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Optimization of anthocyanin and polyphenols extraction using organic acid from colored rice bran by using response surface method

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Colored rice bran derives its colors from phytochemicals like anthocyanins. Most of anthocyanin and polyphenols in rice bran exist in free form which can be extracted easily by acidic solvent. To extract anthocyanin from plant sample, acidified ethanol (with HCl, pH<2) is generally used and considered to retain the flavylium form of anthocyanin which is most stable form and retain antioxidant capacity (Fig.1). However, HCl is not acceptable solvent in case of food additive, so organic acids are used in place in juice processing industry. Nevertheless, the extraction using organic acid showed low level of extraction yield of anthocyanin and polyphenols. Thus, in the present study, organic acid concentration was optimized using Response Surface Method (RSM) to extract anthocyanin and polyphenols from colored rice bran. Five organic acid (citric, acetic, malic, tartaric, lactic acid) were chosen for the optimization and the results were compared with the HCl extraction method. Five factors (X): time (X_1), temperature (X_2), acid % (X_3), ethanol % (X_4) and solid-solvent ratio (X_5) were selected for the studies and based on response (Y) [anthocyanin content (ACNs, Y_1) and total polyphenol contents (TPC, Y_2) and antioxidant capacity (DPPH, Y_3 and ABTS, Y_4)] significant factors were selected using Plackett-Burman design. Selected significant factors were then further optimized using response surface method (RSM). Organic acid extraction response (ACNs, TPC, DPPH and ABTS) using optimized condition showed comparable results with HCl extract, almost similar or higher yield. Thus, organic acid has enough effect to extract anthocyanin and polyphenols in case of rice bran extraction and these extracts could be used for food directly.

Biography

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