UNCONVENTIONAL TECHNOLOGIES FOR EXTRACTION OF BIOACTIVE COMPOUNDS FROM DIFFERENT PLANTS

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ABSTRACT

This article present the results of supercritical carbone dioxide extraction of sulphur compounds from endemic *Allium* spp. plants.
Thin Layer Chromatography (TLC) was performed for qualitative identification of thiosulphate (Rf = 0.201- 0.486), diallyl thiosulphate with Rf = 0.458 for *Allium ursinum* L. extracts and dipropyl thiosulphate, as light brown with Rf = 0.486 at *Allium cepa* var. "Rubiniu" extract.

MATERIAL AND METHODS

The most popular Romanian Allium spp. (*Allium cepa* var. "Rubiniu" – red onion) was kindly supplied by Research & Development Society for Vegetables (SCDL) Buzău, Romania. The Allium ursinum L – wild garlic leaves were collected from Bacau forests in 2011 May. All of the raw materials were free of external damages and hand selected, cutting using a kitchen knife for their following analysis.

Supercritical fluid extraction

Equipment used for supercritical fluid extraction (Fig. 1) of solid material was designed and supplied by Natex Prozesstechnologie GembH (Ternitz, Austria, www.natex.at).

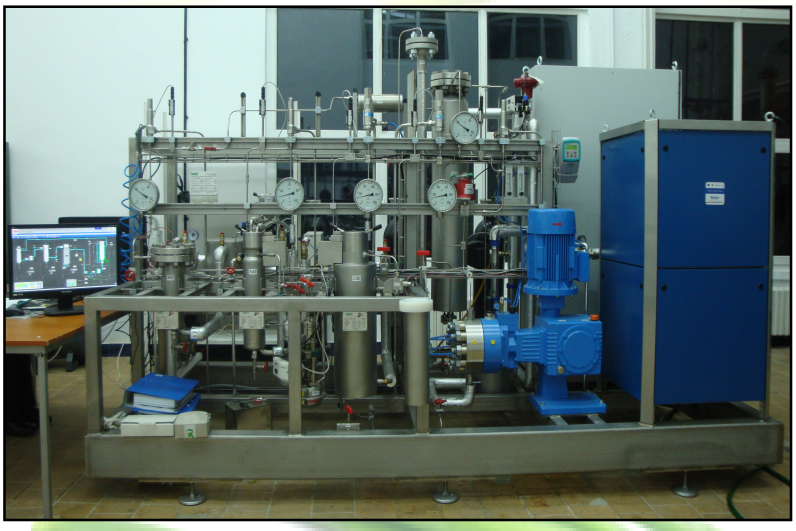

Fig. 1. *Experimental plant for supercritical fluid extraction* (Courtesy of Natex).

Thin Layer Chromatography of the extracts

Thin Layer Chromatography was performed according to Wagner şi Bladt, (1996) after the dissolving of the extracts in methanol (0.05 g solid extract to 30 mL of methanol) and spotted on chromatographic silica gel plate 60 F254 (MERCK, Germany).
The developing system was toluene – ethyl acetate (10:3) (Fig.3a). The detection of the sulphur compounds was possible with detection system (1 g vanillin to 100 mL acetic acid) (Fig.3b).

RESULTS AND DISCUSSION

Humidity content of solid material

The AOAC (2000) specifications were adopted to establish the humidity of wild garlic dried leaves and lyophilized red onion (fig.2).

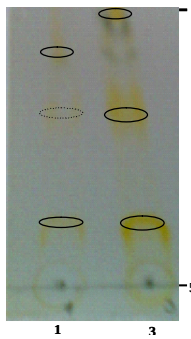

Fig. 3a. *Toluene – ethyl acetate system*

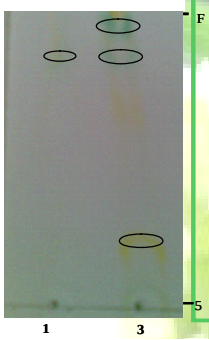

Fig. 3b. *Detection system (vanillin – acetic acid)*

1 – Allium cepa var. "Rubiniu"3 – Allium ursinum L.

TLC identification of sulphur compounds

After impregnation in developing system toluene – ethyl acetate (Fig.3a) were identified the thiosulphates (Rf = 0.201 – 0.486), dialyll tiosulphate with Rf=0.458 in wild garlic extract.
The dipropyl sulphate (Rf=0.486) was characteristic for red onion extracts in small concentration (grey line).

After developing solution treatment, were observed yellow spots (for thiosulphate) and blue-grey (for sulphides) in the case of wild garlic extracts (Fig. 3b).

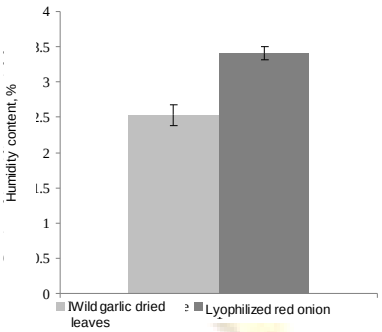

Fig.2. *Water content of solid material used for supercritical extraction (values are mean of two parallel determination ± standard deviation)*

CONCLUSIONS

-The humidity content of lyophilized red onion was 3.409% with 25.79% much higher than humidity of dried wild garlic leaves.
-The Thin Layer Chromatography allow us to identify the sulphur compounds like: thiosulphates, dialyl thiosulphate (for wild garlic extracts) and dipropyl thiosuphate (in small concentration) for red onion extract.
-Future work will be focused on concentration quantification of the sulphur compounds using GC-MS chromatography.

ACKNOWLEDGMENT

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