

Thesis title Direct Mutagenic Potential of Polycyclic Aromatic Hydrocarbons (PAHs) Treated with Nitrite in Simulated Gastric Condition: Comparison between Authentic PAHs and PAH-Containing Fraction Derived from Smoked and Charcoal-Broiled Foods Using Ames Test.

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ABSTRACT

Polycyclic aromatic hydrocarbons (PAHs) and the PAH-containing fraction of smoked and charcoal-broiled foods were evaluated for their mutagenic potential using towards *Salmonella typhimurium* (the Ames test) strains TA 98 and TA 100 in the absence of metabolic activation after interacting with nitrite in simulated gastric condition. The amount of N-nitroso compounds after they were interacted with nitrite (500 mM) in simulated gastric condition (pH 3.0-3.5) were also determined. Studies were conducted on standard polycyclic aromatic hydrocarbons (PAHs) namely, naphthalene, acenaphthene, anthracene, phenanthrene, fluoranthene, pyrene, benz(a)

anthracene, naphthacene, benzo(a)pyrene, benzo(e)pyrene, 9,10-dimethyl-1,2-benzanthracene, dibenz(ah)anthracene, benzo(ghi)perylene and coronene as the first group of sample. The second one was the PAH-containing fraction of typical Thai foods including smoked Sheat fish (*Kyopterus apogon*), smoked Mimrow (*Crossocheilus reba*), skin as well as flesh of smoked Fresh-water catfish (*Clarias batrachus*). The third group include charcoal-broiled foods cooked to a medium and well-done states i.e. chicken wing, rice pork sausage, pork (lean meat), pork (medium fat), spiced pork (medium fat).

The results showed that nitrite could convert all polycyclic aromatic hydrocarbons to be direct acting mutagens towards both strains TA 98 and TA 100 except fluoranthene and benzo(ghi)perylene which exhibited direct acting mutagenic activity to TA 98. All PAH-containing fractions were also direct mutagenic towards strains TA 98 and TA 100 after treating with nitrite except that of the flesh of smoked Fresh-water catfish which showed no mutagenicity either to strain TA 98 or TA 100. Nitrite treated PAH-containing fraction of pork (lean meat) was mutagenic to only TA 100.

Results of this study demonstrated that the interaction of polycyclic aromatic hydrocarbons and nitrite in simulated gastric condition produced direct-acting bacterial mutagens which were proved not to be N-nitroso compounds. It is suggested that the mutagenicity might belong to nitropolycyclic aromatic hydrocarbon, a group of direct acting mutagen mostly occurred by nitration of PAHs by nitrate or nitric oxide. It is, therefore, concluded that the consumption of smoked and charcoal-broiled foods simultaneously with nitrite is hazardous to consumer.