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Betalains, Total Polyphenols, and Antioxidant contents in Red Beetroot Peel (Cylindra type)

Moh Moh Zin, Edit Márki, Szilvia Bánvölgyi
Department of Food Engineering, Faculty of Food Science, Szent István University

Since most of foods go to waste during processing, investigation of how to improve the valuable products extraction from the wastes is deniably effective way to save the planet. Betalains (betaxanthin and betacyanin) and phenolic compounds are rich in antioxidant and chiefly found in red colour vegetables. Among them, beetroots are getting interest of scientists nowadays because of its biological properties. Not only the whole tuber but also waste parts like stalk, peel, and even leaf contain acknowledged source of valuable compounds. The major attention of this project is to optimize process variables which are extraction time (10-60 minutes), operating temperature (20-50 °C), ethanol concentration (25-75%) for effective extraction of valuable compounds such as betalains, total polyphenols, and antioxidant activity from beetroot peel. Peel-to-solvent ratio was fixed at 1:10. Spectrophotometric analysis was applied for quantification of those compounds. Folin-Ciocalteu method was used for determination of total phenolics in the extracts whereas antioxidant assay was done using Ferric Reducing Antioxidant Power (FRAP) method. Process optimization was carried out using Design Expert (11.0.3) statistical software. Being traditional an extraction method, it is not costly compare to modern extraction technology.

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Evaluation of Pellets Character using Thermal Analysis

D. Kunecová, P. Hlavač, Z. Hlaváčová
Department of Physics, Faculty of Engineering, Slovak University of Agriculture in Nitra, Slovak Republic

The main object of this paper was the investigation of first and second class of pellets thermal degradation. Samples were chosen with regard to the environmental friendliness of materials used in households for heating. The aim of this study is to describe the thermophysical properties of various pellets kinds. In Slovakia, industrial pellets are made from mixed wood. Materials suitable for pyrolysis are organic materials that degrade at increased temperature. Thermal processes were carried out in the range from 25 °C to 1100 °C using inert nitrogen atmosphere. Heating rate was linear at values 5 °C min-1, 10 °C min-1 and 20 °C min-1. The mass drops around 150 °C corresponds to the evaporation of water and other lighter hydrocarbons. The decrease is not more than 10% of their mass due to the temperature. At main decrease, the mass loss was between 40% and 90% at the temperature around 300 °C. Activation energies were calculated with the help of two kinetic models (Kissinger-Akahira-Sunose and Flynn-Wall-Ozawa model). The residual of samples was around 40% of mass from the temperature 800 °C.

Key words: activation energy, pellets, thermogravimetric analysis
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