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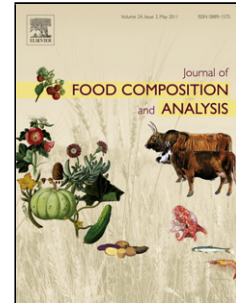
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Original Research Article

Effects of maturity at harvesting and primary processing of cocoa beans on oxalate contents of cocoa powder

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Highlights

- Dried cocoa powder contains 632.2 mg total oxalate/g dry matter
- Soluble oxalate makes up 89% of the total oxalate
- Total oxalate content is marginally reduced when the beans are fermented
- Drying has little effect on the total oxalate content of the final cocoa powder

ABSTRACT

The total, soluble and insoluble oxalate contents of cocoa beans (*Theobroma cacao L.*) harvested at four different maturity stages: immature, mature, half ripe and fully ripe were extracted and measured using HPLC chromatography. The mean total oxalate content of the four maturity stages was 632 ± 20 mg/100 g dry matter (DM); soluble oxalates were 89 % of the total oxalates. Natural fermentation of the whole beans had a small effect on the soluble oxalate content of the raw cocoa powder produced following three to seven days of fermentation. Fermentation of the beans with pectinase had no significant effect on the total oxalate contents of the raw cocoa powder. Soluble oxalates in the cocoa powder were reduced by fermentation with added pectinase (581 vs 613 mg soluble oxalate/100 g DM). For both fermentation treatments, increasing fermentation duration increased the insoluble oxalate content and reduced the proportion of soluble oxalate. There were no differences in the total oxalate contents between samples dried by freeze, oven or sun drying. However oven dried cocoa powder contained the highest level of soluble oxalate (648 ± 11.0 mg/100 g DM) compared to the other two drying methods.

Keywords: food analysis; food composition; cocoa processing; oxalates; cocoa fermentation; cocoa drying; maturity stages;

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