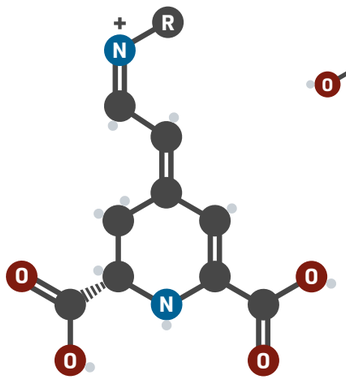
The chemistry of fly agaric mushrooms

COMPOUND INTEREST

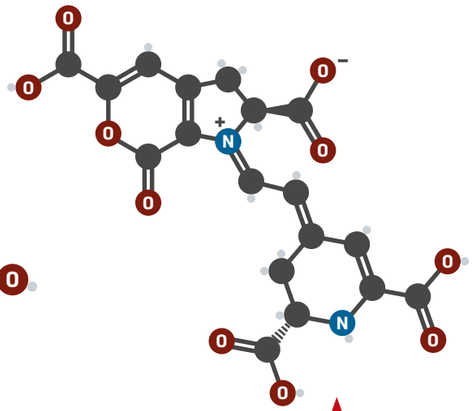
The colour of fly agaric (*Amanita muscaria*)

A number of pigments, shown below, contribute to fly agaric's characteristic colouration. Researchers have identified that muscarufin is the principal pigment in fly agaric. The muscaaurins are the key pigments in the related *Amanita caesarea*.



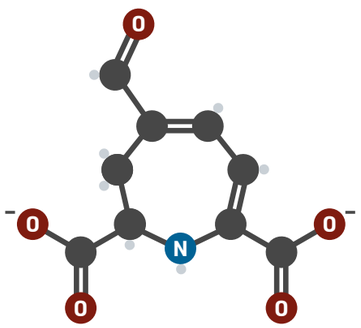
Muscaaurins

Red-orange pigments;
R = amido derivatives of various acids



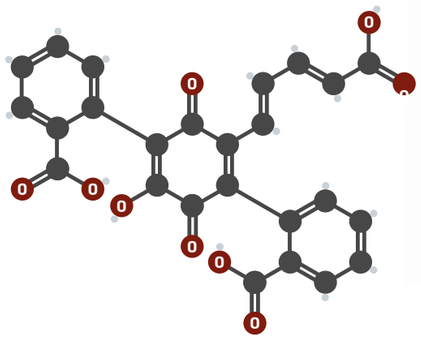
Muscapurpurin

Purple pigment;
Structurally related to muscaaurins



Muscaflavin

Yellow pigment



Muscarufin

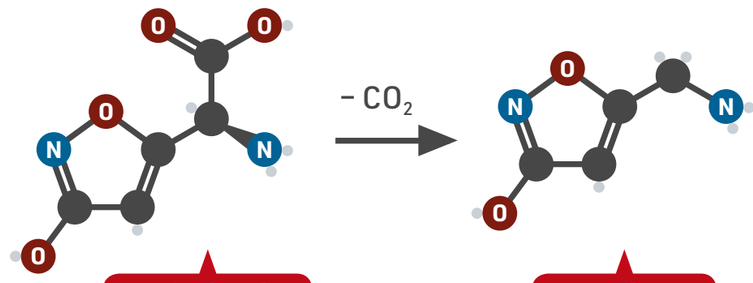
Red pigment

KEY

Carbon — Nitrogen
Oxygen — Hydrogen

Poison and hallucinogen

Fly agaric mushrooms are poisonous if eaten. This is due to the presence of various alkaloid compounds. These include ibotenic acid and muscimol, which give fly agaric psychoactive and hallucinogenic properties when eaten.



Ibotenic acid **Muscimol**

Some ibotenic acid converts to muscimol in the body. Muscimol, the primary compound responsible for psychoactive effects, mimics the action of the neurotransmitter GABA, while ibotenic acid mimics that of glutamate. Eating fly agarics also causes confusion and dizziness, and less commonly nausea, diarrhoea and vomiting. Death due to eating fly agaric is rare.

Unlike humans, reindeer can consume fly agaric without ill effects, and it makes them behave as if they are drunk. The psychoactive compounds pass into the reindeer urine; the indigenous Sámi people of the Sápmi region have been known to feed reindeer fly agaric and collect, boil and drink the reindeer urine to get high.