

NITROSAMINE ANALYSIS

A family of carcinogenic impurities known as **Nitrosamines** is generated when secondary amines, amides, carbamates, and urea derivatives combine with nitrite or other nitrogenous substances.

On the basis of rodent carcinogenicity and mutagenicity studies, nitrosamines have been classified by the ICH M7(R1) Guideline as Class 1 impurities, "**known mutagenic carcinogens.**"

Following the discovery of potential nitrosamine contamination sources in pharmaceutical medications, nitrosamine testing services are currently in great demand. The discovery of the genotoxic contaminant N-nitrosodimethylamine (NDMA) at low levels in a few medications caused the pharmaceutical industry great alarm. Some foods can contain small amounts of the carcinogenic NDMA, and NDMA can be used as an indicator chemical when testing for nitrosamines.

NITROSAMINES IN FOOD PRODUCTS

Nitrosamines are formed when secondary or tertiary amines react with a nitrosating agent. Nitrates can also form N-nitrosamines through the reduction to nitrites by enzymes in the intestinal tract.

- Volatile N-nitrosamines are the lower molecular weight nitrosamines, which are generated from alkyl or monocyclic secondary amines.
- Non-volatile nitrosamines are high molecular weight, more polar nitrosamines that may be detected and extracted from food.

- The apparent total nitrosamine content (ATNC), which includes both volatile and non-volatile nitrosamines, is the third category.

Volatile nitrosamines have been examined in a wide variety of foods. In comparison to meals from Asia and Africa, it has been discovered that western foods contain more nitrosamines. Foods and drinks have been found to contain a lot of nitrosamines, therefore.

COMMON NITROSAMINE COMPOUNDS DISCOVERED IN FOODS INCLUDE:

- **N-nitrosodimethylamine**
- **N-nitroso-diethyl amine (NDEA)**
- **N-nitrosopiperidine (NPIP)**
- **N-nitroso-pyrrolidine (NPYR)**
- **N-nitrososarcosine (NSAR)**
- **N-nitroso-4-hydroxyproline**
- **N-nitrosothiazolidine-4-carboxylic acid**
- **N-nitroso-2-methylthiazolidine-4-carboxylic acid**
- **N-nitroso-2-hydroxymethylthiazolidine-4-carboxylic acid**
- **N-nitrosomethylethylamine (NMEA)**
- **N-nitrosodipropylamine (NDPA)**
- **N-nitrosodibutylamine (NDBA)**

FOOD GROUPS INCLUDE

- Cured meats
- Specific fruits and vegetables
- Non fat dry milk, some cheeses
- Sea food like cooked fish, salt dried fish
- Cooked bacon
- Processed meat
- Alcoholic beverages



REGULATORY BODIES

National and international regulatory bodies have designated NDMA and NDEA as "probable human carcinogens." The substance that is by far the most frequently encountered is NDMA.

There are currently no regulatory limitations for N-nitroso compounds (NOC) in foods in the EU, whereas there are restrictions for total nitrosamines (NDMA) in bacon, barley malt, ham, and malt drinks in the United States.

Crop protection product manufacturers are required to check the level of nitrosamines in their goods to make sure it complies with established standards.

Premier Analytical Services (PAS) was contacted by the Food Standards Agency (FSA) to create a standard screening procedure to identify and quantify the constituent amounts of NOCs in foods that are generated during manufacturing and processing.



A LIST OF CURRENTLY RECOGNISED ROOT CAUSES IS NOT EXHAUSTIVE:

- Utilization of crop protection tools to increase agricultural productivity
- To prevent microbial contamination, meat is preserved with the addition of sodium or potassium salt
- Some foods are dried directly by fire
- Eating habits that include nitrates and nitrites
- Utilization of tainted raw materials during production Recycled materials, such as solvents, reagents, and catalysts
- Utilization of tainted sources and intermediaries by nitrosamine
- Cross-contamination that may result from several activities that are carried out on the same line
- Drug compounds, intermediates, and beginning ingredients all undergo degradation processes when stored or used to make finished goods
- Utilising certain packing materials



WHY US

Eureka fulfils the need for reliability and traceability. Eureka has all the essential equipment to perform analytical tests, including LC MSMS and GC MSMS systems, and is capable of testing nitrosamines in a variety of food categories.

Our competent team of scientists and researchers is equipped to carry out a variety of analytical tests since they have the requisite training. We are a leading contributor to ensuring food safety and assurance.