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Extra virgin olive oil (EVOO) shelf life monitoring by advanced chemical approaches integrated with chemometrics

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Abstract:

Olive oil is greatly known as one of the best sources of monounsaturated fats, that has been shown to improve blood cholesterol levels. Extra Virgin Olive Oil (EVOO) is the highest quality grade of olive oil because it has many well evidenced health benefits as an individual food, and as part of the Mediterranean diet. EVOO is described as a key bioactive food and naturally high phenolic content confers them a powerful antioxidant capacity, which not only contributes positively to health e.g., fight a number of diseases including cancer, immune-inflammatory diseases, but also provides them with a differential and technological added-value through improved shelf life which increases their cost-effectiveness. Till date, no comprehensive study has jointly examined EVOOs healthy properties and their potential superiority as a powerful natural antioxidant-rich food, addressing different aspects of their stability and possible economic connotations. This PhD project (EVOO-VALUED) will contribute to extend the benefits of consumption beyond the already well-proven its healthy profile, unique sensory attributes, and high nutritional values for encouraging producers and consumers to further defend and recognized.
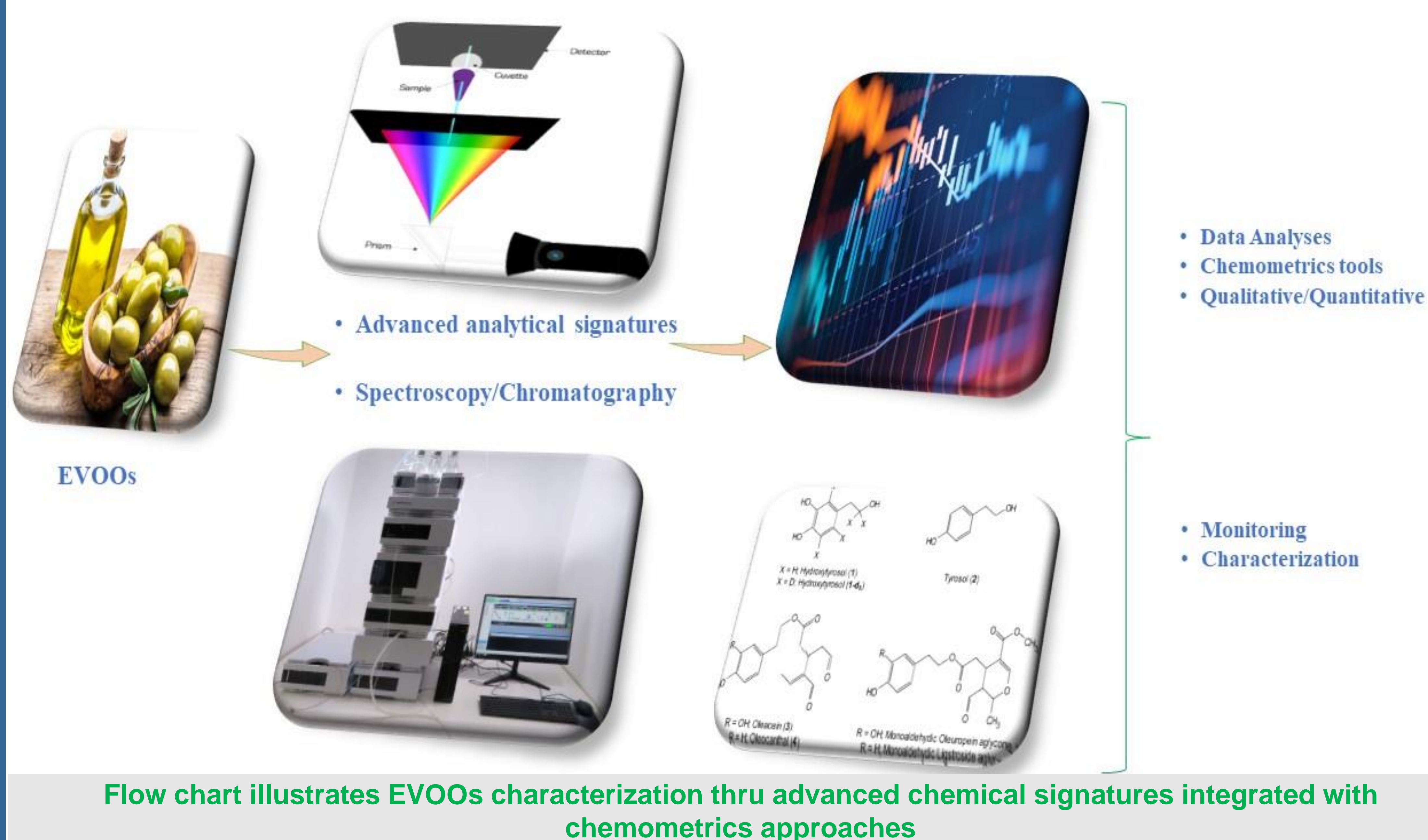
State of the art :

Based on existing literature, EVOO is prone to oxidation owing to high concentration of unsaturated fatty acids. The oxidation process is greatly affected by the EVOOs chemical composition e.g., free fatty acids, total phenolics, other minor compounds and storage conditions.

Motivation:

This study will provide the information needed on EVOOs shelf life monitoring based on chemometric analyses for identifying differential chromatographic and/or spectroscopic signatures associated with enhanced EVOO stability to assure EVOOs quality.

Milestones:

i.   Sampling design to select a representative subset of EVOOs acknowledged with the health claim.
ii. Assessment of physico-chemical qualities, and spectroscopic/spectrophotometric analysis.
iii. Evaluation of oils stability during storage: under controlled/ or non controlled conditions.
iv. Application of data analysis techniques for EVOOs monitoring through chemometrics & big data approaches for identifying differential chromatographic and/or spectroscopic signatures associated with enhanced EVOO stability (maintenance of healthy properties/resistance to degradation).

EVOOs
- Advanced analytical signatures
- Spectroscopy/Chromatography

- Data Analyses
- Chemometrics tools
- Qualitative/Quantitative

- Monitoring
- Characterization

Flow chart illustrates EVOOs characterization thru advanced chemical signatures integrated with chemometrics approaches

References:

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