

# Study on the Extraction of Bioactive Compounds from Beetroot Peels

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## Abstract

Beetroot (*Beta vulgaris*) has been cultivated for hundreds of years and is used as a vegetable in daily food, but also in the form of juice and extract, later being used in traditional medicine, as a food colouring and additive for cosmetic products. After processing the beetroot, a considerable amount of peels results which can be valorised due to the high content of bioactive compounds that can be used in the food industry. Polyphenols represent a group of secondary metabolites in the cell walls of plants, beetroot being included in the list of the main vegetables with an important antioxidant capacity. The presence of the betalain pigments determines the classification of beetroot powder in the category of food colouring. Betanin (E162) is used to restore the original colour of some food products and to colour some food products. The aim of this study was to optimize the extraction process of polyphenols and betalains from beetroot peels, in order to use the extracts as food colouring or in food supplements with antioxidant properties and in the pharmaceutical industry. Thus, the content of polyphenols and betalain pigments (betaxanthins and indicaxanthins) present in the peels of beetroot was analysed and which, under certain favorable conditions, can be extracted and used in different fields, such as food industry, pharmaceutical industry i.e. In the experimental study, the influence of temperature, time, solvent concentration, type of solvent and ultrasonic frequency on the polyphenols and betalains (indicaxanthin and betaxanthin) extraction from beetroot peels was studied. The extraction of polyphenols and betalains was carried out according to different parameters, as following: ultrasonic frequency (12.5, 25 and 45 kHz), temperature (50, 60 and 70 °C), time (15, 30 and 60 min), and solvent (methanol, ethanol and 2-propanol in different concentrations: 50, 70 and 90%). As a general conclusion regarding obtaining an optimal extraction of polyphenols from the beetroot peels extract, it was found that the most favorable conditions were achieved by using methanol 50% as an extraction solvent, at an ultrasonic frequency of 12.5 kHz, temperature of 70 °C and a time of 30 min. Moreover, the optimal parameters for extraction of betaxanthin and indicaxanthin from the beetroot peels were methanol 90% used as an extraction solvent, an ultrasonic frequency of 12.5 kHz, temperature of 70 °C for 60 min.

**Keywords:** beetroot peels, polyphenols, betalains, ultrasonic extraction

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