UNIVERSITI PUTRA MALAYSIA

ANALYSIS OF FORMALDEHYDE CONTENT AND HEALTH RISK ASSESSMENT OF COMMONLY CONSUMED FISH AT THREE WET MARKETS IN SELANGOR, MALAYSIA

SITI AMINAH BINTI ABDULLAH

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By

SITI AMINAH BINTI ABDULLAH

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfillment of the Requirements for the Degree of Master of Science

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Chair: **Prof. Dr. Zailina Binti Hashim**

Faculty: **Medicine and Health Sciences**

The health benefits of consuming fish as a source of omega-3 fatty acids have been established. It can reduce cholesterol levels and the incidence of stroke and can protect against cardiovascular disease, improve cognitive development in children and slow cognitive decline in the elderly. Formaldehyde is used as an antibacterial agent and preservative in food processing for dried food, fish, certain oil and fats and disinfectants for container. Formaldehyde is classified by the International Agency for Research on Cancer (IARC) in the Group 1 as carcinogenic to humans. A survey was conducted on adults, adolescents and children to identify the type of commercial fish commonly consumed in order to assess the formaldehyde content and health risks of consuming different type of commercial fish. Based on the survey, seven types of commercial fish species were analysed. All of the samples were purchased in different wet markets and analysed under different circumstances; raw, boiled and fried. Formaldehyde was determined in all fish circumstances analysed using Nash's reagent and spectrophotometer. The formaldehyde content in the sample was in the range of 2.38 to 2.95 µg/g for raw, 2.08 to 2.35 µg/g for boiled and 2.28 to 2.49 µg/g for fried fish meat. This study showed that formaldehyde content among all fish species and fish circumstances were still lower than the amount set by Malaysian Food Act (1985) and Malaysian Food Regulation (1985) whereby the maximum limit value for formaldehyde in fish and fish products are 5mg/kg. From the risk assessment calculation, there was no adverse health effects from the consumption of fish contain of low formaldehyde. Thus, the fish from wet market can be considered safe for consumption for all age groups.

Key words: commercial fish, risk assessment, formaldehyde.

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Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Sarjana Sains

ANALISIS KANDUNGAN FORMALDEHID DAN PENILAIAN RISIKO KESIHATAN DARIPADA PENGAMBILAN IKAN YANG BIASA DI TIGA PASAR BASAH DALAM SELANGOR, MALAYSIA

Oleh

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Manfaat kesihatan daripada pengambilan ikan sebagai sumber omega-3 asid lemak telah terbukti. Ia boleh mengurangkan tahap kolesterol dan kejadian strok serta boleh mencegah berlakunya penyakit kardiovaskular, meningkatkan perkembangan kognitif kanak-kanak dan melambatkan penurunan kognitif terhadap warga tua. Formaldehid telah digunakan sebagai agen antibakteria dan pengawet dalam pemprosesan makanan seperti makanan kering, ikan, minyak dan lemak tertentu dan sebagai antibakteria untuk bekas makanan. Formaldehid diklasifikasikan oleh Agensi Antarabangsa bagi Penyelidikan Kanser (IARC) dalam Kumpulan 1 sebagai karsinogenik kepada manusia. Satu kajian telah dijalankan terhadap orang dewasa, remaja dan kanak-kanak untuk mengenal pasti jenis ikan yg sering diambil dalam usaha untuk menilai risiko pengambilan ikan komersial yang berbeza yang mengandungi formaldehid. Tujuh jenis spesies ikan komersial berdasarkan kaji selidik telah dianalisis. Semua sampel telah dibeli di pasar basah yang berbeza dan dianalisis dalam keadaan yang berbeza iaitu mentah, rebus dan goreng. Formaldehid telah ditentukan dalam semua keadaan ikan yang dianalisis menggunakan reagen Nash dan spektofotometer. Kandungan Formaldehid adalah dalam julat 2,38-2,95 μg / g untuk mentah, 2,08-2,35 μg / g untuk rebus dan 2,28-2,49 μg / g daging ikan goreng. Kajian ini menunjukkan bahawa kandungan formaldehid di kalangan semua spesies ikan dan keadaan ikan masih rendah daripada had yang ditetapkan oleh Akta Makanan Malaysia (1985) dan Peraturan Makanan Malaysia (1985) di mana nilai had maksimum formaldehid dalam ikan dan produk ikan ialah 5mg/kg . Dari pengiraan penilaian risiko, tiada kesan kesihatan yang buruk kepada pengambilan ikan yang mengandungi formaldehid yang rendah. Oleh itu, ikan dari pasar basah boleh dianggap selamat untuk kegunaan bagi semua kumpulan umur.

Kata Kunci : ***Ikan komersial, risiko kesihatan, formaldehid.***

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DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or at any other institution.

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