BIOHIT OYJ
PRESS MATERIAL
11 JANUARY 2010 9:30 AM

BASIC INFORMATION ABOUT ACETALDEHYDE AND FOOD PRODUCTS

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FOOD PRODUCTS MAY CONTAIN PLENTY OF ACETALDEHYDE – CONCENTRATIONS ARE TRADE SECRETS

- **Food products are the primary source of acetaldehyde exposure to non-smokers, non-drinkers and people who use alcohol in moderation.**
- **Due to acetaldehyde concentrations being trade secrets, it is not known – including in this instance – whether acetaldehyde has been added to food products as a flavour-enhancing substance or if its presence is related to the production process.**

The greatest concern regarding acetaldehyde is focussed on children and neonates, whose weight-adjusted acetaldehyde exposure may be the highest.
The studies we have conducted show that the average acetaldehyde concentration in yogurts sold in Finland exceeds the limit of mutagenicity eight-fold.
Acetaldehyde concentration in home-brewed beer and mead may exceed the mutagenicity limit 60-fold. Acetaldehyde concentrations similar to those of yogurt are also found in many fruit juices, soy sauces and even fruit purees intended for infants.
According to scientific literature, the dairy industry has engaged in an active years-long attempt to develop yeasts whose acetaldehyde-producing capacity is as high as possible.
These methods are geared towards improving product quality by enhancing its flavour characteristics.

Acetaldehyde in alcoholic beverages and food products is a trade secret

Acetaldehyde contained in alcoholic beverages is the second most important source of acetaldehyde exposure.
The mouth, pharynx, oesophagus and stomach are the organs primarily exposed to this type of acetaldehyde. Exposure is associated with holding the beverage in the mouth and swallowing it; depending on circumstances, it may last from a few seconds to a few minutes.
According to an extensive investigation conducted in 2008, most of the alcoholic beverages sold in Germany contain acetaldehyde concentrations that exceed the mutagenicity limit manifold.
The average acetaldehyde concentration in beer exceeded the limit four-fold, in wine 15-fold, in cider 22-fold, and in calvados and sherry even 70-fold.
It should be noted that each group of beverages contains types of beverages whose acetaldehyde content was either zero or clearly under the limit of mutagenicity.

Because it is a trade secret, it is not known to date if acetaldehyde has been added to some types of beverages, or whether the stated acetaldehyde concentrations are associated with the actual production process, where acetaldehyde is formed from sugar as a result of the alcohol fermentation process.

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Acetaldehyde accumulates in the body

Exposure to acetaldehyde is always cumulative, depending on heredity, lifestyle, nutrition and possible illnesses.
In the digestive tract area, alcohol use results in exposure to microbial acetaldehyde, depending on the ingested dose.
The higher the blood and saliva alcohol concentration, and the longer the alcohol remains in the system, the higher the exposure to acetaldehyde.

Deficient oral hygiene increases the risk

Deficient oral hygiene increases the production of microbial acetaldehyde in the area of the upper digestive tract. Exposure to cigarette smoke leads to exposure of the lungs and larynx to the acetaldehyde in cigarette smoke. In addition, some of the acetaldehyde in cigarette smoke dissolves in saliva, thereby exposing the oral, pharyngeal, oesophageal and gastric mucosa to the acetaldehyde contained in cigarette smoke.
The same areas are also affected by the acetaldehyde contained in alcoholic beverages and food products.
Hereditary deficiency in the capacity to destroy acetaldehyde – or to generate a surplus of it from alcohol – exposes the digestive tract to higher than normal concentrations of acetaldehyde.
Certain diseases, such as anacidic stomach, expose gastric mucosa to microbial acetaldehyde originating in either alcohol or sugar.

Microbes transform alcohol into acetaldehyde

The microbes inherent in the human body (yeasts and bacteria) form the most significant mechanism for producing acetaldehyde in the digestive tract.
Microbes immediately transform alcohol – either ingested or passed from the circulation into saliva and the intestinal tract – into acetaldehyde.
However, microbes and mucosa have a limited capacity for destroying acetaldehyde; therefore it is accumulated in saliva and contents of the large intestine in mutagenic concentrations (more than 50–100 micromoles per litre).
Along with saliva, acetaldehyde is transported further into the pharynx, oesophagus and stomach.
Microbial acetaldehyde exposure is of long duration, since alcohol remains in the circulation, saliva and intestinal tract for hours or even days, depending on the amount ingested.

In the stomach, local production of acetaldehyde may be considerably increased by any gastric microbes present.
A healthy, acidic stomach is microbe-free, whereas an anacidic stomach is an environment where many oral and pharyngeal yeasts and bacteria can live and reproduce.
Even small quantities of alcohol in an anacidic stomach lead to considerable acetaldehyde production. Additionally, some of these microbes are in certain conditions (oxygen deficiency) also capable of producing acetaldehyde from sugar.
Helicobacter pylori can live and reproduce in an acidic stomach as well. Many types of *H. pylori* are capable of producing acetaldehyde from both alcohol and sugar. An anacidic stomach and *H. pylori* infection – in addition to smoking – are the most significant risk factors for stomach cancer.

Further information:
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