Proceedings of the LXIV SIGA Annual Congress
Online, 14/16 September, 2021
ISBN: **978-88-944843-2-8**

Oral Communication Abstract – 3.04

EFFECT OF MALTING ON NUTRITIONAL, ANTIOXIDANT, AND ANTINUTRITIONAL PROPERTIES OF THE SEEDS OF TWO INDUSTRIAL HEMP (CANNABIS SATIVA L.) CULTIVARS

FARINON B.*, COSTANTINI L.*, MOLINARI R.*, DI MATTEO G.**, FERRI S.***, GARZOLI S.**, MANNINA L.**, MAZZUCATO A.***, MERENDINO N.*

*) Department of Ecological and Biological Sciences (DEB), Tuscia University
**) Department of Chemistry and Technology of Drugs, Sapienza University of Rome
***) Department for innovation in biological, agro-food and forest systems (DIBAF), Tuscia University

industrial hempseeds, malt, antioxidant capacity, trypsin inhibitors, tocopherols

The impact of malting process on antioxidant, nutritional and antinutritional features of the seeds of two industrial hemp cultivars (*Futura 75* and *Secuieni jubileu*) was investigated. Seeds were steeped at room temperature for 5 h, 3-day germinated at 24°C, and kilned at 50°C or 70°C for 6 h. Malted and unmalted seeds were analyzed for total phenolic content (TPC), polyphenol profile, total antioxidant capacity (TAC), tocopherol and proximate composition, fatty acids and antinutritional profiles. Results demonstrated that although differences in nutritional and phytochemical composition were noticeable between the analyzed cultivars, the applied malting conditions influenced all assessed parameters in a similar way, inducing a significant increment in protein content, without affecting the fat amount and seeds' fatty acids profile. A different behavior between the two cultivars was found for the carbohydrates and ash content: malting did not induce significant changes in the ash content in *Secuieni jubileu* variety, but a significant decrease was found in *Futura 75*. A decreasing trend in carbohydrates was observed for both cultivars after malting, but the change was significant only for *Secuieni jubileu* seeds malted at 70°C.

Malting also improved the TPC, tocopherol profile and TAC of seeds: 3 days of germination led to a 3-fold increment in the TPC and neither 50°C nor 70°C heat treatment significantly reduced it. Interestingly, 70°C kilning temperature resulted suitable to increase the level of N-*trans*-caffeoyltyramine and cannabisin A, especially in the *Futura 75* cultivar. A significant increase in the total tocopherol was observed after malting, but only in *Secuieni jubileu* seeds. Among the tocopherol isoforms, delta-tocopherol content significantly increased only in *Secuieni jubileu* seeds malted at 70°C, whereas alpha-tocopherol increased for both cultivars after malting especially at 50°C. Concerning the TAC, the 2,2?-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) ($ABTS^{\bullet+}$) radical scavenging activity and the reducing power significantly improved after germination. Kilning at 50°C or 70°C did not negatively affect the $ABTS^{\bullet+}$ radical scavenging activity, whereas the reducing power of both cultivars significantly enhanced after kilning, especially at 70°C. The kilning temperature of 70°C was also effective to reduce the amount of the antinutritional trypsin inhibitors, although it did not affect the phytate content.

Overall, the data proved that malting may represent a suitable strategy to obtain hempseeds' transformation products valuable as ingredient to formulate improved foods. Further investigation concerning the effect of malting on other hempseed varieties may be advisable to identify if among the industrial hemp cultivars,

there exist those more suitable to be malted, to provide suitable tools to consciously address the hemp breeder’s choice about the selection of hemp cultivars to farm, consistently with the production aim.