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Comparative analysis of strawberry total phenolics via Fast Blue BB vs. Folin-Ciocalteu: Assay interference by ascorbic acid

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Abstract

Unblemished fully ripe fruit from five day-neutral strawberry cultivars were harvested on two separate dates and evaluated for ascorbic acid (AsA), fruit sugars, and phenolic composition. Individual phenolics were determined by HPLC, and total phenolics by Folin-Ciocalteu (F_C) and by a new™ assay: Fast Blue BB (FBBB), which detects phenolics directly. FBBB reported an average 2.9-fold greater concentration of total phenolics than F_C, had a significant correlation ($r = 0.80$; $P = 0.001$) with total phenolics via HPLC and did not interact with AsA or sugars, whereas F_C, an indirect detection assay for total phenolics, appeared to under-report total phenolic concentrations, had no significant correlation ($r = 0.20$) with total phenolics via HPLC

or with sugars, but had a significant correlation ($r = 0.64$; $P = 0.05$) with total AsA. Results from this study indicated that previous studies of strawberry fruit, using the standard indirect Folin-Ciocalteu assay, have greatly underestimated the total phenolics content and that this assay should be replaced in future studies by the FBBB assay.

Highlights

- ° Strawberry phenolics were determined by Folin-Ciocalteu and Fast Blue BB assays.
- ° Folin-Ciocalteu is an indirect assay and Fast Blue BB is a direct assay of phenolics.
- ° Fast Blue BB measured 3-fold greater total phenolics than Folin-Ciocalteu.
- ° Fast Blue BB had $r = 0.80$ with phenolics and no ascorbic acid interference.
- ° Folin-Ciocalteu had $r = 0.20$ with phenolics and $r = 0.64$ with ascorbic acid.



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Abbreviations

AsA, ascorbic acid; DAsA, dehydroascorbic acid; Folin-Ciocalteu, Folin-Ciocalteu; FBBB, Fast Blue BB

Keywords

Strawberries (*Fragaria x ananassa* Duch.); Diazonium; HPLC; Food analysis; Food composition; Assay for total phenolics; Bioactive non-nutrients; Fructose; Glucose; Sucrose

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