
Effect of germination time on properties, flavour attributes and in vitro starch digestibility of green Altamura lentils

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Germination of lentils (*Lens culinaris* Medik.) is one of the most common and effective treatment to improve the functional and nutritional properties and expand its usage as an affordable plant-based protein in other food applications. Green Altamura Lentils are quite rich in components essential for good human health such as carbohydrates, proteins, dietary fibres, minerals, vitamins (mainly vitamin B3/niacin) and phenolic compounds.

In this work, the effect of the two germination time -0 (C), 24 (G), 48 (H) hours-on some physico-chemical, functional, aromatic and nutritional features of lentils flour samples have been studied.

Lentil flour samples (CF, GF and HF) were achieved by grinding both the whole green seeds (C) and the germinated seeds (G and H), respectively and then sifted to obtain a particle size < 300 µm.

Germinated samples -GF (24 h), HF (48 h)- showed some differences on results of chemical and bioactive properties of CF (control).

The total starch, amylose content and total phenolic amounts of GF and HF decreased compared to the control sample, while their protein content increased ($p < 0.05$). Flavour attributes were significantly influenced by the germination times. Overall, a total of 14 (CF) and 17 (GF and HF) aromatic compounds were identified. Germination time affected flour properties, leading to a significant increase in techno-functional properties such as water absorption (WHC), oil absorption (OHC) capacities and swelling index (SI). CF had the smallest WHC (1.65 g/g) and OHC (1.39 g/g). The SI of all samples showed similar behaviors, but GF and HF had the highest SI values at all temperatures (60- 90°C). Germination also had a significant impact on the in vitro starch digestibility of samples. In particular, the different starch fractions (RDS, SDS) and glycemic index values of germinated lentils were found to be lower when compared to the results of control (CF). Technological characteristics of CF, GF and HF doughs were studied by using a Brabender farinograph. Germination strongly influenced all farinographic properties of doughs except of dough development time and elasticity.

In conclusion, germination time could be a key factor for modulating some crucial lentil flour properties.