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Dietary relevance and potential of Kenyan grown quinoa for food applications

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Abstract

Despite the growing interest in quinoa cultivation in Kenya, limited information exists on the nutritional quality and functional performance of quinoa grown under Kenyan conditions. To bridge this information gap, this study assessed the nutritional composition, *in vitro*-protein digestibility, phytochemical content and functional properties of six quinoa genotypes grown in Kenya to determine genotype-dependent variations, dietary relevance and their suitability in local food applications. Proximate composition showed significant variations with crude protein ranging from 15.0 to 23.12 %, fibre from 1.58 to 2.60 %, and carbohydrate from 58.6 to 65.91 %. Mineral analysis indicated high concentrations of potassium (2,337.5–12,750 mg/kg), magnesium (2,107.5–2,467.5 mg/kg), phosphorus (3,877.5–4,430 mg/kg), iron (201 to 246 mg/kg) and calcium (619 to 728 mg/kg). Phytic acid and saponin were more abundant than total phenolic compounds. Phytate levels showed significant inhibitory effects on Fe, Ca, and Zn bioavailability, while saponin levels exceeded the upper limit for direct human consumption. *In vitro* protein digestibility ranged from 70.0 to 79.8 %. In functional properties, the genotypes showed good water -and oil holding capacities (WHC, OHC) exceeding 100 %, swelling capacity (SC) ranged from 70.14 to 88.67 %, emulsification capacity from 45.33 to 56.56 %, foaming capacity from 15.0 to 32.41 % and foaming stability from 28.91 to 46.66 %. Crude protein correlated positively with WHC (r =0.85), OHC (r =0.83) and protein water solubility (r=0.90).Carbohydrate had negative correlations with WHC (r =-0.68), OAC (r =-0.66) and SC (r=-0.61).The six quinoa genotypes showed adequate nutritional quality and functional performance, which can be further improved through processing, for developing diverse quinoa-based products targeting specific nutritional and functional requirements.

Keywords: Bioavailability, Digestibility, Food, Nutrients, Products, quinoa

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