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Screening of PAHS Concentrations in Traditionally Smoked Freshwater Fish Products from Tonle Sap in Cambodia

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Abstract

More than 85 % of the population in Cambodia is strongly dependent on agriculture, especially the fishery industry. Freshwater fish meat and products are one of the main sources of Cambodians income. The low living standards result in a lack of access to electricity, which affects 66 % of the population in Cambodia. Thus, smoking as one of the oldest preservation method is still widely used in the country. Potential health hazards associated with smoked foods may be caused by carcinogenic components of wood smoke – mainly polycyclic aromatic hydrocarbons (PAHs). Smoked fish represents important source of nutrients for the Cambodian population. However, this also leads to an excessive intake of PAHs produced during traditional smoking of fish. Traditional techniques of smoked fish production in Cambodia had not been fully investigated. Therefore, a field study was conducted among selected smoked fish producers near Tonle Sap river in Kampong Chang province, Cambodia, and questionnaire survey within 5 provinces (Kampong Chhnang, Battambang, Siam reap, Kampong Cham) in Tonle Sap area, Cambodia. During the research, 23 samples from 10 producers were collected. Extraction of completely homogenized samples by Soxtec apparatus was followed by pre-cleaning by gel permeable chromatography (GPC). Analytes in recupered eluate were evaluated by high performance liquid chromatography with fluorescence detector (HPLC-FD) for analysis. Identification based on comparison of retention times with standards, quantification was performed by method of external standard. The study revealed that maximal limits (ML) for a sum of 4 PAHs and BaP given by EC 1881/2006 were exceeded between 2 to 60 times (34.25 μg.kg^{-1} to 597.75 μg. kg $^{-1}$) and 2 to 50 times (4.58 μg.kg^{-1} to 119.45 μg. kg $^{-1}$), respectively. Such burden can lead to an increased risk of development of carcinogenic diseases and other diseases related to PAHs exposure. Further investigation and research focused on concentration on the amounts of PAHs per gram of fish consumed or fat content is recommended.

Keywords: Cambodia, food chain, freshwater fish, pollutants

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