

Effect of grain pre-treatment on different extractable phenolic groups in cereals and legumes commonly consumed in Tanzania

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Abstract

Extractable phenolic compounds, classified as total phenolics, resorcinols, catechols and galloyls, were determined in cereals and legume food grains commonly consumed in Tanzania, using various colorimetric methods. Grain samples of red sorghum (udo), finger millet, cowpea, mung bean and brown kidney bean were further processed—soaked in water at different pHs, germinated, cooked or dehulled (legumes only)—and the effect on extractable phenolics was analysed. In untreated grains, total phenolics ranged from 0.9 to 33.7, catechols from 0.8 to 13.5 and resorcinols from 0.2 to 11 mg catechin equivalents (CE) g⁻¹. Galloyls (tannic acid equivalents, TAE) were found in negligible amounts in most grains, but in appreciable amounts in red sorghum (5.5 mg g⁻¹). Processing of grains led to variable effects on the extractable phenolics. Soaking the grains significantly ($p < 0.05$) reduced the amount of total extractable phenolics in red sorghum, finger millet and cowpea, with alkali and acidic media being more effective. Water soaking had no effect on total extractable phenolics in mung bean and water, while alkali and acidic soaking had no effect on total extractable phenolics in brown kidney bean. Extractable catechols and resorcinols were affected by soaking in a similar pattern to total extractable phenolics. Germination reduced total extractable phenolics, catechols and resorcinols in all samples, except for catechols in mung bean. Cooking (boiling of grains) was more effective in reducing total extractable phenolics in cereals than germination and water soaking, while dehulling was the most effective method for reducing total extractable phenolics in legumes ($p < 0.01$).

