Antioxidant and Antidiabetic Properties of Condensed Tannins in Acetonic Extract of Selected Raw and Processed Indigenous Food Ingredients from Kenya

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Abstract

Recently, tannins have received considerable attention as health-promoting component in various plant foods and several studies have reported on its nutraceutical properties. However, no study has established the role of condensed tannins in indigenous foods of Kenya. Therefore, this study was designed to evaluate the antioxidant activity (DPPH and FRAP) and antidiabetic effects (α-amylase and α-glucosidase inhibition activities) of condensed tannins in some selected raw and traditionally processed indigenous cereals, legumes, oil seeds, and vegetables. The condensed tannin content of the grains and vegetables ranged between 2.55 and 4.35 g/100 g DM and 1.53 and 5.73 g/100 g DM, respectively. The scavenging effect of acetonic extract on DPPH radical ranged from 77% to 90% while the reducing power was found to be 31 to 574 mmol Fe(II)/g DM in all the investigated food ingredients. The condensed tannin extracts of the analyzed samples showed promising antidiabetic effects with potential α-amylase and α-glucosidase inhibition activities of 23% to 44% and 58% to 88%, respectively. Condensed tannins extracted from the amaranth grain, finger millet, field bean, sunflower seeds, drumstick, and amaranth leaves exerted significantly higher antioxidant and antidiabetic activities than other food ingredients. Among the traditional processing methods, roasting of grains and cooking of vegetables were found to be more suitable mild treatments for preserving the tannin compound and its functional properties as opposed to soaking + cooking and blanching treatments. The identified elite sources of optimally processed indigenous food ingredients with promising results could be used as health-promoting ingredients through formulation of therapeutic diets.