for estimating whether formaldehyde in squid over standard limit or not, DFA and SIMCA based on PCA were used to analyze data of electronic nose data for semi-quantitative determination of formaldehyde content in squid. Finally, a rapid quantitative prediction model based on electronic nose and PLS was established (R2=0.9266). To verify the accuracy of quantitative model, t-test was employed and no significant difference between predicted values and true values was found. This approach showed well potentiality to provide a rapid, nondestructive and quantitative method for detecting formaldehyde residue in food.

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