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ANTIOXIDANTS OF OAT EXTRACTS AND THEIR ANALOGUES

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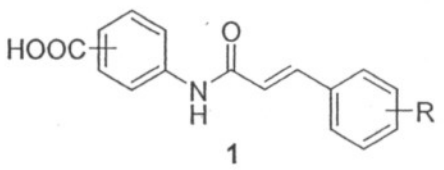
Vegetable oils are widely used in food, cosmetics and pharmaceuticals; during the last decade the industrial application of these oils increased considerably: they are employed as lubricants, fuels, transformer coolants etc. Unfortunately, the storage of vegetable oils is limited due to the autooxidation processes. Stabilization of vegetable oils with extracts of natural plant antioxidants has gained increasing interest of researchers during the last years [1–3].

Oat (*Avena Sativa* L.) is well known source of natural antioxidants [4]; oat extracts obtained with organic solvents can be used for the stabilization of vegetable oils [5]. An excellent solution for improvement of oxidative stability of vegetable oils would be the preparation of lipophilic (oily) extracts of natural antioxidants. We worked out several methods for production of vegetable oil extracts of ground oats; these procedures exclude usage of organic solvents. We used 3 different extraction methods:



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1) ground oats were extracted with some vegetable oil,
2) ground oats were mixed with oilseeds and this mixture was cold-pressed,
3) ground oats were macerated in a small amount of the vegetable oil overnight, then mixed with corresponding oilseeds and cold-pressed.

In order to evaluate the oxidative stability of obtained oily extracts, samples were kept under accelerated oxidation conditions and the oxidative deterioration was monitored by detection of peroxide values. We have found out, that oat additives increased oxidative stability of hempseed, linseed and rapeseed oils sometimes even more than 3 times.

In order to clear up structure-antiradical activity relationships of avenanthramides (main antioxidants of oats) and their synthetic analogues, we have synthesized a range of *N*-cinnamoyl anilines **1**, which differed with position of carboxylic group in the moiety of aniline ring and with substituents (OH, OMe or H) and their number in the aromatic ring of cinnamic acid. The antiradical activity of synthetic analogues of avenanthramides was determined with DPPH method. It was observed that the antiradical activity was not affected by the position of carboxylic group in the aniline moiety, but the presence of hydroxyl group in *para*-position of cinnamic acid ring and at least one methoxy group next to hydroxyl group were essential requirements for antiradical activity. Several synthetic analogues of oat antioxidants were 2 or even 5 times better as free radical scavengers than widely used butylated hydroxytoluene. Synthesized *N*-cinnamoyl anilines successfully can be applied at reduced amounts (in comparison with traditional synthetic antioxidants) for improvement of the oxidative stability of vegetable oils as well as alkyl esters of fatty acids.

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