Università degli Studi di Messina
DIPARTIMENTO DI SCIENZE BIOMEDICHE, ODONTOIATRICHE E DELLE IMMAGINI MORFOLOGICHE E FUNZIONALI

Società Chimica Italiana
Gruppo Interdivisionale Chimica degli Alimenti

ITA CHEMFOOD

CHIMALI 2023
MARSALA

XIII CONGRESSO NAZIONALE DI CHIMICA DEGLI ALIMENTI

LIBRO DEGLI ABSTRACTS

www.chimali2023.it

29 – 31 maggio 2023

Hotel Resort Villa Favorita,
Marsala (TP)

C04

Green coffee, bioactive compounds' analysis of experimental cultivation in Sicily: a new frontier in the Sicilian food sector

Vita Di Stefano[1], Carla Buzzanca[1], Fortunato Ruvutuso[1], Giovanni Gugliuzza[2], Dario Scuderi[3], Eristanna Palazzolo[3], Vittorio Farina[3]

[1]Department of Biological, Chemical, and Pharmaceutical Science and Technology (STEBICEF), University of Palermo, via Archirafi 32, 90123 Palermo, Italy
[2]CREA—Research Centre for Plant Protection and Certification, 90128 Palermo, Italy
[3]Department of Agricultural, Food and Forest Science (SAAF) University of Palermo, Viale delle Scienze, 90128 Palermo, Italy
carla.buzzanca@gmail.com

Recently, climate change represents a new possibility for tropical cultivars fruit in Mediterranean areas. The focus of this work is the evaluation of the real possibility of coffee cultivation in Sicily, like coffee plants grown in tropical and subtropical regions. The objective was to evaluate plant adaptation to our climate and to study the chemical qualities of green coffee pulps and seeds: total phenolic content, antiradical capacity, fatty acids, amino acids, alkaloids, vitamins, proximate composition, polyphenolic profile and other bioactive compounds of cosmetic, pharmaceutical and agrary interest. Temperature, light and vegetative growth of *Coffea arabica* L. cv. "Caturra" plants were monitored. Our study highlighted how, by implementing small measures in terms of agronomic management, the crop adapts well to climate. Total phenolic content (TPC) using Folin-Ciocalteau method and antiradical capacity using DPPH and ABTS approach [1] were performed on dried pulps and green seeds samples. Data obtained show TPC values like coffee cultivars in Vietnam, Brazil and Kenya, instead, antiradical activity values were comparable to coffee grown in Central America, Indonesia, Uganda and Vietnam. Identification and quantification of fatty acids were carried out by GC-MS. In particular, the dried green coffee pulps show a low percentage of fatty acid (1,84 g/100g) of which 71,6% of SFA. Indeed, the green coffee seeds show a high level of fatty acid (13,85g/100g) of which 46,84% of SFA and 41,6% of PUFA. A study of proteins was carried out on pulps and seeds after acid hydrolysis; amino acids profile shows low concentrations of proteins in seeds (0,53 g/100g) and higher in dried pulp (10,45g/100g). The study of seed proteic fraction was extended to bound proteins. Hydrolysis of bound protein highlighted, by alkaline condition, higher level of released amino acids in seeds (10,56g/100g) [2]. The data obtained from the analysis of fatty acid and amino acids indicate similar values of chemical constituents like coffee cultivated in Brazil, Colombia, Honduras, Guatemala and Kenya. Quantification of caffeine was performed in GC-MS and expressed in g/100g. High levels of caffeine in seeds (2,34 g/100g) and in dried pulps (1,56 g/100g) were similar to Salvadoran, Brazilian and Mexican green coffee (Coffea Arabica var. Bourbon, Caturra and Mundo Novo). Quali-quantitative analysis of flavonoids, chlorogenic acids, anthocyanidins, trigonelline and other bioactive compounds was obtained with LC-MS [3]. The study revealed in the seeds a higher amount of vitamin C (0.40 mg%), vitamin B2 (0.18 mg%), vitamin B3 (12 mg%), K (2017 mg%), P (170 mg%), Mg (168 mg%) and Ca (133mg%). Our results indicate the possibility to cultivate coffee in Mediterranean climate obtaining seeds with interesting qualitative traits.

References

[1] A. Ali, H. F. Zahid, J.J. Cottrell, F.R. Dunshea, *Molecules*, **2022**, *27*, 5126.
[2] W. Dong, Q. Chen, C. Wei, R. Hu, Y. Long, Y. Zong, Z. Chu, *Ultrasonics Sonochemistry*, **2021**, *74*, 105578.
[3] B. Nemzer, N. Abshiru, F. J. Al-Taher, *Journal of Agricultural and Food Chemistry*, **2021**, *69*, 11, 3430.