

THE USAGE POTENTIAL OF ACTIVATED CARBON IN SUGAR BEET MOLASSES PURIFICATION: INFLUENCE ON COLOUR AND TURBIDITY

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Abstract

Sugar beet molasses represents valuable sugar industry by-product due to the diversity of present compounds. Constrains towards molasses complete exploitation through present compounds valorisation initiated numerous investigations. The primary aim of the corresponding investigations was to identify an effective treatment for sugar and non-sugars separation. Separation of sugar and non-sugars concentrated in the sugar beet molasses could be achieved by various adsorption based treatments under appropriate conditions.

Considering successful application of activated carbon as an adsorbent of non-sugars in juice purification, the presented study aims to investigate its usage potential in molasses purification. In this regard, granulated activated carbon adsorption performance was determined through sugar beet molasses colour and turbidity assessment.

According to the applied Box-Behnken experimental design, the influence of 3 independent parameters: pH (3, 5 and 7), temperature (40, 60 and 80°C) and activated carbon concentration (1, 3 and 5 g/L) on molasses colour and turbidity were examined. The molasses dry substance (10° Brix) was kept constant in all conducted experiments. Response surface methodology was used for determination of applied parameters significance.

Molasses colour and turbidity reduction extent was greatly dependent on pH. Applied strongly acidic conditions (pH 3) were adequate for reaching maximal molasses colour reduction while the opposite effect was observed in molasses turbidity reduction. Furthermore, an increase in the activated carbon concentration contributed to the molasses colour reduction. The influence of treatment temperature was not established as significant in terms of molasses colour and turbidity reduction.

The obtained positive results regarding molasses colour and turbidity reduction upon activated carbon application confirm its adsorption potential towards non-sugars present in molasses. Nevertheless, to accomplish balance between satisfactory molasses colour and turbidity reduction, determination of adequate treatment conditions is crucial and requires further research.

Key words: molasses, colourants, adsorbent, purification

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