BRIEF COMMUNICATIONS

ISOLATION AND CHARACTERISTICS OF THE PECTIN OF Mentha piperitae

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The utilization of wastes from plant raw material is one of the most important tasks of the essential-oil industry. Some of the plants, especially mint, can serve as a source of pectin after the essential oils have been removed.

Pectin from Mentha piperitae (variety Krasnodarskaya 116) was obtained in the following way. The lipids, part of the pigments and of soluble sugars (they were converted into the insoluble state by denaturation) and part of the proteins were first eliminated by exhaustive extraction of the ground air-dry material with methanol. The residue was treated in the cold with a 1% solution of formalin to free it from polyphenolic compounds.

To prevent the formation of water-insoluble polysaccharide complexes with Cu^{2+}, Ca^{2+}, and other cations and to improve the solubility of the pectin being isolated, the material was treated with dilute hydrochloric acid.

The polysaccharides of the mint were extracted with a 1% solution of ammonium oxalate at 75°C (3 times). The pectin was purified by repeated reprecipitation with methanol from aquous solutions followed by dialysis.

After freeze-drying, the mint pectin (yield 3%) consisted of a snow-white flocculant powder readily soluble in water with $[\alpha]_D^{20}$ + 250° (in water). Gel filtration on Sephadex gave only one peak of an acidic polysaccharide.

The monosaccharide composition of the compound obtained was determined by the paper chromatography of hydrolyzates (2 N H_2SO_4, 100°C, 18 h) followed by elution and quantitative determination by Hagedorn's method [1]. Uronic acids, galactose, arabinose, and rhamnose were found in a ratio of the monosaccharides of 1:1:1.

The quantitative and qualitative characteristics of the mint pectin were determined by the titrimetric method [2]. The amount of free carboxy groups, K_c, was 16.53% and of esterified groups, K_e, 5.95%, the degree of esterification was 26.45%, the amount of methoxy groups 4.1%, and the total nitrogen content determined by the Kjeldahl method 0.5% which corresponds to 2.8% of protein (N_x=6.25). The weight-average molecular weight M_W, calculated from the relation

$$kM^2 = [\eta] = 1{,}1 \cdot 10^{-5} M_W^{1{,}22}$$ [3],

where $[\eta]$ is the reduced viscosity, amounted to 117,000.

The number-average molecular weight (M_n), determined by the end-group method [4], was 72,5000.

Partial hydrolysis (2 N H_2SO_4, 100°C, 4 h) yielded a polysaccharide with $[\alpha]_D$ + 240° (water), M_n=44,600. Only galacturonic acid was found in the hydrolyzate of this polysaccharide.

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