Utilisation of Amaranth and Finger Millet as Ingredients in Wheat Dough and Bread for Increased Agro-Food Biodiversity

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Abstract

Amaranth and finger millet are important food security crops in Africa but show poor bread making ability, even in composite wheat breads. Malting and steaming are promising approaches to improve composite bread quality, which have not been fully explored yet. Therefore, in this study, wheat was blended with native, steamed or malted finger millet or amaranth in the ratio of 70:30. Wheat/native amaranth (WHE-NAM) and wheat/malted amaranth (WHE-MAM) had longer dough development times and higher dough stabilities, water absorption capacities and farinograph quality numbers than wheat/steamed amaranth (WHE-SAM), wheat/native finger millet (WHE-NFM), wheat/steamed finger millet (WHE-SFM) or wheat/malted finger millet (WHE-MFM). The WHE-NAM and WHE-MAM breads had lower crumb firmness and chewiness, higher resilience and cohesiveness and lighter colours than WHE-NFM, WHE-SFM and WHE-MFM. Starch and protein digestibility of composite breads were not different ($p > 0.05$) from each other and ranged between 95–98% and 83–91%, respectively. Composite breads had higher ash (1.9–2.5 g/100 g), dietary fibre (5.7–7.1 g/100 g), phenolic acid (60–122 mg/100 g) and phytate contents (551–669 mg/100 g) than wheat bread (ash 1.6 g/100 g; dietary fibre 4.5 g/100 g; phenolic acids 59 mg/100 g; phytate 170 mg/100 g). The WHE-NAM and WHE-MAM breads possessed the best crumb texture and nutritional profile among the composite breads.

Keywords: **amaranth**; **bread**; **dough**; **finger millet**; **wheat**