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Enzyme-assisted extraction of cinnamon (*Cinnamomum zeylanicum*) bark oil and its effect on extraction yield and quality

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Cinnamon (*Cinnamomumzeylanicum*) is a highly significant spice, native to Sri Lanka and its bark oil is used as a fragrance, flavor in many applications and in the pharmaceutical industry. The volatiles are mainly extracted using traditional distillation methods such as hydro-distillation and steam distillation. In this study, the novel extraction method, Enzyme-assisted Distillation (EAD) is studied to extract the volatile compounds from plant matrices. Aqueous Enzyme solution of Viscozyme and α -amylase were prepared in different concentrations of 0.25%, 0.5%, 1% ((w/w) of raw materials). In the method, the crushed plant materials were soaked in a prepared enzyme solution (pH 4-5) and incubated at 45+2 °C for 90 min followed by hydro-distillation for 6 hours. The same procedure was followed for the control sample without enzyme pretreatment. Cinnamon Bark Oil (CBO) yield was determined for all the samples and GC-MS analysis was carried out to analyze Trans-Cinnamaldehyde Content (TCC) in the prepared samples. The CBO yield and the TCC of the pre-treated samples with enzymes were significantly higher ($P < 0.05$ at 95% confidence level) compared to the control (1.4487±0.0033% CBO yield, 57.095±0.593 % TCC). Amidst various treatments, which were done using different types of enzymes and different concentrations, viscozyme treated sample showed significantly higher CBO yields of 1.6369±0.0019% and 1.6362±0.0022% at 0.5% and at 1% concentrations respectively. TCC was significantly higher in same concentrations of viscozyme; 67.577±0.288% at 0.5% and 67.623±0.080 at 1%. The mixture of viscozyme and α -amylase concentrations showed high CBO yields and trans-cinnamaldehyde content than α -amylase in all concentrations. Therefore, the overall study reveals that viscozyme enzyme is performing better compared to α -amylase enzyme as a pretreatment for cinnamon bark oil distillation. This happens due to the disruption of the cell wall structure in cinnamon after treating with viscozyme, which is composed of cellulase and pectinase than the treatment with α -amylase. Further, the study demonstrated that the 0.5% Viscozyme concentration is the optimum concentration for treating cinnamon bark. The application of Enzyme-assisted extraction substantially improved the oil yield compared to traditional methods. The overall results of this study reveal that EAD could be effectively used in the spice industry to enhance the extraction yield as well as the quality of cinnamon bark oil in an economical way.

Keywords: Cinnamon bark oil, Enzyme assisted extraction, Trans-cinnamaldehyde

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