OCCURRENCE AND FORMATION OF VOLATILE N-NITROSO COMPOUNDS
IN THAI ACID FOODS AND IN SIMULATED GASTRIC CONDITION

BY

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ABSTRACT

The occurrence and formation of volatile N-nitroso compounds was studied in Thai acid foods and in simulated gastric condition. Fifty samples of 5 different kinds of Thai acid foods surveyed from 5 different local retail markets in Bangkok, were chosen to study namely: "Tom-yum Gung" (Spicy Thai soup with shrimp), "Tom-yum Plakapong" (Spicy Thai soup with bass); "Tom-yum Plamuk" (Spicy Thai soup with cuttle fish): "Gang-som Plachorn" (Hot and sour curry with serpent head) and "Gang-som Gung" (Hot and sour curry with shrimp). By analysis, using combined gas chromatograph and thermal energy analyzer chemiluminescence detector (GC-TEA), all were found non-detectable amount of any preformed volatile N-nitroso compounds: N-nitrosodimethylamine, N-nitrosodiethylamine, N-nitrosodipropylamine,
N-nitrosopiperidine, N-nitrosopyrrolidine, and N-nitroso-
morpholine. These groups of foods were found positive
for the presence of N-nitrosodimethylamine after
incubation with 3 mg sodium nitrite and 20 mg potassium
thiocyanate under simulated gastric condition at 37 °C,
pH 3 for 2 hours with simulated gastric juice. The
average amount calculated per 250 g incubated portion was
less than 1 µg. On acidification with simulated gastric
juice of the 250 g edible portion of model "Tom-yum Gung"
chewed by 10 healthy, non-smoker volunteers who had taken
high nitrate diet "Guay-tiew pud se-iew" (Fried chinese
noodle with collard, chicken and egg) in the previous
meal, showed the variable amounts of N-nitrosodimethyl-
amine detected per portion with average value
(mean ± S.D.) of 4.33 ± 4.28 µg. The simultaneous
addition of ascorbic acid to the incubation mixtures
provided a large extent of significant inhibitory effect
(69%, 88%, and 94% for 100, 500 and 1,000 mg ascorbic
acid, respectively) to the formation of N-nitrosodimethyl-
amine. This study indicated that these groups of Thai
acid foods may obviously not contribute to the serious
problem of exogenous exposure from the potentially
carcinogenic volatile N-nitroso compounds for Thai but
will represent the values in view of exposure to volatile
N-nitroso compounds endogenously in some parts of
population. Particularly, when this group of food is
taken in large amount at a meal follows the meal with
high nitrate intake. Furthermore, ascorbic acid is also
valuable in its role to prevent the formation of volatile N-nitroso compounds by simultaneous application with such meal. However, it will render more information if the study are done with the total diet as normally taken.