

The composition and structure of the tea leaves, processed in supercritical carbon dioxide

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Abstract

In the example of a commercial sample of China and Vietnam green teas and demonstrated the possibility offered pretreatment procedure tea leaves that enhance Extractable including caffeine in the aqueous phase at the preparation stage of the beverage, and provide more complete utilization of the biological potential of the feedstock. The conditions to minimize the effect of SC-CO₂-extraction ash minerals and bioactive components of tea leaves in the implementation of the above-noted procedures. The results of studies of the effect of CO₂ supercritical parameters during pre-treatment on the structure and phase state of one of the leaf tea ingredients (caffeine), the structure of the leaves of green Chinese tea and the elemental composition of the tea leaves. It is found that pre-4-hour circulation of carbon dioxide through the extractor with the feedstock at T = 333.15 K and P = 10 MPa allows an increase in yield of caffeine on the aqueous phase of the beverage preparation step to 25%. Analysis of changes in the target component is extractable with brewing tea beverage by isolines (P, T, τ) indicates the presence of a causal link between the structural changes in the tea leaf. In particular, the increase in temperature of 35 to 50 °C for the conditions of P/T = 10 MPa/3 hours, P/T = 10 MPa/5 hours, P/T = 20 MPa/6 hours accompanied by an increase in the content of absolutely all discussed components of tea raw materials. By increasing the duration of the pretreatment procedure of tea material with 3 to 6 hours for the vast majority of the minerals and salts tested, an increase of their content in the beverage, but only in the case where the treatment is carried out at 50 °C. For leaf tea, treated at 35 °C, this tendency is not established. Recorded and evaluated by FTIR absorption spectroscopy in the structural changes of tea leaves subjected to treatment in supercritical carbon dioxide (static regime). Revealed shift of the absorption bands of caffeine in the tea leaves, and reducing the intensity of the sample strips that have passed this treatment. Pretreatment of raw tea in dynamic mode (SC-CO₂-circulation) significantly affects the final content of minerals and salts discussed in the tea beverage.

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