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Nitrosamines: A Brief Summary

Carcinogenicity

Nitrosamines are carcinogenic in animals at all dose levels examined, irrespective of whether they are administered in food, water or by inhalation. There is some evidence of increased carcinogenicity when nitrosamines are given in combination with polycyclic hydrocarbons, which also occur in tobacco smoke and Dontenwill has shown that smoke condensate, coupled with diethylnitrosamine, enhances the incidence of lung tumours.

In humans, dimethylnitrosamine leads to liver cirrhosis and some limited local studies suggest that nitrosamines in the diet or the environment play a role in human carcinogenesis. In other cases, carcinogenicity has been related to the formation of nitrosamines in the human gut due to high levels of nitrate in local drinking water supplies. These effects may be enhanced respectively in the presence of Vitamin C deficiency or pernicious anaemia.

Relation of levels in Side-stream Smoke to Environmental Levels

Levels of nitrosamines currently reported as arising from exposure to side-stream cigarette smoke are significantly higher than those present in the diet or in the environment. This is particularly the case with cigarettes having high levels of nitrate salts in the tobacco (high levels of nitric oxide in smoke; e.g. air-cured and US blended tobaccos).

The levels of nitrosamines in frying bacon can be reduced by addition of ascorbate (Vitamin C) and its addition, coupled with a reduction in the nitrite level, is now required by a U.S. Department of Agriculture regulation. Hoffman La Roche have patented the addition of such compounds, claiming a 70% reduction in nitrosamines.

There is no 'safe' level for nitrosamines and, industrially, exposures will have to be reduced to the maximum practicable extent consistent with continued use.

Clearly, with this background, every effort should be made to reduce levels in main-stream, and particularly, side-stream smoke, as the levels to which non-smokers are exposed, will increase further relative to other sources, as levels in the diet and environment are reduced.

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