

Production of high tannin content and antioxidant activity extract from an unripe peel of *Musa acuminata* (Cavendish) using ultrasound-assisted extraction (UAE)

ABSTRACT

Musa acuminata (Cavendish) unripe peel is a waste product of limited value that is generated in large quantities. Therefore, the conversion of this by-product into a more useful product is necessary. This study aimed to optimize the ultrasound-assisted extraction (UAE) parameters, including extraction temperature, extraction time, preincubation time, and solid to solvent concentration from an unripe banana peel using response surface methodology (RSM). The UAE parameters affected the recovery of yield, total tannin content, and flavonoid content with antioxidant activities. The optimum extraction temperature was 60 °C with an optimum extraction time of 30.0 min. Additional optimum conditions included 25.0 min for the preincubation time and 5.03% solid to solvent concentration. The optimum yield processing parameter of crude extract of unripe peel was 14.9% and the total tannin content was 119.2 mg TAE per g of the sample. Furthermore, the content of flavonoid was 29.0 mg RE per g of the sample and the DPPH and ABTS scavenging activity was 80.8% and 84.7%, respectively. The results from this study can be used for further isolation and purification of tannin from unripe banana peel. Further explorations could lead to the possible application of bio-based polymer in packaging materials.

Keyword: Tannin; Ultrasound-assisted extraction; Response surface methodology; Optimization; *Musa acuminata*; Unripe peel; Antioxidant; Radical scavenging