Determination of Isotopic Fingerprint of rice cultivated in Central Macedonia, Greece

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Rice (Oryza sativa L.) plays a crucial role in the diet of the global population, with its nutritional value making it essential in diverse dietary patterns. The geographical origin of rice is an essential factor affecting its quality, taste and authenticity. Environmental parameters such as soil composition, climate, and water availability contribute to the prevalence of unique quality characteristics related to the cultivation region of the product. Nowadays, adulteration of high-value agricultural products such as rice is a critical issue worldwide for consumers and industries. Identifying geographical origin can be useful for preventing food fraud and increasing supply chain assurance. In this frame, isotope ratio mass spectrometry (IRMS) methodology is increasingly used worldwide for food origin verification. Thus, the aim of this study was, is the determination of the characteristic 'isotopic fingerprint' of rice cultivated in the areas of Xalastra (40°37′N, 22°44′E) and N. Malgara (40°36′N, 22°40′E) Central Macedonia, Greece, using IRMS methodology. Experimental design includes sample collection from different fields of the above-mentioned areas during the cultivation periods of 2023 and 2024. A detailed sampling methodology based on soil and microclimatic parameters was implemented to ensure the representativeness of the samples. Thereafter, stable isotope ratios of C, N, and S were measured using Isotope Ratio Mass Spectrometry (IRMS), and the results obtained were analyzed using chemometric techniques. According to the results, the mean values of stable isotope ratio for rice cultivated in the study area were δ15NAIR = 5.91‰, δ13CV-PDB = −27.95‰, and δ34SV-CDT = 4.04‰ for N, C and S respectively, which constitutes the characteristic "isotopic fingerprint" for the rice cultivated in Central Macedonia area.

Biography

Prof. A. Patakas has a long-time research experience in plant physiology and especially in precision agriculture. The recent years his research activity has also orientated to the implementation and assessment of different methodologies capable of geographical origin verification of agricultural products. The specific interest in the above-mentioned work fields resulted in the participation in many EU and nationally funded research projects and the publication of a great number of research papers.

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