

## Extraction of Genépi (*Artemisia umbelliformis*) using the SpeedExtractor E-916 for the Quantification of Costunolide

The Genépi plant (*Artemisia umbelliformis*) grows in alpine areas. It is also cultivated and used to produce a herb liquor. Costunolide is a sesquiterpene lactone and the main compound responsible for the bitterness of the Genépi plant. Ground Genépi was extracted with the SpeedExtractor E-916 using an alcohol-water mixture and subsequently analyzed on HPLC. The determined costunolide content in the samples was 9.52 mg/g and corresponds to the values reported in literature [2], [3].

### Introduction

The Genépi plant (*Artemisia umbelliformis*) grows in alpine areas between 2000 and 3700 meters above sea level. The plant is cultivated and used to produce a herb liquor, a local specialty in the region of the Valais Alps of Switzerland, Northern Italy and Western France.



Figure 1: Genépi (*A. umbelliformis*)

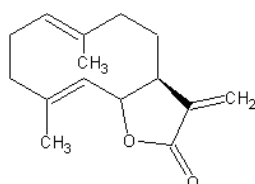


Figure 2: Costunolide

Costunolide is a sesquiterpene lactone and the main compound responsible for the bitterness of the Genépi plant and much desired for its distinguished taste. Costunolide has also been reported to have an anti-cancer effect [1] and as a remedy for stomach cramps and loss of appetite [2]. The amount of costunolide found in Genépi varies based on the time of harvest [3].

### Experimental

**Instrumentation:** SpeedExtractor E-916, ultra centrifugal mill, HPLC system with UV detector (210nm)

The dried and ground plants (<1 mm) were mixed with diatomaceous earth and extracted with the SpeedExtractor E-916 using the parameters shown in Table 1. The sample was extracted in triplicate.

Table 1: Extraction method of SpeedExtractor E-916

|                    |                        |
|--------------------|------------------------|
| Temperature        | 50 °C                  |
| Pressure           | 100 bar                |
| Solvent            | Water 60%, Ethanol 40% |
| Cells              | 40 ml                  |
| Vials              | 240 ml                 |
| Cycles             | 3                      |
| Heat-up            | 1 min                  |
| Hold               | 9 min                  |
| Discharge          | 5 min                  |
| Flush with solvent | 3 min                  |
| Flush with gas     | 5 min                  |

Costunolide was quantified by HPLC (equipped with UV detector at 210 nm), using a calibration based on an external standard.

### Results

The results (see Table 2) correspond to the values reported in literature from 5.6 mg/g up to 29.1 mg/g [2], [3]. The value of sample two is not an outlier according to the Grubbs test (significance 95%).

Table 2: Determined amount of costunolide

|                   | Costunolide [mg/g] |
|-------------------|--------------------|
| Sample 1          | 9.80               |
| Sample 2          | 8.85               |
| Sample 3          | 9.91               |
| <b>Mean value</b> | <b>9.52</b>        |
| rsd %             | 6.10               |

### Conclusion

The extraction of Genépi plants using Speed Extractor E-916 represents a very powerful method to prepare extracts for the quantification of important plant compounds such as costunolide. The values determined are in correspondence with literature. The short total extraction time of approx. 1 h 10 min and the small solvent volume used of approx. 60 ml are further benefits of this procedure.

### Acknowledgment

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### References

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- [2] Rey, Ch.; Slacanin, I. (1997) Domestication du genépi blanc. *Revue Suisse Vitic. Arboric. Hortic.* Vol.29 (3) I-VIII.
- [3] Simmonet, X. et al. (2006) Stade phénologique et qualité des hampes florales du genépi blanc. *Revue Suisse Vitic. Arboric. Hortic.* 38(3) 189-193.

SpeedExtractor E-916 operation manual

For more detailed information, refer to Application note 004/2009