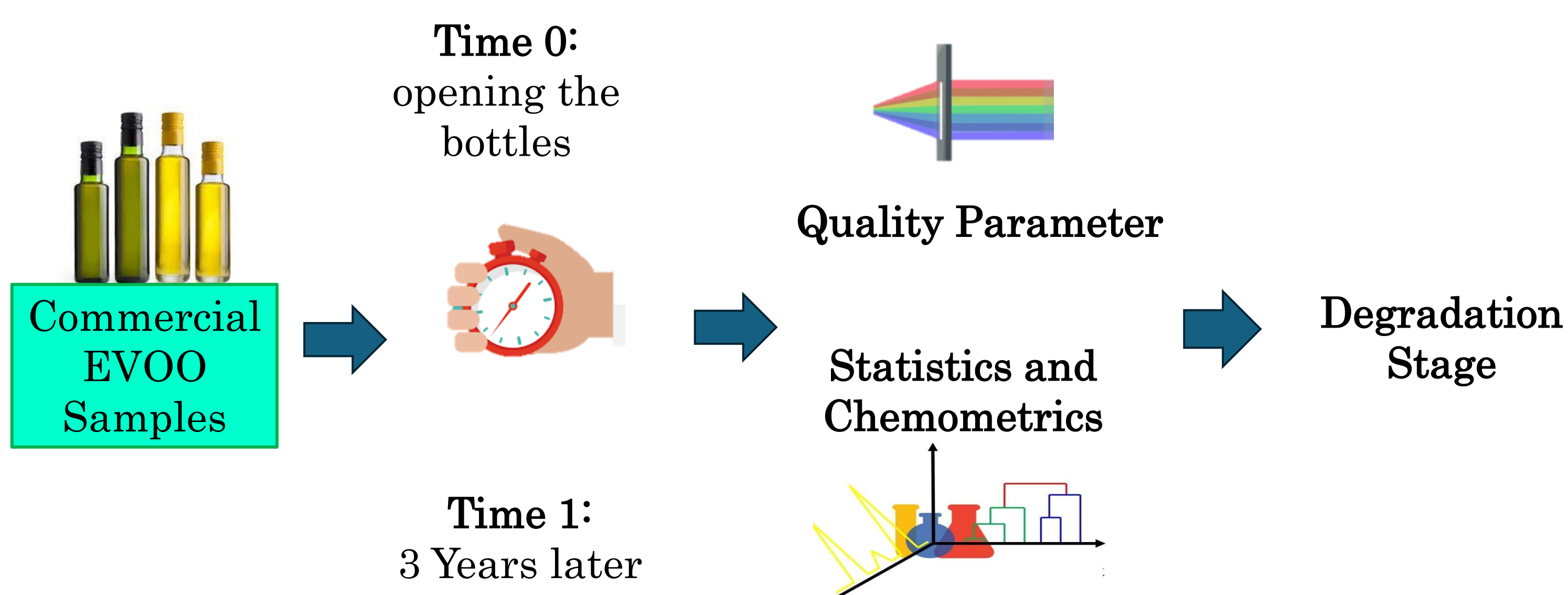


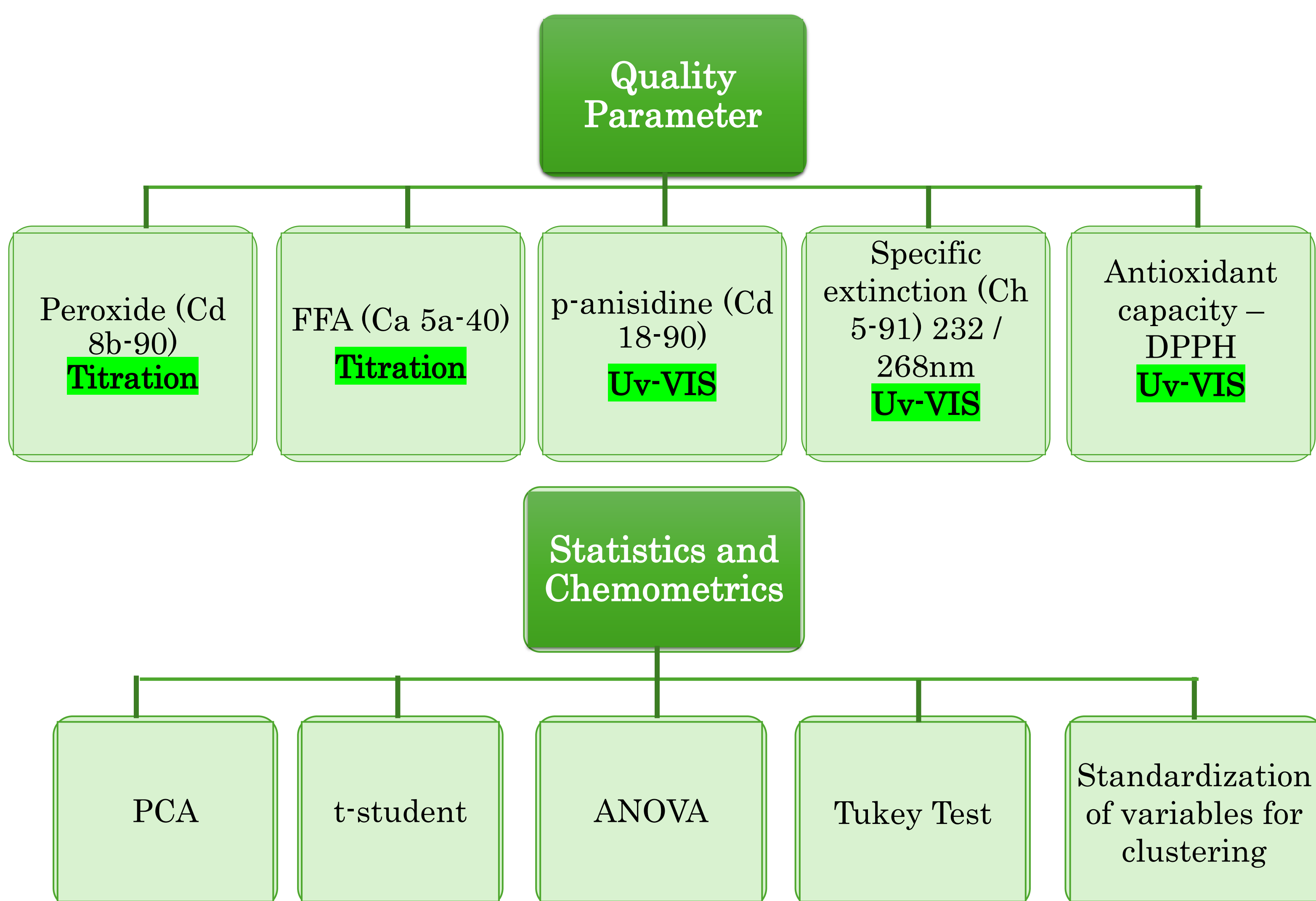
Quality and Oxidative Stability of Commercial Olive Oils for Pharmaceutical Use: A Statistical and Chemometric Evaluation

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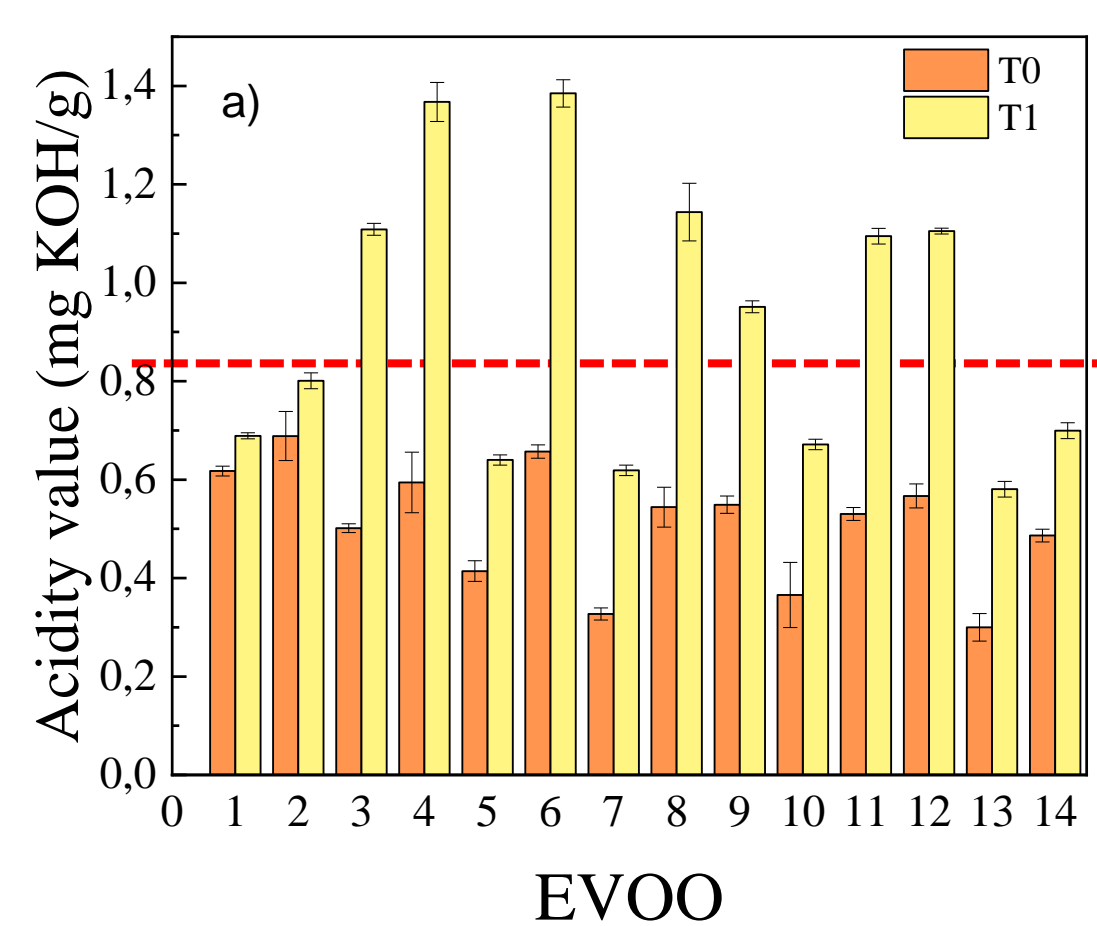
Introduction



Methodology



Results

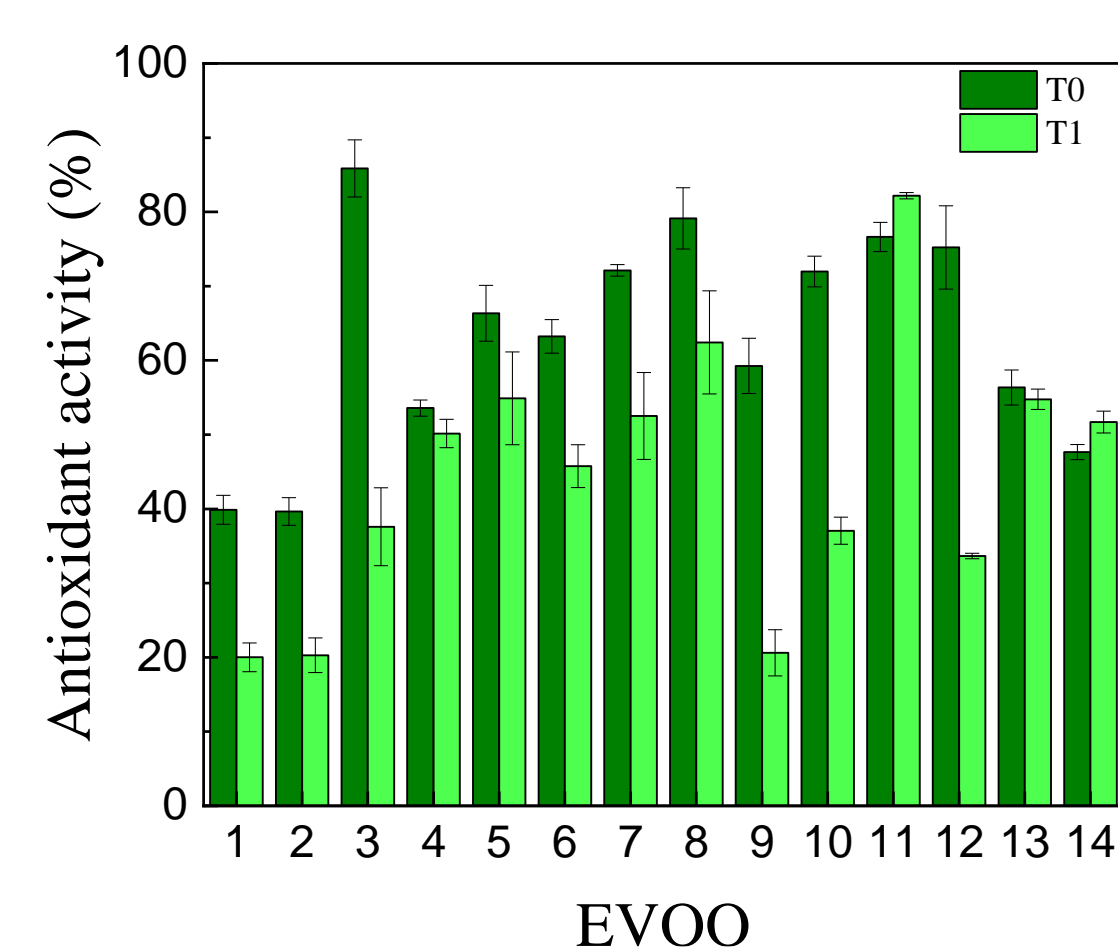


Acidity Value

- T0: all samples with AV < 0.8 g of oleic acid · 100 g⁻¹ of oil
- T1: 50% within the limit
- Increase associated with O₂ exposure → oxidation + hydrolysis.

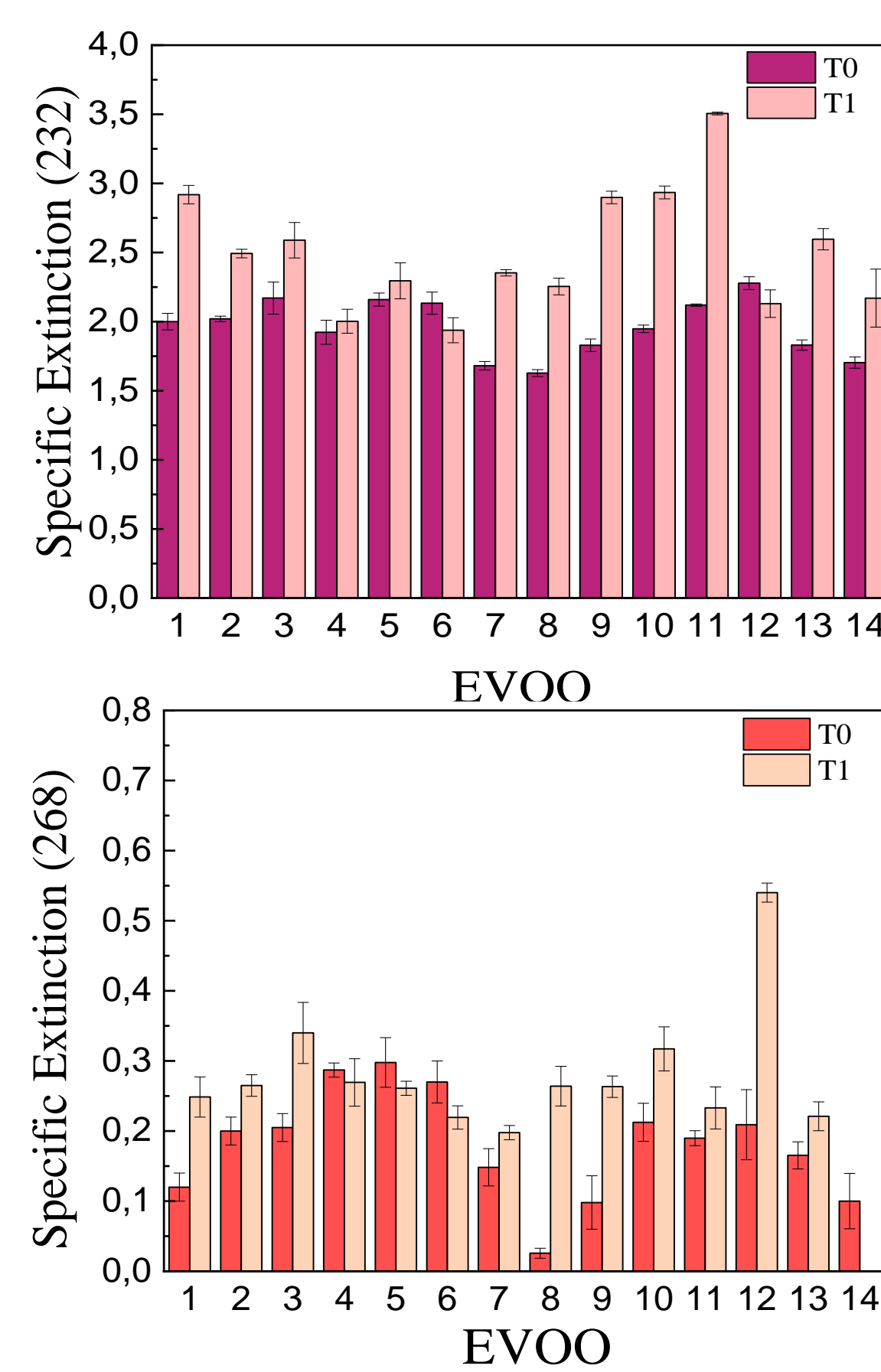
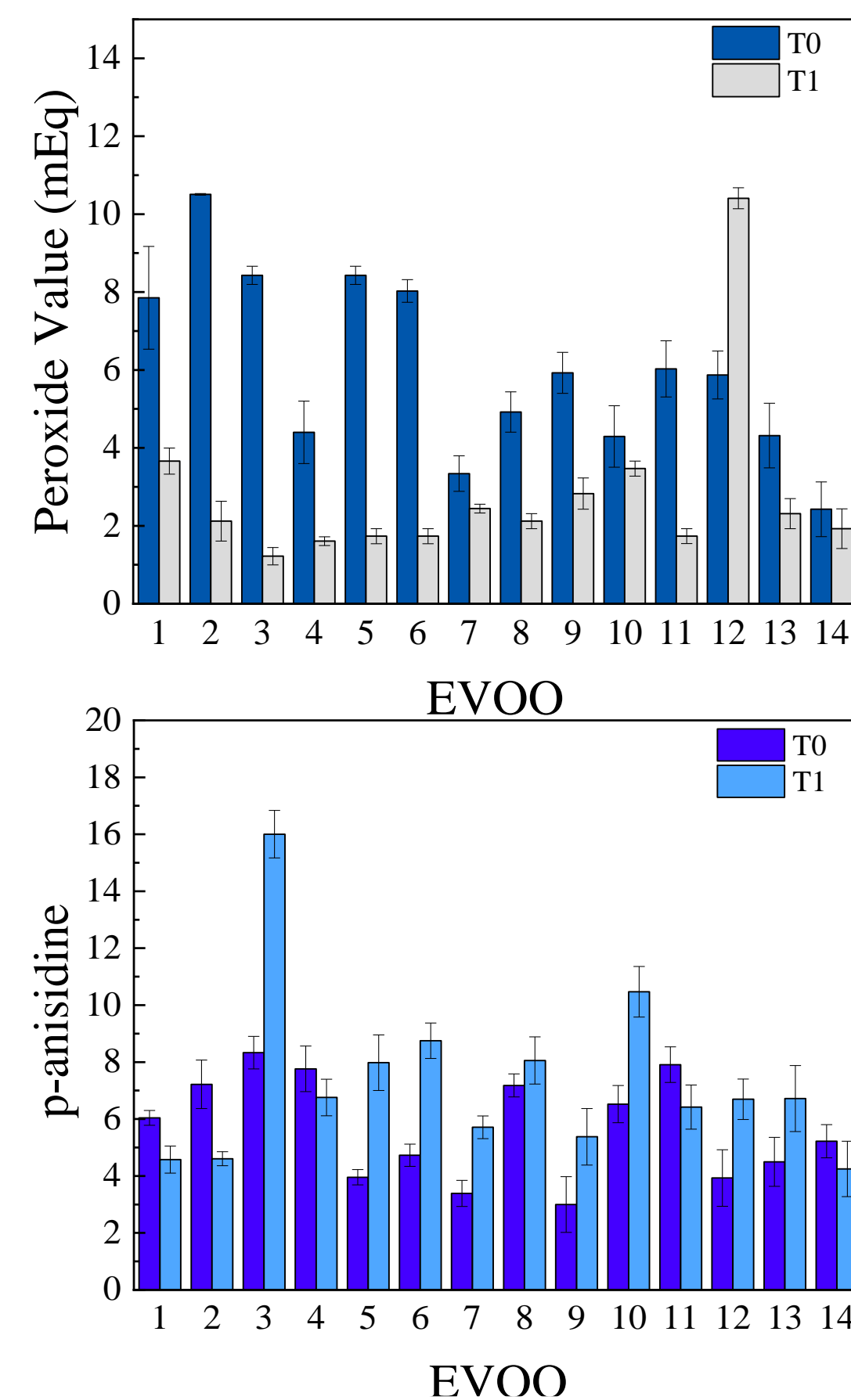
Peroxide Value and P-anisidine (Respectively, initial and final stages of lipid degradation)

- T0: Most samples with PV, 10 meq O₂ kg⁻¹ → good stability
- T1: PV decreased, oxidation progressed
- p-AV increased in most samples as hydroperoxides decomposed.
- Some samples showed reductions due to volatilization or reactions with other compounds
- Taken together, the results indicate that EVOOs largely entered the termination phase of lipid oxidation at T1.



Antioxidant Activity

- T0: eleven AA samples above 50%; with six exceeding 70%
- T1: seven AA samples above 50%; one above 70%
- degradation of phenolic compounds over time.

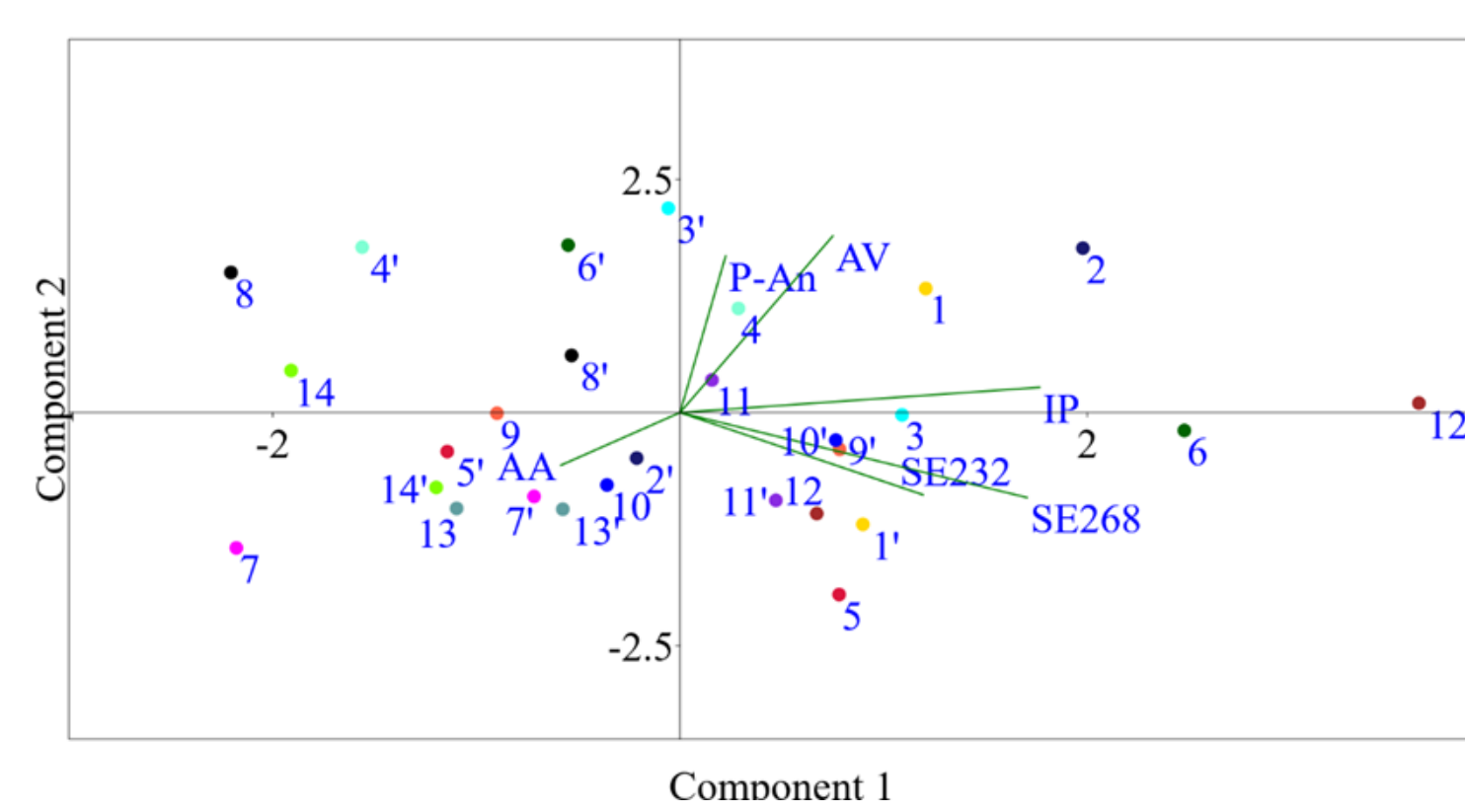


Specific extinction 232 / 268 nm

- SE (SE₂₃₂ and SE₂₆₈ conjugated dienes and trienes)
- T0, all samples were within recommended limits (SE₂₃₂ ≤ 2.5; SE₂₆₈ ≤ 0.22) → low oxidation levels
- T1: six samples exceeded the SE₂₃₂ limit, while the number of samples above the SE₂₆₈ limit doubled, although the overall variation was moderate
- At T0, the oils were in an early stage of oxidation, with primary and secondary oxidative products accumulating over time, consistent with the trends observed in the PV and p-AV measurements.

Test	Main Results
ANOVA	<ul style="list-style-type: none">Significant differences for all parameters → F > 1.8993; p < 0.05
Tukey's Test	<ul style="list-style-type: none">T0: 50% significant differences → except SE₂₆₈T1: AA, AV, SE₂₃₂ significant in → more than 50% of sampleAA: 13/14 samples significant variation → loss of phenolic compounds
Paired t-test	<ul style="list-style-type: none">SE₂₃₂ & SE₂₆₈: significant differences in most samplesp-AV & PV: indicate ongoing oxidative processesAV: less sensitive → 7/14 varied

PCA

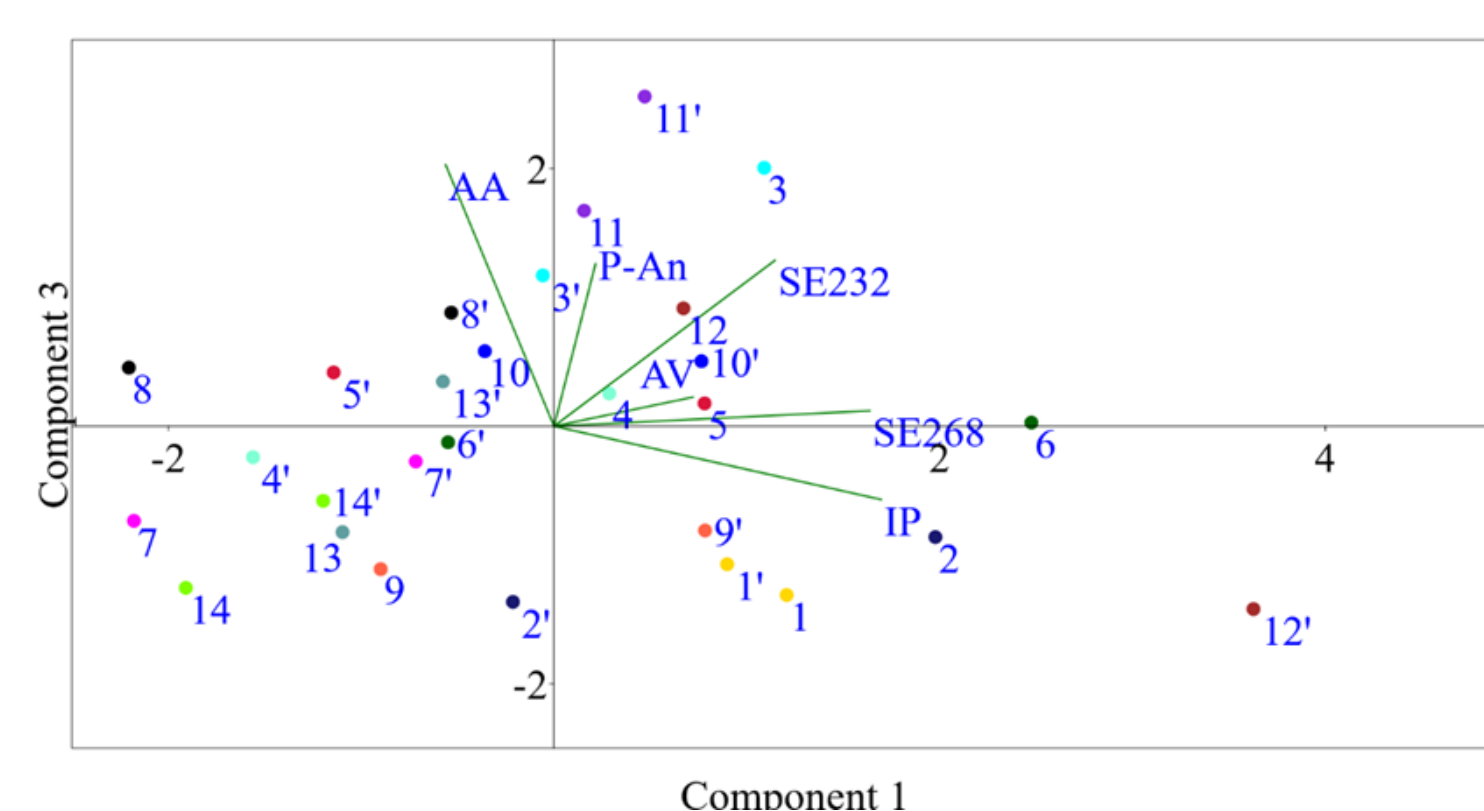


PCA Analysis (PC1 vs. PC2 and PC1 vs. PC3)

Clear separation of samples according to oxidation state and antioxidant activity.

PC1 vs. PC2: samples in the upper-right quadrant → higher primary and secondary oxidation values + elevated acidity.

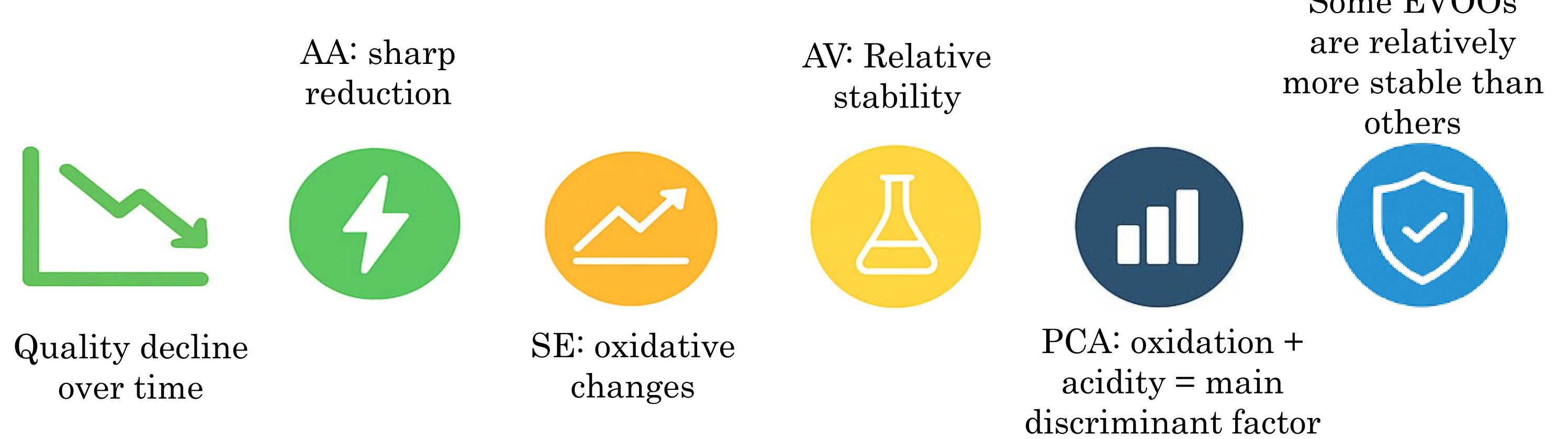
PC1 vs. PC3: samples with higher PC3 values → stronger antioxidant activity → greater resistance to oxidation.



Three main clustering patterns identified:

- Low oxidative degradation + high antioxidant activity → better quality.
- Predominance of primary oxidation (PV, SE₂₃₂, SE₂₆₈).
- Higher secondary oxidation (P-An) + acidity (AV) → advanced degradation.

Conclusion



Acknowledgement