

Tea (*Camellia sinensis*)

Avoiding inadvertent pyrrolizidine alkaloid contamination

What are pyrrolizidine alkaloids?

Pyrrolizidine alkaloids are a group of naturally-occurring compounds that are common in numerous plants. Many of these plants are noxious, invasive weeds that are common in agricultural areas, pastures, and along roadsides, etc. Some pyrrolizidine alkaloids have been shown to be toxic to the liver, may cause genetic damage, and may be able to cause cancer.

Why are pyrrolizidine alkaloids important to the harvest of tea?

Plants that product pyrrolizidine alkaloids may be present in the same areas in which tea is cultivated, so tea harvesters must avoid inadvertently harvesting plants that may contain pyrrolizidine alkaloids along with the tea leaves.

What pyrrolizidine alkaloid containing plants may contaminate tea?

These images are two examples of pyrrolizidine alkaloid containing plants that may contaminate tea. Many other pyrrolizidine alkaloid containing plants may be present in cultivation areas, depending on the geographic location.



Common vipersbugloss (*Echium vulgare*)



Alpine ragwort (*Senecio nemorensis*)

Can pyrrolizidine alkaloid containing plants be controlled prior to harvest?

If pyrrolizidine alkaloid containing plants are identified in the cultivation area, they can be removed by hand-pulling or other mechanical techniques, or by applying herbicides if permitted.

How can pyrrolizidine alkaloids be avoided during the harvest of tea?

Hand harvesting

Harvesters should focus on collection of only the tea leaf as the best way to avoid inadvertent contamination with pyrrolizidine alkaloids.

Machine harvesting

The settings and operation of the harvesting equipment for tea leaf should be optimized to avoid the harvesting of weeds that may contain pyrrolizidine alkaloids. Equipment should be thoroughly cleaned between uses.

Can post-harvest handling practices reduce pyrrolizidine alkaloid contamination?

When practical, plant material that may contain pyrrolizidine alkaloids can be removed during post-harvest inspection, cleaning, and drying of harvested tea leaves. Any non-target plant material that is removed should be destroyed and not composted.

Can plant material that may contain pyrrolizidine alkaloids be composted?

Plant material that may contain pyrrolizidine alkaloids should not be composted. It should be carefully removed from the cultivation area and destroyed off site to avoid reintroduction into the soil of the cultivation area.

Resources for further information

AHPA *Good Agricultural and Collection Practices and Good Manufacturing Practices for Botanical Materials* (GACP-GMP), 2021 can be accessed at:

<https://www.ahpa.org/AHPAResources/GoodAgriculturalandCollectionPractices.aspx>

European Commission “Amending Regulation (EC) No 1881/2006 as regards maximum levels of pyrrolizidine alkaloids in certain foodstuffs” and the Annex of maximum levels for each foodstuff can be accessed at: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32020R2040&rid=1>

Food Supplements Europe (FSE) *Guidelines and recommendations to reduce the presence of pyrrolizidine alkaloids in food supplements*, 2021 can be accessed at:

https://foodsupplementseurope.org/wp-content/themes/fse-theme/documents/publications-and-guidelines/Pyrrrolizidine_Guidelines-May2021.pdf

This detailed guidance contains a useful Annex of common plants that contain pyrrolizidine alkaloids with descriptions and color images of the following species:

Anchusa arvensis L.

Borago officinalis L.

Cynoglossum officinale L.

Echium vulgare L.

Eupatorium cannabinum L.

Heliotropium europaeum L.

Leucanthemum vulgare Lam.

Lithospermum arvense L.

Myosotis arvensis (L.) Hill.

Myosotis stricta Link ex Roem. & Schult.

Petasites hybridus (L.) G. Gaertn., B. Mey. & Scherb.

Pulmonaria officinalis L.

Senecio erucifolius L.

Senecio inaequidens DC.

Senecio jacobaea L.

Senecio nemorensis L.

Senecio viscosus L.

Senecio vulgaris L.

Symphytum asperum Lepech.

Symphytum officinale L.

Symphytum × *uplandicum* Nyman

Tussilago farfara L.