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TRACING MEDITERRANEAN HIGH VALUE FOOD PRODUCTS: THE REALMED APPROACH

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REALMed is an international project that promotes the authenticity and valorisation of Mediterranean (Med) traditional products. Its aims are to provide reliable technological tools for authentication and quality assessment; to make these tools largely accessible to stakeholders and consumers; and to promote traditional knowledge and the sustainable development of local economies. REALMed offers the unique opportunity for a transdisciplinary approach, addressing authenticity of traditional value products by applying innovative research techniques managed by a permanent team of experts. REALMed products under testing are: the Iberian black pig (Portugal and Spain), Argan Oil (Morocco), Truffles (Italy and Slovenia) and Mountain Lamb and Kid (Tunisia). All these products are highly recognized by own intrinsic and extrinsic quality traits.

Most are especially valuable due to existing links to their origin. The Med area is globally recognised for boosting healthy dietary lifestyle driving consumers to demand proof of authenticity and, to achieve this, there is the need to develop tools able to reach the market and policy efforts to confirm the authenticity of Med products. Clear geographical references can increase food products competitiveness and even broaden the range of consumers based on products reputation. Nonetheless, geographical references are insufficient to guarantee the origin of the food product, but when linked to the uniqueness of the productive system environment, the products geographical origin can be confirmed and traced. Among methodological approaches for determining the geographical origin, isotopes are one of the best tools for fingerprinting. Stable isotope ratio analysis (SIRA) is a well-established and acknowledged method for authenticity testing, being able to differentiate substances from its unique isotopic signature, reflecting the biochemical and physiological processes, climate, geography, geology, agricultural practices, and processing factors. Isoscapes are a way to visualize the complex information deriving from isotopic ratios analysis and can be considered as a template for data analysis and visualization, and

as a common platform and language for establishing a dialogue among specialists and the public.

The innovation of REALMed approach is clearly associated with a mechanistic framework (from local to regional scales) based on GIS and statistical models, that will enable analysis of the relationships between isotope ratios and the fractionation processes associated with local climate data, as well as plant and animal physiology, geology and pedology: Isoscapes. In this sense, this project seeks the integration of isotope analysis and climatic-geologic-geographic data and the application of computational mathematics to reach origin authenticity of Med products. Indeed, REALMed is invested to deliver a faster, cheaper and user-friendly way to authenticate Med products, through isoscapes of carbon, oxygen and nitrogen to answer scientific or stakeholders and producers' questions regarding the provenance of Med products via their isotopic signatures. In the Iberian Peninsula, target product is the renowned Iberian black pig and acorns are an integrant part of its feeding system, responsible for the meat and derived products prime-quality (fatty acid and aromatic composition). Grazing is restricted to the "montanhaeira" (pannage) period, corresponding to the beginning of the annual pasture production cycle and acorn production (October to February).

Due to the particularity of this feeding system, acorns can be used as tracers of geographic origin for the Iberian black pig through respective isotopic signatures. Thus, for the Iberian black pig stable isotope profile definition, a massive acorn sample collection has already been carried out: 82 sites, 110 and 46 acorn samples of *Quercus rotundifolia* and *Q. suber*, respectively (each sample represents an individual tree). Pork fat sample collection as also started, with samples being collected from independent pig herds from different producers (each sample represents 30% of a pig herd). Multivariate analysis and geospatial data analysis were applied to illustrate the result of the correlation between acorn isotopic composition and environmental variables, as well as the correspondent values of pork fat tissues. The results indicate that is of crucial importance for the future Iberian black pig meat/products geographic origin strategy, to define the relation between acorn isotopic signature and pig fat production during the "montanhaeira" period.

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