

Ramson confusable with poisonous plants

Kirsten Pilegaard
Division of Toxicology and Risk Assessment
National Food Institute, Technical University of Denmark

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The National Food Institute, Technical University of Denmark has assessed the possible toxic effects of eating ramson, which in recent years has become a popular plant to gather and eat in Denmark. As such, ramson does not contain harmful substances, but it may be mistaken for poisonous plants. In particular, before flowering, ramson leaves can be confused with autumn crocus and lily of the valley. Several cases of poisoning have been reported in other European countries, even with fatal consequences, as a result of this confusion.

Ramson, bear garlic or wild garlic (*Allium ursinum* L.) has for a long time been used abroad, but new Nordic cuisine in particular has made ramson gathering in Denmark a popular activity. In several European countries, including Denmark, ramson grows wild. In many, primarily central European countries, there is a tradition for picking ramson in the wild and using the leaves in salads, as a culinary herb or boiled and served as a vegetable.

Natural is not a synonym for safe

Plants and fungi contain different bioactive substances, some of which are beneficial to humans while others are potentially toxic. The fact that something comes from nature is no guarantee that it is safe to consume. According to Hostettmann (2009), Switzerland has eight times as many cases of poisoning from plants as poisonings from fungi. This is because many people who gather food in the wild lack sufficient botanical knowledge.

Correctly identified ramson is not poisonous

Relatively little is known about the substances in ramson compared to those in cultivated plants. Some studies have chemically analysed the substances in ramson on its own or compared them with the constituents found in for example, garlic (*Allium sativum* L.) or other onion (*Allium*) species.

Ramson contains different types of sulphur-containing compounds, the so-called cysteine sulfoxides, which are also found in other onion species, for example garlic, and various flavonoids (Schmitt *et al.* 2005, Štajner *et al.* 2008, Fritsch & Keugsen 2006). As such, ramson does not contain harmful substances.

In reviewing the literature, the National Food Institute, Technical University of Denmark, has not found any descriptions of people being poisoned after consuming ramson leaves. The biggest toxicological problem when using ramson is the confusion with poisonous plants e.g. with autumn crocus (*Colchicum autumnale* L.) or with lily of the valley (*Convallaria majalis* L.) (Hermanns-Clausen *et al.* 2006, Colombo *et al.* 2009, Weidmann *et al.* 2006). See figure 1.

Ramson confused with poisonous plants

The confusion happens when picking the plants' leaves before the plant is in flower. Ramson and lily of the valley flower in the spring, while, as its name implies, autumn crocus flowers in the autumn. Autumn crocus grows wild in, for example, central Europe. In Denmark, it is grown as a garden plant. It is rarely found in the wild in Scandinavia, but can run wild from gardens. Lily of the valley is found both in gardens and in the wild in Denmark.

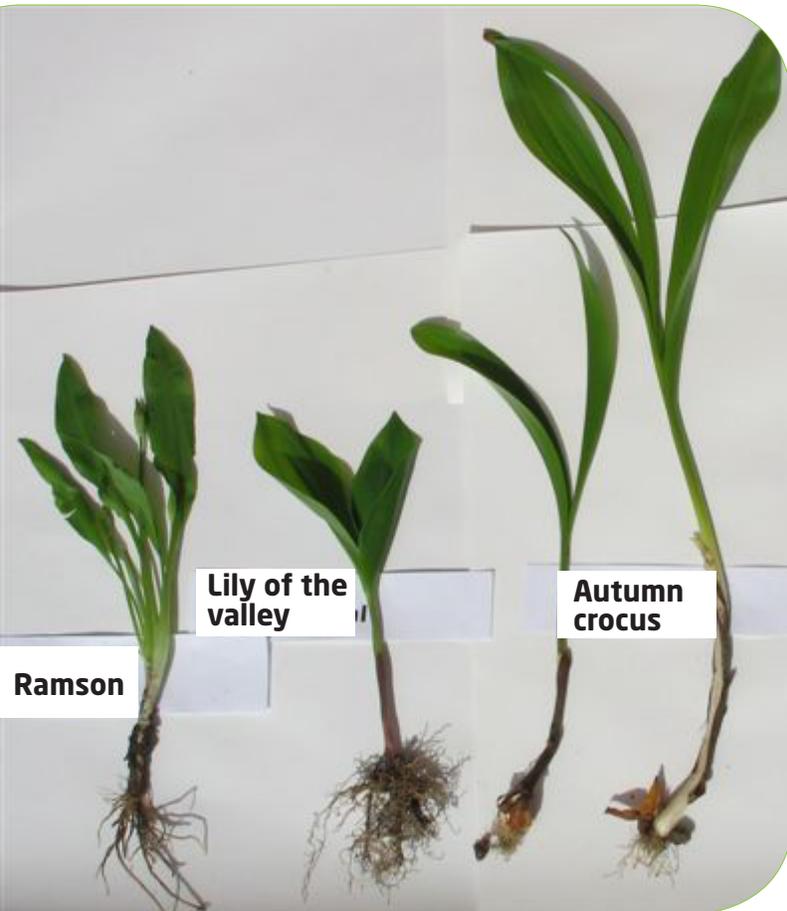


Figure 1: Ramson (left), lily of the valley (in the middle) and autumn crocus leaves (right) which can be confused before the plants flower (Photo: Anette Schnipper, National Food Institute, Technical University of Denmark).

A German study (Hermanns-Clausen *et al.* 2006) collected information on 32 cases of poisoning from autumn crocus leaves, which were mistakenly eaten instead of ramson leaves. The data was collected between 1994 and 2004, and stems from a poison information centre in Munich, and from 2000-2004 from one in Freiburg in southern Germany. In six cases the poisonings were lethal.

In 17 cases, the victims suffered mild intoxication with symptoms such as malaise, nausea, mild vomiting and diarrhoea. In six cases of medium severity people experienced liver failure, violent or protracted vomiting or diarrhoea and muscular pains and damage – so-called rhabdomyolysis. In three severe cases with liver failure, the victims suffered from shock, pulmonary oedema, severe rhabdomyolysis and unconsciousness.

Heated autumn crocus the most toxic

In 14 of the cases, the leaves were consumed in a salad, in four cases as a pesto, in two cases as a vegetable and in 12 cases in soups, for example as a culinary herb. If the leaves were eaten raw, 30% of cases suffered medium or severe poisoning, while 64% developed these symptoms after eating leaves which had been heated.

The toxin in autumn crocus is colchicine. The leaves from autumn crocus contain between 0.075-0.2% colchicine. A portion of salad containing 60 g of leaves contains 45-120 mg colchicine. Symptoms of intoxication occur after ingesting 0.5 mg per kg of body weight, while doses in excess of 0.8 mg per body weight are lethal. This means that if a person weighing 60 kg consumes a portion of salad weighing 60 g, there is a risk that the person is ingesting a lethal dose.



Figure 2: Flowering ramson (Photo: Colourbox).

Cases of poisoning from autumn crocus have also been reported from Croatia, Slovenia, Austria, Switzerland and Italy as a result of ingestion of autumn crocus instead of ramson (Brvar *et al.* 2004, Garbrscek *et al.* 2004, Sundov 2005, Klintschar M 1999, Hostettmann 2009, Colombo *et al.* 2009, Weidmann 2006). In Italy, two out of 11 cases of intoxication with autumn crocus were lethal.

Ramson can be confused with lily of the valley

The literature also warns of poisoning through confusion with lily of the valley. The toxic substances in lily of the valley are cardenolide glycosides. They are found in all plant parts but are found in the highest concentration in the flowers and seeds. The cardenolides cause irregularities of the action of the heart. Lily of the valley also contains steroidal saponins which affect the gastrointestinal tract.

There are differences in the composition of cardenolides in lily of the valley from, for example, north-west Europe and eastern Europe. Only relatively few poisonings are described even though the cardenolides have a highly toxic effect on the heart. This might be due to the fact that only about 10% of the cardenolides are absorbed from the gastrointestinal tract due to nausea and vomiting caused by other substances e.g. the steroidal saponins (Frohne & Pfänder 1997, Cooper & Johnson 1998).

Colombo *et al.* (2009) report 29 cases over a 12-year period where lily of the valley has been the cause of poisoning – without fatalities. The possibility of mistaking ramson with lily of the valley is also mentioned, but there are no details on how many of the cases are caused by such a mix-up. Cooper & Johnson (1998) report one case of poisoning where ramson was mistaken for lily of the valley and made into a soup. The people involved became hot, flushed, and tense and experienced additionally symptoms like headaches, hallucinations and red skin patches.

Contact

Senior adviser Kirsten Pilegaard, kpil@food.dtu.dk, tel. +45 35 88 75 65



Figure 3: Flowering lily of the valley (Photo: Colourbox).

Conclusion

In central Europe, ramson leaves have been picked wild and used as a culinary herb, a salad ingredient or cooked as a vegetable. The plant contains various sulphur-containing substances, cysteine sulfoxides. The occurrence of this type of substance is also known from other onion species, for example garlic. Cases of intoxication as a result of ingestion of leaves from correctly identified ramson are not described.

On the other hand, it is problematic if people with insufficient botanical knowledge collect the leaves in Denmark or abroad for their own use or with a view to resale. From central Europe and northern Italy, cases of poisoning, a number with fatal results, are described as a result of confusion with autumn crocus leaves. Autumn crocus is not native to the Danish flora, but is cultivated as an ornamental plant which can in rare cases go wild. Poisoning following confusion with lily of the valley, which is grown as an ornamental plant and grows wild in Denmark, is also described.

It has been mentioned that it is possible to pick ramson in parks and cemeteries. It is, however important to be aware that there is a greater risk of not only finding ramson but for example also, autumn crocus here, than in the open countryside.

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