Jose S Torrecilla, J Food Microbiol Saf Hyg 2017, 2:4(Suppl)
DOI: 10.4172/2476-2059-C1-004

7th EUROPEAN FOOD SAFETY & STANDARDS CONFERENCE

November 13-14, 2017 | Athens, Greece

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Estimation of food quality during transportation and storage

Extra virgin olive oil (EVOO) is known for its beneficial properties in nutrition, making the quality control of this food a relevant task. In this regard, three different high-quality grade Spanish EVOOs (As Pontis, Marqués de Valdueza, and Empeltre), which are currently exported to the USA, were monitored under three different temperature conditions (3ºC, 40ºC, and room temperature) in order to simulate potential situations which EVOO undergoes during shipment and storage. The different temperatures led to distinct modifications of the optical properties of the EVOO samples, which were analyzed by means of absorption visible spectroscopy and neural network models. These modifications also depended on the time span in which the EVOO withstood a given temperature. The final algorithm is a non-linear mathematical tool that has been employed to relate the UV-vis absorption with temperature and exposure time. The intensity of the UV-vis absorption spectra peaks, which are originated by the chlorophylls and carotenoids present in EVOO, decrease with time and temperature. Generally, the results reveal that higher temperatures lead to a faster degradation of EVOO when compared to lower ones. This data was utilized to design, optimize, and validate an artificial neural network, capable of distinguishing the time and temperature conditions that EVOO samples suffered. This technique is fast, user-friendly, cost-effective, as well as non- destructive, meaning that it could have a direct impact for the real-time quality control of edible oils during their distribution chain, as ideal conditions could be found and implemented.

Biography

Jose S. Torrecilla presently working as a professor of the Chemical Engineering Department of the Complutense University of Madrid (UCM). He has done Ph.D. with honors in Chemical Engineering from UCM in 2000. Advanced Technician in Occupational Risk Prevention and Integrated Management Degrees were achieved in 2005. In 2017, he got his MBA degree with honors. Modeling complex systems for many fields such as health, chemistry, and food technology is his main line of research, which is done in collaborations at national and international levels.

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