

## BRIEF COMMUNICATION

### LIPIDS OF *Helichrysum maracandicum* FLOWERS

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The genus *Helichrysum* (everlasting) of the Asteraceae family includes over 500 species distributed mainly in South Africa, Australia, and Asia Minor. Few species are found in the rest of Asia. Several species are used as garden plants. Several species of everlasting are valuable medicinal plants [1]. The flower clusters yield liquors, extracts, or granules that are used in medicine for chronic ailments of the liver and bile ducts, cholecystitis, and hepatitis [2].

We investigated the flower clusters of *Helichrysum maracandicum* M. Pop. ex Kirp. that were collected at the start of fruit bearing. Hexane and  $\text{CHCl}_3$ — $\text{CH}_3\text{OH}$  (2:1 by vol.) extracts were isolated from air-dried and ground material. The latter extract was freed of nonlipid components by washing with 0.05% aqueous  $\text{CaCl}_2$ . The hexane extract included neutral lipids (NL) whereas the  $\text{CHCl}_3$ — $\text{CH}_3\text{OH}$  extract contained polar lipids (PoL), i.e., the total glyco- (GL) and phospholipids (PL). The yield of NL was 2.2%; PoL, 1.7% of the total dry mass. The PoL were separated by column chromatography on silica gel into GL and PL using elution by acetone and methanol, respectively. The yield of GL was 1.2%; of PL, 0.5% of the total mass.

The GL were identified by TLC on silica gel using  $\text{CHCl}_3$ —acetone— $\text{CH}_3\text{OH}$ — $\text{CH}_3\text{CO}_2\text{H}$ — $\text{H}_2\text{O}$  (65:25:10:10:3 by vol.) solvent and  $\alpha$ -naphthol development [3]. The content of the individual classes was estimated visually: sterolglycoside esters > sterolglycosides > monogalactosyldiacylglycerides > digalactosyldiacylglycerides.

The PL were analyzed by two-dimensional TLC on silica gel using solvents: 1)  $\text{CHCl}_3$ — $\text{CH}_3\text{OH}$ — $\text{NH}_4\text{OH}$  (65:25:5 by vol.) and 2)  $\text{CHCl}_3$ — $\text{CH}_3\text{OH}$ — $\text{CH}_3\text{CO}_2\text{H}$ — $\text{H}_2\text{O}$  (14:5:1:1 by vol.). Bands were detected visually using ninhydrin and Dragendorff's and Vas'kovskii reagents [3].

A series is formed according to the increasing content of individual classes of PL: N-acylphosphatidylethanolamines - lysophosphatidylcholines - phosphatidic acid - phosphatidylethanolamines - phosphatidylcholines - phosphatidylinosites.

The total NL were separated into individual classes by preparative TLC on silica gel using hexane—diethylether (8:2 by vol.) to give 8.7% hydrocarbons, 23.1% fatty acid (FA) esters and alcohols, 35.2% triacylglycerides, 10.7% free FA and aliphatic alcohols, 8.3% sterols, and 14.1% unidentified components.

Fatty acids from NL, GL, and PL were isolated by alkaline hydrolysis [4]. Their composition was established on a Chrom-4 instrument with flame-ionization detection using a 2000×4 mm column packed with Chromaton N-AW with 15% Reoplex 400 at 198°C (Table 1).

Table 1 shows that the lipids from everlasting flowers contain a wide assortment of FA, up to 16 components. The ratio of saturated to unsaturated FA in the NL is near unity whereas the GL and PL are enriched in the saturated acids. The fraction of high-molecular-weight acids of the 20:0-25:0 series in all lipid classes is significant, from 20 to 27%.

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TABLE 1. Fatty Acids of NL, GL, and PL of *Helichrysum maracandicum* Flowers, % GLC

Acid	NL	GL	PL
12:0	0.8	2.8	0.7
14:0	5.5	5.8	3.6
15:0	1.5	2.5	0.4
16:0	9.9	18.5	19.9
16:1	1.0	2.8	3.3
17:0	0.9	2.8	2.9
18:0	3.5	9.2	9.9
18:1	13.3	14.7	14.2
18:2	32.7	8.0	17.4
18:3	3.7	6.2	7.7
20:0	4.3	5.8	Tr
21:0	0.5	6.5	0.7
22:0	5.9	5.9	5.0
23:0	2.2	5.1	5.3
24:0	5.4	3.4	5.0
25:0	8.9	Tr	4.0
$\Sigma_{\text{sat}}$	49.3	68.3	57.4
$\Sigma_{\text{unsat}}$	50.7	31.7	42.6

## REFERENCES

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