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Stabilization of Hempseed Oil with Natural Antioxidants

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I. INTRODUCTION

Hempseed (*Canabis sativa*) oil is most perfectly balanced oil for its high content and perfect ratio (1:3) of the two essential acids – linolenic acid and linoleic acid. Hempseed oil is widely used for food as well as in medicine and cosmetics. The oil improves skin condition and is used for antiaging and quick wound healing. Unfortunately, due to the high amount of polyunsaturated fatty acids, the hempseed oil easily undergoes to undesired autooxidation processes. This shortage can be prevented by addition of antioxidants - most often synthetic compounds are used for this purpose, but more valuable would be stabilization of hempseed oil with extracts of natural antioxidants.

II. RESULTS AND DISCUSSION

In this work we investigated influence of extracts of plant antioxidants obtained from sea buckthorn (*Hippophae rhamnoides*) pomace (SBP), peppermint (*Mentha × piperita*) leaves (PL) and hop (*Humulus lupulus*) cones (HC) on the oxidative stability of hempseed oil (HO).

The sea buckthorn pomace is press residue of juice production – pomace consists from peels and seeds, which contain ~8-12% oil. The main natural antioxidants in lipophilic extracts of sea buckthorn pomace are tocopherols and carotenoids [1], of peppermint leaves - flavonoids, phenols and terpenoids [2], of hop cones – xanthohumol, humulones and lupulones [3]. Beside antioxidants these plant materials rise interest due to other compounds, which they comprise: e.g., peppermint leaves contain menthol, menthone, menthyl acetate, 1,8-cineole, limonene, β-pinene, β-caryophyllene, but extracts of hop cones can be used as natural UV filters.

We used in our experiments cold-pressed hempseed oil and 4 hempseed oil extracts (see table 1), which were prepared by cold-pressing of hempseeds together with grounded plant materials.

TABLE I
HEMPSEED OIL EXTRACTS OF PLANT MATERIALS

Extract	Plant material			
	No 1	%	No 2	%
1	sea buckthorn pomace	5	-	-
2	sea buckthorn pomace	5	peppermint leaves	2.5
3	sea buckthorn pomace	5	hop cones	1.5
4	sea buckthorn pomace	5	hop cones	2.5

Total phenolic content (TPC) of hempseed oil and plant extracts was determined by Folin-Denis method: in comparison with pure hempseed oil TPC of SBP extract (No 1) increased more than 2 times. Extracts which beside lipophilic compounds of SBP contained components of the second plant material (PL or HC) had considerably higher

TPC: even 5-10 times higher than pure hempseed oil; the most effective were extracts of hop cones. It is well known, that blends of different type antioxidants often has enormously increased activity - synergy is observed.

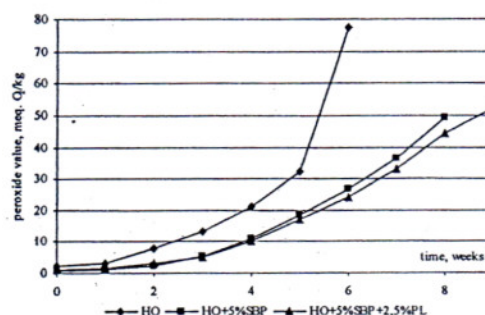


Fig.1. The impact of antioxidants of sea buckthorn pomace (SBP) and peppermint leaves (PL) on the oxidative stability of hempseed oil (HO)

We investigated influence of extracts of plant antioxidants on oxidative stability of hempseed oil by monitoring of peroxide values of samples which were kept under accelerated oxidation conditions (40°C, air); the acid and peroxide values were monitored once per week. Plant material additives improve oxidative stability of hempseed oil. The oxidative stability increased about 1.5 times when sea buckthorn pomace was added to hempseed oil, and for 1.6 times when hempseed oil was enriched both with antioxidants of sea buckthorn pomace and peppermint leaves (see fig. 1).

III. CONCLUSIONS

The extracts of sea buckthorn pomace, peppermint leaves and hop cones which contain different type lipophilic antioxidants can be successfully used to improve oxidative stability of hempseed oil; such stabilized oil can be used for production of cosmetics.

IV. REFERENCES

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