

## INFLUENCE OF TEMPERATURE AND PH ON THE COLOUR PARAMETERS OF RED BEETROOT PIGMENTS

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Food colour is an important characteristic influencing considerably the consumption decision and it can be drastically changed by different factors. More than that, the increasing demand for functional foods and the potential of plant kingdom to offer an endless source of healthy pigments, recommends natural pigments originated from plants as replacement for the synthetic pigments. But, simultaneously, it rise the problem of pigments stability during the extraction and all the procedures concerning their inclusion into the functional foods. There are also, important qualitative and quantitative differences between the pigment content of different varieties of the same plant. The present research studies the influence of temperature and pH on the colour of 3 varieties of red beetroot aqueous extracts.

Three varieties of red beetroot (*Beta vulgaris* L. var. rubra) were analysed: Bordeaux, Cylindra and Detroit. The pigments extraction was performed using distilled water, at room temperature for 75 min and was followed by filtration. The initial betanin content was measured at 538 nm. The CIELab colour parameters were determined for the native pH ( $4.96 \pm 0.11$ ), but also at more acidic ( $3.29 \pm 0.07$ ) and alkaline ( $10.53 \pm 0.03$ ) pH. The influence of temperature was studied at 25°C (room temperature), 45°C and 75°C.

The variety Detroit proved the highest betanin content, followed by Bordeaux and Cylindra. The analysis of CIELab parameters confirms that pH strongly affects the colour of betalains. At native and more acidic pH, the initial colour of all extracts was reddish at room temperature, but at pH  $3.29 \pm 0.07$ , it was very unstable in case of Bordeaux (changing to brown after about 16 hours at 4°C) and Cylindra (changing to yellow). At alkaline pH, the initial colour of extracts at room temperature was blue-violet. The temperature affects the colour stability, especially in the presence of acid or alkaline pH. At the native pH, the temperature effect was lighter, especially in case of 45°C treatment and of Detroit variety.

Detroit variety of red beetroot proved the most important betanin content, and the best colour stability at native pH, for all the studied temperatures. As consequence, from the three studied varieties, Detroit is recommended to be used as a source of betanins, which can be used as natural food dyes at pH around 5.

**Keywords:** Beta vulgaris, betacyanins, betalains, betanin content, CIELab, stability

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