

Title Improvement of the specificity of the Folin-Ciocalteu assay for total phenolics determinations

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Abstract

The Folin-Ciocalteu (FC) assay is used to measure the content of total phenolic compounds (PC) in food samples. This method is based on redox-reactions between the PC and the FC-reagent. However, other compounds such reducing sugars (i.e. fructose and glucose), ascorbic acid (AA) and dehydroascorbic acid (DHA), which are present in food extracts, are also oxidized by the FC-reagent, overestimating the total phenolics content. The present project objective was to improve the specificity of the FC-assay by reducing the interferences of non-PC during the assay. Solutions containing AA, DHA, gallic acid (GA), fructose, and glucose were prepared. Different treatments of temperature (40-60°C for 10 min) and hydrogen peroxide (H₂O₂, 1-1000 mM) were applied to the solutions containing AA, DHA, GA, fructose, and glucose alone and in combination before the FC-assay was performed. Results indicated that temperature treatments did not affect the results of the FC-assay. However, the application of H₂O₂ treatments oxidized the non-PC compounds, reducing the reaction between the non-PC and the FC-reagent. Moreover, results suggest that in mixtures containing all the commercial standards the application of H₂O₂ oxidizes all compounds except the phenolics (GA). Treating the food extracts with H₂O₂ prior to the determination of total phenolic content can be used as an easy and fast method to diminish the interferences of the major non-PC present in food extracts used to determine total PC by the FC-assay.