

BUCKWHEAT SPROUTS AS RAW MATERIAL FOR NEW FUNCTIONAL FOOD FORMULATIONS

MOLINARI R.*, BONAFACCIA G.*, MAZZUCATO A.***, PUCCI A.***, COSTANTINI L.***, BONAFACCIA F.***, MERENDINO N.***

*) National Institute of Research for Food and Nutrition, Via Ardeatina 546, 00178 Roma (Italy)

**) Dept. of Science and Technologies for Agriculture, Forestry, Nature and Energy, University of Tuscia, Via S. C. de Lellis snc, 01100 Viterbo (Italy)

***) Dept. of Ecological and Biological Sciences, University of Tuscia, Largo dell'Università snc, 01100 Viterbo (Italy)

buckwheat sprouts, antioxidants, polyphenols, functional food

Several studies have showed that buckwheat (*Fagopyrum* spp.) flour may be a basis for producing healthy foods, due to the antioxidant properties attributed to its high content of phenolic compounds like rutin and quercetin. Two species of buckwheat are mainly used, common buckwheat (*F. esculentum*) and tartary buckwheat (*F. tartaricum*), in which the general composition of crude protein, fiber, fat are essentially the same. However, tartary buckwheat seems to contain more flavonoids than the common species. Recently, buckwheat sprouts have been introduced as new raw material for the production of functional foods. Indeed, buckwheat sprouts seems to have an higher content in amino acids, minerals, crude fiber, lysine and rutin than that detected in seeds.

In our study, we have compared three different types of buckwheat seeds and sprouts, namely, two common buckwheat cultivars (Darja and Lileja) and one accession of tartary buckwheat (Ljse) and examined germinability, sprout yield and the total polyphenol content and antioxidant capacity *in vitro*, either as seed flour and as sprout both fresh and dried. The results showed that all three accessions had a high germination power (at the third day ranging 85-90% of the total germinable seeds). Most seedlings had lost the pericarp by day eight. The final germinability was significantly higher in Ljse and Lileja than in the Darja cultivar, reaching a maximum of 90% in the *F. tartaricum* accession. At day ten, sprouts were cut above the crown and dried at 55°C for 22 h. To remove remnants of the pericarp, dry sprouts were crumbled by hands and sieved. The total antioxidant capacity and total polyphenols of the methanol extracts of buckwheat seeds and sprouts (fresh and dried) was examined. The dried sprouts of tartary buckwheat had the highest total polyphenol content and an antioxidant capacity higher than the dried sprouts of common buckwheat. Based on these results, the dried tartary sprouts were chosen as ingredient for the formulation of new functional foods. Dried tartary sprouts were milled to obtain a flour to be used for the production of “spaghetti” containing 30% of dried sprouts and 70% of durum wheat flour. The effect of spaghetti-making and cooking on total polyphenols and antioxidant properties was studied comparing pasta prepared with buckwheat seed flour, with buckwheat sprout flour and with only durum wheat flour. Spaghetti made with buckwheat sprout flour exhibited significantly higher levels of total phenolic content (3.7±1.0 mg/g GAE) than those made with buckwheat seed flour and with only durum wheat (2.2± 0.6 mg/g GAE and 0.3±0.5 mg/g GAE respectively). However, total phenolic content in spaghetti made with buckwheat sprouts was 60% of the original content after cooking. The results indicate a higher antioxidant capacity of pasta made with sprout flour in

comparison with the product derived by milled seeds. Further investigations on the health implication of the spaghetti-dried sprouts are ongoing.