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A simple and efficient method for enrichment of cocoa polyphenols from cocoa bean husks with macroporous resins following a scale-up separation

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Abstract

The aim of this study is to develop an efficient method for the decaffeination and enrichment of the polyphenols from cocoa husks extracts. LX-17 was selected for the exploration of optimal processing parameters from eight kinds of macroporous resins. The adsorption kinetics and thermodynamics of (-)-epicatechin (EC) were studied prior to the scale-up separation. The optimum parameters for separation were as follow: 6.0 mg/mL cocoa extracts, pH 2.0, 25 °C column temperature, flow rates of adsorption and desorption 1.6 BV/h (Bed Volume, the volume of the resin) and ethanol-water (20:80, 50:50, 95:5, v/v) solutions in the gradient elution. In the scale-up separation, 2 kg of cocoa husks were extracted in 20 L 50 % ethanol solutions, separated on 3 L LX-17 resins and yielded 34.99 g cocoa polyphenols. This method significantly increased the total polyphenol contents from 2.23 % to 62.87 % with a recovery yield of 78.57 %.

Key words

Cocoa husk, Polyphenol, Macroporous resin, Adsorption, Separation, Scale-up

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