

FLAX SPROUTS FROM COMMERCIAL AND WILD SPECIES AS FUNCTIONAL FOOD

DOUGUÉ KENTSOP R. A.*, PAPPALARDO V.**, ZACCHERIA F.**, CONSONNI R.**,
GENGA A.*, MATTANA M.*

*) Istituto di Biologia e Biotecnologia Agraria-CNR

**) Istituto di Scienze e Tecnologie Chimiche "Giulio Natta" -CNR

flax, lignans, antioxidants, polyphenols, sprout

Nowadays, consumer awareness of diet and health has contributed to the development of new trends towards functional food consumption. Seeds and sprouts of different botanical origins are an important raw material for functional foods due to their numerous pro-health benefits, including prevention of cardiovascular diseases, type 1 or 2 diabetes, bowel regulation, reduction of obesity, cholesterol and triglycerides levels. The bioactive effects are mainly due to the polyphenol content and to their antioxidant properties. Numerous factors affect the polyphenol content of plants, such as degree of ripeness, environmental factors, processing and storage. Germination is an inexpensive and simple method of improving nutrititional value of seeds, since several studies have reported higher levels of both phenolic compounds and minerals in sprouts compared to their ungerminated counterparts. Moreover, germination leads to the reduction of some anti-nutritional factors. Besides the most common cultivated cereals, legumes, and oilseeds, studies are now considering wild and marginal species never previously used for sprouting. Flax is one of the richest seed sources of lignans and other bioactive compounds and includes about 200 species. *Linum usitatissimum* (with its varieties) is the main cultivated species for seeds and textile, but many other wild species are described for their bioactive compounds. Recently, lignans have attracted increased interest mainly for their antioxidative, anti-inflammatory, anti-atherosclerogenic, and antiestrogenic potential, thus suggesting their ability to reduce risk and protect against degenerative diseases and cancer. In this study, seeds, sprouts and seed-coats from several *L. usitatissimum* varieties and wild species have been characterized for their oil, total phenols, total flavonoids, lignans and antioxidant

capacity with the aim to highlight their potential as functional foods. The results obtained showed differences in oil content, $\omega 3$ and $\omega 6$ percentages, total phenols, flavonoids both among varieties/species and among tissues. In particular, the wild species *Linum dolomiticum* accumulated a higher amount of flavonoids than the *L. usitatissimum* varieties, namely isoorientin and isovitexin. On the other hand, the most representative lignan, secoisolaricilresinol diglucoside (SDG), was present in seeds and specifically in seed-coats of *L. usitatissimum* varieties only. Moreover, the *L. usitatissimum* varieties showed stronger antioxidant ability than wild type species, with sprouts and seed-coats having higher values than seeds in all species analysed. The results on total phenol content were in agreement with antioxidant activity data.

sPATIALS3 project, financed by the European Regional Development Fund under the ROP of the Lombardy Region ERDF 2014–2020–Axis I "Strengthen technological research, development and innovation"–Action 1.b.1.3 –Call Hub.