



## **Method for the Determination of Tansy Ragwort (*Senecio jacobae* L.) and Common St. Johnswort (*Hypericum perforatum* L.) in hay**



International Association of Feedstuff Analysis

Section Feedstuff Microscopy



## 1. Objection and field of application

The method is used for the qualitative determination of Tansy Ragwort (*Senecio jacobae* L.) and Common St. Johnswort (*Hypericum perforatum* L.) in hay.

## 2. Principle

Tansy Ragwort and Common St. Johnswort are determined by macroscopic identification using the morphologic characteristics. For estimating their amount in the sample, the identified plant material in the hay is weighed.

## 3. Reagents

3.1 Embedding agent

3.1.1 Chloral hydrate ( $\beta = 60\%$ )

## 4. Equipment and accessories

4.1 Optical equipment

4.1.1 Stereo microscope (at least 70x magnification) recommended additional equipment: image support system

4.1.2 Magnifier (up to 10x magnification)

4.2 Analytical balance (accuracy 0,001 g)

4.3 Additional laboratory equipment is listed in supporting document (9)

4.4 Reference material

## 5. Procedure

All plant material which is not considered to be of grass origin is selected from the submitted hay sample. From the remaining plant material all those plant parts are selected which show the morphologic characteristics of Tansy Ragwort and/or common St. Johnswort.

5.1 Identification

Important for the identification of the plant material is the habitus of the plant parts in a whole (length of the stem, branching, edged or grooved stem etc.), as well as obtained parts of leaf-, blossom and fruit.

For the identification of Tansy Ragwort and / or Common St. Johnswort literature descriptions and reference material is used.



Tansy Ragwort belongs to the Asteraceae family. The plant is 30-100 cm tall and shows feathered leaves. The stem is strong and branched. The golden-yellow disc-and radiant blossoms yield uphold umbel clusters.

Common St. Johnswort belongs to the Hyperaceae family. The plant is 30-60 cm tall. The leaves are oval looking and standing towards each other. The uphold stem shows two exalted length edges. The blossoms are golden-yellow with asymeric, black dotted crown leaves. They yield rich flowering clusters. The calyx and crown leaves consist of black, lined and tapped oil glands, which cause red colouring when grinded.

Qualitative test of hypericin: A plant part with dark red spots is moistered with a drop of chloral hydrate. A dark red area is observed, if the dark spots are secretion glands.

## 5.2 Quantification

At least 500g of an original hay sample is used to select all plant parts of Tansy Ragwort and Common St. Johnswort, respectively. The whole sample and the selected plant parts are weighted separately (4.2)

## 6. Calculation and report

### 6.1 Caculation

The amount of selected plant material in mg/kg (ppm) feedingstuff (original sample) is calculated using the following formula:

$$C = \frac{BC \times 1000}{E} \text{ [mg/kg]}$$

**C** = amount of component in mg/kg feedingstuff (ppm)

**BC** = selected fragments of component in the laboratory sample or an aliquot of it [mg]

**E** = total weight of the laboratory sample or an examined aliquot of the laboratory sample [g]



## 6.2 Report

### 6.2.1 Negative result:

6.2.1.1 As far as was discernible using a microscope, plant material of Tansy Ragwort was not found in the submitted sample.

6.2.1.2 As far as was discernible using a microscope, plant material of Common St. Johnswort was not found in the submitted sample.

### 6.2.2 Positive result:

6.2.2.1 As far as was discernible using a microscope, x mg plant material of Tansy Ragwort (per kg hay) was found in the submitted sample.

6.2.2.2 As far as was discernible using a microscope x mg plant material of Common St. Johnswort (per kg hay) was found in the submitted sample.

## 7. Validation

Not applicable

## 8. Remarks

8.1 The fresh as well as the dried plant of Tansy Ragwort is very toxic. It contains pyrrolizidin alkaloids, which are changed into metabolites in the liver. These react irreversibly with DNA and other macro molecules, causing liver damage or even the death of the animals. Important is the total amount of pyrrolizidin alkaloid intake, no matter of time.

8.2 Common St. Johnswort contains hypericin. This chemical causes continuous photosensitivity of the skin. Horses are especially sensitive. Unpigmented or poor haired skin areas can be hurt.

8.3 This method is also applicable for the determination of other toxic plants in hay.

This method has been developed by the International Association of Feedingstuff Analysis (IAG) – Section Feedingstuff Microscopy

## 9. Supporting document

Method for the Sample Preparation for Macroscopic and Microscopic Analysis



## **10. Literature**

ROTH, L.; DAUNDERER, M. und KORMANN, K., 1994: Giftpflanzen-Pflanzengifte.  
4. Auflage, ecomed verlagsgesellschaft, Landsberg