

**PENGEMBANGAN METODE ANALISIS BORON DALAM SAMPEL MAKANAN  
SECARA SPEKTROFOTOMETRI UV-Vis MELALUI DISTILASI ISOTERMAL**

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**INTISARI**

Pengembangan metode distilasi isotermal dalam analisis boron pada sampel makanan secara spektrofotometri UV-Vis menggunakan pereaksi kurkumin-asam oksalat telah dilakukan. Penelitian ini bertujuan untuk mendapatkan metode analisis boron dalam sampel makanan melalui distilasi isotermal senyawa trimetoksi boran serta menerapkannya untuk menganalisis boron dalam makanan. Optimasi dan validasi dilakukan sebelum analisis boron pada sampel makanan.

Hasil penelitian menunjukkan bahwa senyawa kurkumin-oksalat dan senyawa kompleks boron-kurkumin memiliki  $\lambda_{maks}$  masing-masing pada 414 dan 550 nm. Waktu optimum distilasi pada analisis boron adalah 24 jam, dan volume optimum metanol sebesar 3 mL. Hasil validasi menunjukkan kompleks boron-kurkumin memiliki linieritas dengan nilai  $R^2 = 0,9982$  pada rentang 0,1–0,6 mg L<sup>-1</sup> dengan nilai absorptivitas molar sebesar  $6,3864 \times 10^4$  L mol<sup>-1</sup> cm<sup>-1</sup>. Batas deteksi (LOD) dan batas kuantifikasi (LOQ) masing-masing sebesar 2,63 dan 7,97 µg L<sup>-1</sup> dengan nilai %RSD antara 0,221–0,932%. Persentase perolehan kembali analisi boron sebesar 86,48% sampai 98,68%. Konsentrasi boron yang terdapat dalam sampel bakso memiliki rentang antara 0,22 sampai 1,81 mg kg<sup>-1</sup> dan pada sampel mie antara 0,14 sampai 0,31 mg kg<sup>-1</sup>.

Kata kunci: Boron, kurkumin, trimetoksi boran, spektrofotometri UV-VIS, distilasi isotermal

## DEVELOPMENT OF BORON ANALYSIS METHOD IN FOOD SAMPLES BY UV-Vis SPECTROPHOTOMETRY THROUGH ISOTHERMAL DISTILLATION

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### ABSTRACT

Development of boron analysis in food with isothermal distillation by UV-Vis spectrophotometry method using curcumin-oxalic acid reagent was studied. The aim of this research is to obtain boron analysis method by isothermal distillation of trimethoxy borane for analysis of boron in foods. The method optimization and validation were performed before analysis.

The results showed that curcumin-oxalic acid and boron-curcumin complexes had  $\lambda_{\max}$  of 414 and 550 nm respectively. The optimum distillation time was 24 h, and the methanol volume was 3 mL. The result of validation showed that the linearity of boron-curcumin complex standard solutions was good with  $R^2 = 0.9982$  in range of 0.1–0.6 mg L<sup>-1</sup> and absorptivity of molar 6.39 x 10<sup>4</sup> L mol<sup>-1</sup> cm<sup>-1</sup>. The limit of detection (LOD) and limit of quantification (LOQ) of the method were 2.63 and 7.97 µg L<sup>-1</sup> with %RSD 0.221–0.932%. The range of percent recovery of boron is from 86.48% to 98.68%. The range of boron concentration in meatballs was found from 0.22 to 1.81 mg kg<sup>-1</sup> and in noodle was from 0.14 to 0.31 mg kg<sup>-1</sup>.

Keywords: Boron, curcumin, trimethoxy borane, UV-VIS spectrophotometry, isothermal distillation