Meats and Sausages

The content of biogenic amines in meat products varies extensively. Some types of sausage contain comparably high amounts of histamine (see below), while the majority of other fresh meat products hardly ever reaches critical levels. Next to histamine, there are other amines that are of importance, especially regarding meat. Studies have shown that the concentrations of diamines cadaverine and putrescine, both substrates of DAO as well, are indicators of the meat's freshness.

- Osso collo (and other types of dried meats): up to 320 mg/kg
- Salami: up to 280 mg/kg
- Cervelat: up to 100 mg/kg
- Westphalian ham: up to 40-270 mg/kg
- Knackwurst: up to 100mg/kg

Other Sources

With concentrations of up to 4000 µg/l, red wine vinegar contains high amounts of histamine. The histamine content in chocolate varies between 5 – 100 mg/kg, depending on the type of chocolate.

Additional information for patients with histamine intolerance

Since alcohol increases intestinal permeability and hence promotes the passage of histamine from the bowel into the organism, drinking alcoholic beverages, especially during meals, should be avoided.

Warning: Pain killers (such as aspirin) also increase the intestinal wall's permeability!

A well-known problem

Already Hippocrates warned not to eat cheese, but also emphasised that not everybody would develop symptoms. The first documented case of histamine-related poisoning dates back to 1828 and concerns a group of British sailors who developed symptoms after eating bonito (type of mackerel). This was first described by Henderson In 1830.

Since then, there have been numerous reports of cases with poisoning where food containing histamine was the suspected or confirmed source. Noticeably, only some of those who had eaten the food in question developed symptoms later.

Today we know those people suffered from diamine oxidase deficiency.

Recommended literature:

Histaminintoleranz, Reinhart Jarisch Thieme Verlag Stuttgart, ISBN: 313105381X

Histaminfrei Kochen / Gut essen – Besser leben: Kochrezepte by Martha Lassner-Stur, 2nd edition

order at www.histaminfrei.com or contact the author Ms. Martha Lassner-Stur, F. Mistelbacherweg 3, A-3390 Melk (Austria)

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NUTRITION

PATIENT INFORMATION

Dietary histamine restrictions

Diamine oxidase deficiency

IMD Labor Berlin

What is histamine intolerance?

Histamine intolerance is an adverse reaction to ingested histamine. A deficiency in the histamine-degrading enzyme diamine oxidase (DAO) or a mismatch between the ingested histamine and the present DAO level cause this reaction. Thus, histamine intolerance becomes clinically apparent, when the body is exposed to more histamine than it can break down. In addition, allergic conditions, such as hay fever and asthma or sensitisations regarding mould or mites, are sources of histamine, that add to the ingested histamine.

Symptoms

Certain symptoms, such as those similar to the sniffles (rhinitis), skin eczema, urticaria episodes, high blood pressure, bowel disorders, headaches, asthma, or menstrual cramps, may occur immediately or several hours after the ingestion of a meal rich in histamine.

Histamine

Histamine found in food is produced due to bacterial activity, mainly during maturation processes. Hence, high levels are detected primarily after microbial production and fermentation (such as in cheese, sauerkraut, wine), and in protein-rich foods (such as in fish and meat products). The longer the storage period, the higher the histamine content, which explains why measurements vary widely. Extraordinarily high levels are detected in spoiled foodstuffs. Since it is heat-stable, histamine cannot be destroyed by deep-freezing, cooking, grilling, frying, or baking.

In cases of confirmed deficiency of the enzyme diamine oxidase in blood, the most important treatment is to avoid thehistamine-rich foods listed below.

In cases of confirmed diamine oxidase deficiency in the blood, the most important treatment step is to avoid any of the histamine-rich foods listed below.

Recommendation

As histamine levels increase with storage time, process food and meals quickly, do not store food for long periods and do not re-heat them!

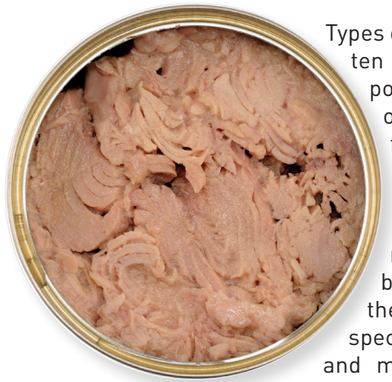
Wine and other alcoholic beverage

During the alcoholic fermentation process, where, among other mechanisms, proteins are broken down by certain bacteria, histamine is produced as well. Here, lactic acid bacteria of the species Pediococcus cerevisae were identified as histamine producers. They also play an important role in the preparation of sauerkraut. The histamine level is a quality feature of wines, while the price itself is in fact not always relevant. Histamine content in red wines is generally higher and concentrations of 3000 µg/l are not unusual – these are wines that typically cause tension headaches. Whether the wine has been produced organically is irrelevant; what matters is the care that went into grape processing and wine production.

Average levels of histamine:

- Red wine: 60-3800 µg/l
- Champagne: up to 670 µg/l
- Sparkling wine: 15 - 80 µg/l
- Dessert wine: 80 - 400 µg/l
- White wine: 3 - 120 µg/l
- Beer: 20 - 300 µg/l
  (Stout > Lager, Alt > Pilsener)

Fish



Types of fish species that often provoke symptoms of poisoning after ingestion belong mostly to the family of Scombridae (mackerels). Hence, cases of fish poisoning are frequently referred to as scombroid poisoning within the literature. These fish species (especially tuna and mackerels) possess a significant amount of dark muscle tissue, which can have high histamine levels.

However, higher histamine levels have also been detected in other types of fish, such as herrings, sardines and anchovy. Histamine production in fish meat is, among others, influenced by the temperature at which it is stored between catching and further processing. Often, when high amounts of histamine were found in canned tuna or smoked mackerel, investigations revealed that the fish had been transported or stored without proper cooling over longer periods of time. Surprisingly, higher levels of histamine have been proven in marinades more frequently than in the actual fish meat.

- Tuna: up to 8000 mg/kg
- Smoked mackerel: up to 788 mg/kg
- Mackerel (canned): up to 15 mg/kg
- Sardine: up to 1500 mg/kg
- Anchovy: up to 180 mg/kg
- Herring: up to 12 mg/kg
  (esp. when marinated)

Milk and cheese

While raw and drinking milk contains only minimal amounts of histamine, remarkable levels have been detected in some cheese varieties. As a general rule, histamine content increases with maturation and storage time. Lactobacilli and streptococci most likely are the cause.

- Emmentaler: 10 - 500 mg/kg
- Harz cheese: up to 400 mg/kg
- Stilton (English blue cheese):
  up to 160 mg/kg
- Tilsit: 10 - 60 mg/kg
- Gorgonzola: up to 160 mg/kg
- Gouda: 10 - 200 mg/kg
- Camembert: 10 - 300 mg/kg
- Cheddar:10 - 60 mg/kg
- Parmesan: 10 - 580 mg/kg