Aspirochlorine is not detected in various types of sake

Considering that *Aspergillus* has been used in food for ages, it is assumed that *koji* mold (*Aspergillus* spp.) is a safety microorganism. In addition, at the genetic level, it does not produce fungal toxins, e.g., aflatoxin. On the other hand, microorganisms, including *koji* mold, produce various physiologically active constituents (secondary metabolites) at the growth stage. Confirming the safety of these constituents is an important routine study. The antibiotic aspirochlorine was investigated. Although it is an antibiotic, aspirochlorine supposedly exhibits marginal toxicity.

Strains of *koji* mold were selected to cover the most of all type *koji* mold used in industry. The capacity of each fungus to produce aspirochlorine was evaluated, and aspirochlorine was not produced under typical production conditions of *koji* making or *koji* spores (*moyashi*). In addition, tests for aspirochlorine were conducted using various types of sake samples across Japan, but it was not detected. Such studies will be continued for determining the safety of Japanese alcoholic beverages.

[Explanation of Terminology]

- **Aspirochlorine**

Aspirochlorine is a secondary metabolite produced by microorganisms of the genus *Aspergillus;* this genus exhibits antibiotic activity against *Candida* pathogens and mild toxicity, with an LD_{50} of 106 mg/kg for mice (ref.: caffeine, 200 mg/kg; nicotine, 1-7 mg/kg; and verotoxin (pathogenic *Escherichia coli*), 0.001 mg/kg).

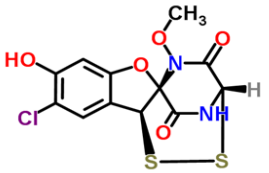
Aspirochlorine is not detected in various types of sake.

Aspirochlorine is not detected in various types of sake

I. Aspirochlorine

Registered as a secondary metabolite and an antibiotic produced by *koji* mold

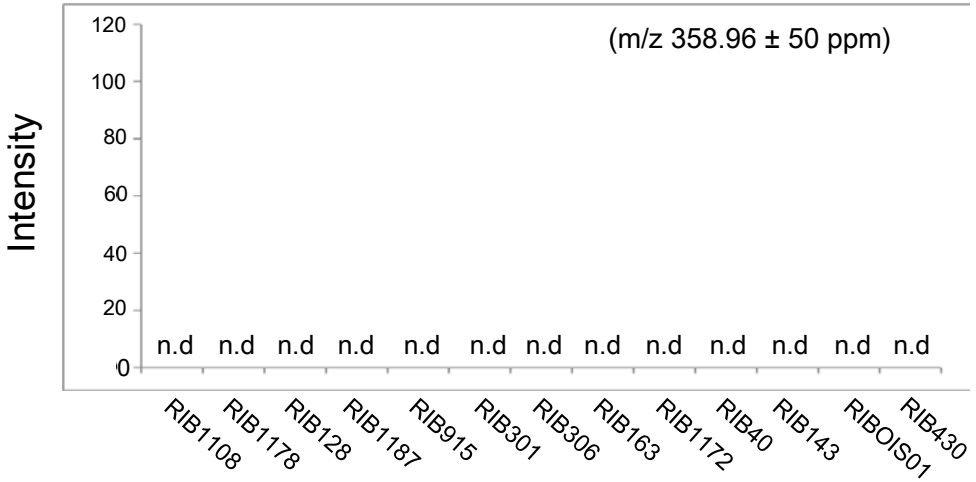
Structural formula



Koji mold clearly produces aspirochlorine in an experimental culture, but it is not clear if it is produced under brewing conditions.

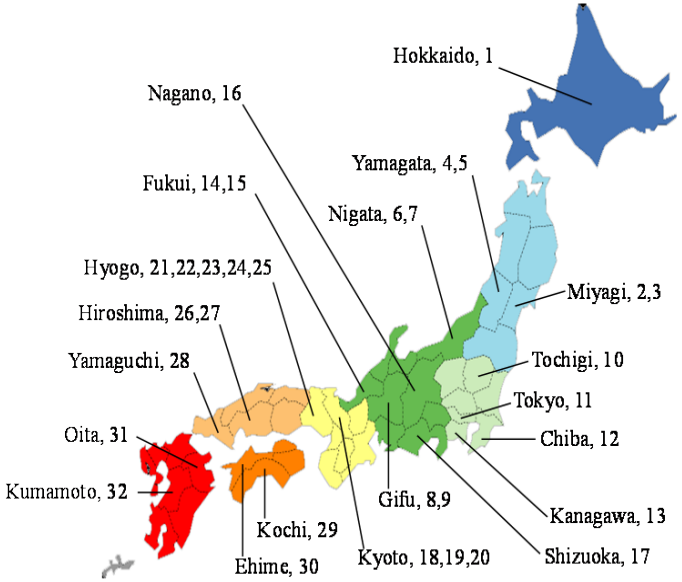
Possibility of producing aspirochlorine when making rice *koji*, as well as its content in commercial refined sake, was verified.

II. Aspirochlorine is not produced in rice *koji*



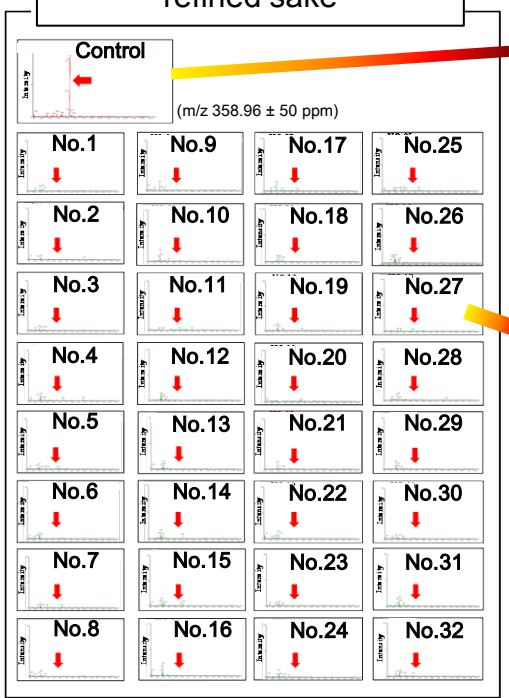
(nd: not detected) (n = 3)

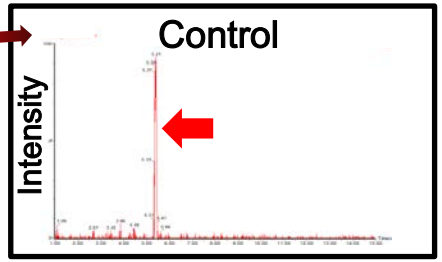
III. Survey of refined sake sold in Japan

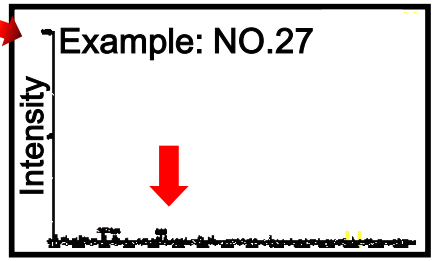


Study of different refined sake samples, e.g., premium, standard, and sparkling sake

Aspirochlorine content in refined sake







Aspirochlorine was not detected in any commercial refined sake sample.