

Antioxidant Protection And Colour Enhancement In Wines From The Varieties Skiadopoulo And Avgoustiatis From The Ionian Islands.

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INTRODUCTION



- The Ionian Islands possess a rich heritage of indigenous grape varieties.
- These local cultivars are underutilized but show great oenological potential.
- Recent research focuses on enhancing their quality through viticultural and oenological practices.
- Major challenges:
 - **Oxidation in white wines** (while using the minimal effective concentration of potassium metabisulfite)
 - **Low phenolic content in red wines**
 - **Poor colour stability**
- Leaf removal (defoliation) is traditionally used to improve phenolic development through sunlight exposure.
- However, because of the climate change, defoliation may need to be reconsidered

AIM OF THE STUDY



Two of the main indigenous Ionian Grape Varieties were studied:

- **Skiadopoulo:** White wines like Skiadopoulo are highly prone to oxidative browning due to phenolic composition
- **Avgoustiatis:** Red wines such as Avgoustiatis face challenges with poor phenolic content and unstable colour.



- Apply viticultural and oenological
- Evaluate chemical, oxidative and sensory properties

WINEMAKING INTERVENTIONS IN SKIADOPOULO

Control: 5 g/hL potassium metabisulfite

SK24CO

Ascorbic acid: 10 g/hL

SK24AS

Glutathione: 20 g/hL

SK24GL

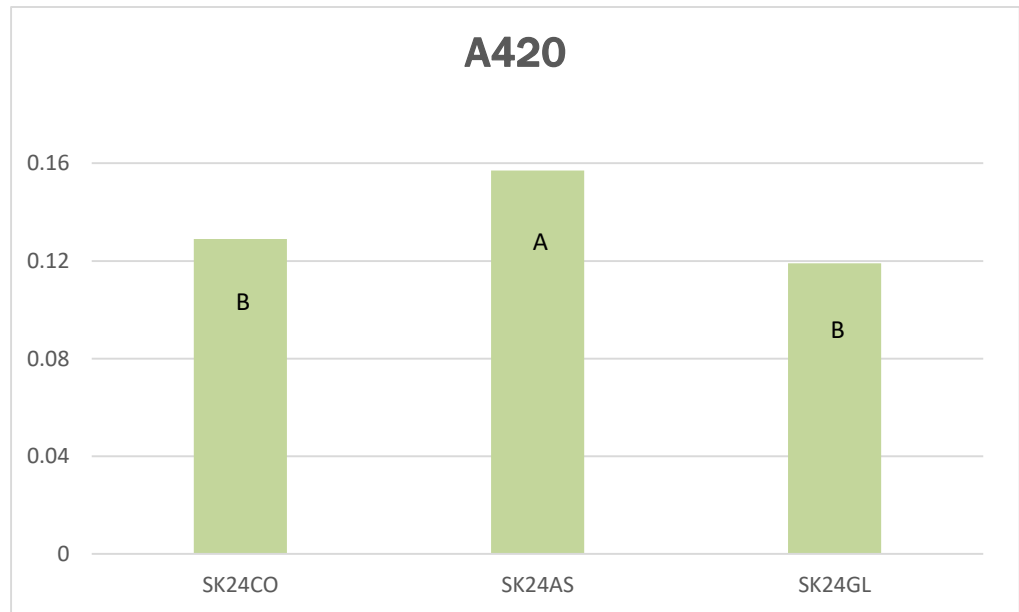
Antioxidant Capacity (mM TEAC)

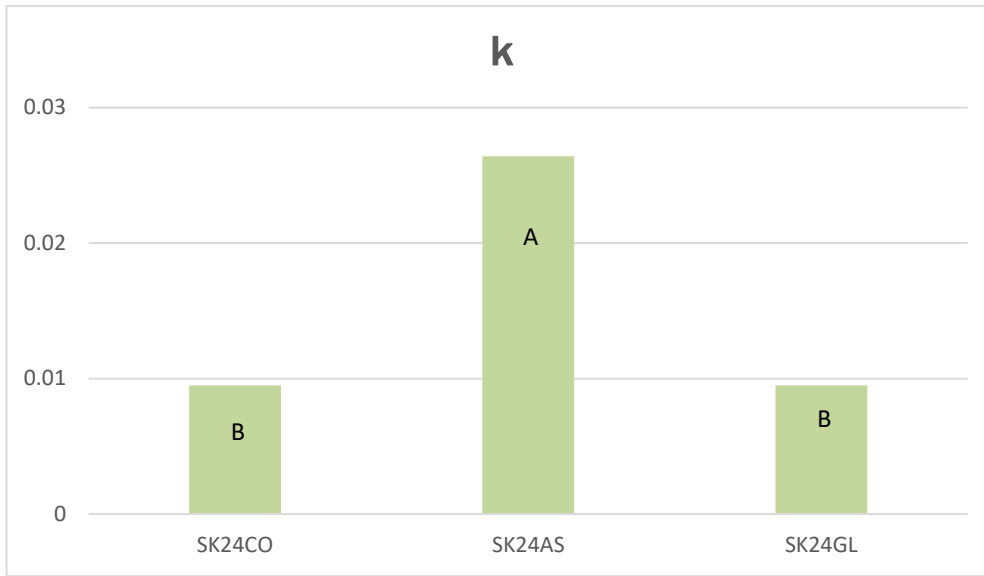


No significant differences were observed in antioxidant capacity among the treatments. This indicates that neither ascorbic acid nor glutathione significantly enhanced antioxidant capacity.

Although ascorbic acid did not alter TEAC, it exacerbated the discoloration, likely due to secondary oxidation. Glutathione protected the colour, with a low A420.

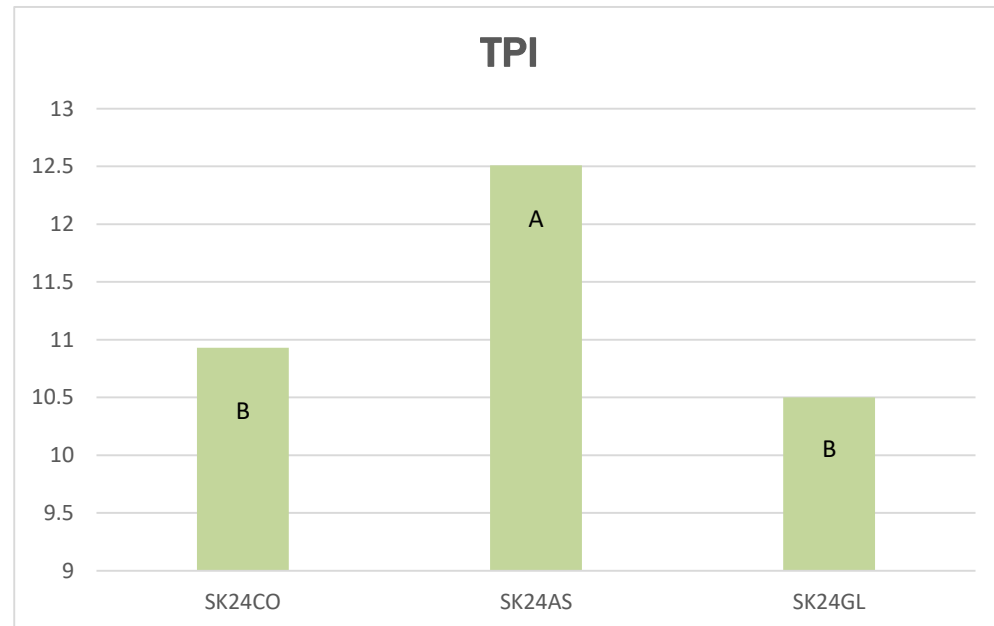
A420





Ascorbic acid accelerated oxidation, while glutathione offered the most protection.

Ascorbic acid increased the phenolic load but without antioxidant benefit. Glutathione kept the phenolics stable and protected from oxidation.

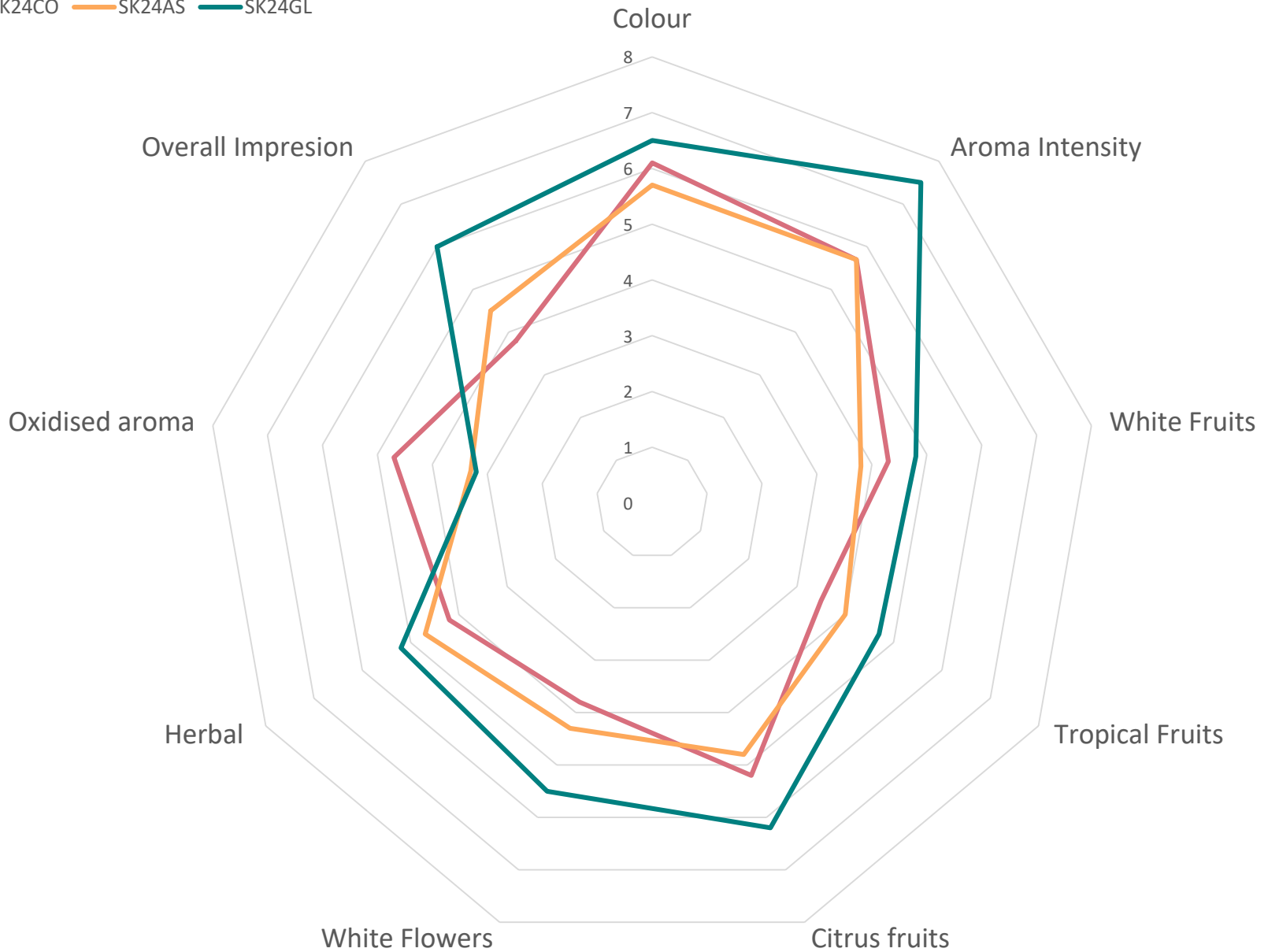


RESULTS

Sample	A420	TPI	TEAC	k	INTERPRETATION
CONTROL	0,129	10,93	0,58	0,0095	Acceptable stability without intervention.
ASCORBIC ACID	0,157	12,51	0,70	0,0264	Pronounced browning and faster oxidation. Low overall stability.
GLOUTATHIONE	0,119	10,50	0,65	0,0095	Higher antioxidant capacity with improved colour and phenolic stability. More effective protection against oxidation.

SENSORY EVALUATION

SK24CO SK24AS SK24GL



VITICULTURAL AND OENOLOGICAL INTERVENTIONS IN AVGOUSTIATIS

Control: no tannin addition

AUG24BL

Grape Tannins: 10 g/hL

AUG24GT

Ellagic Tannins: 10 g/hL

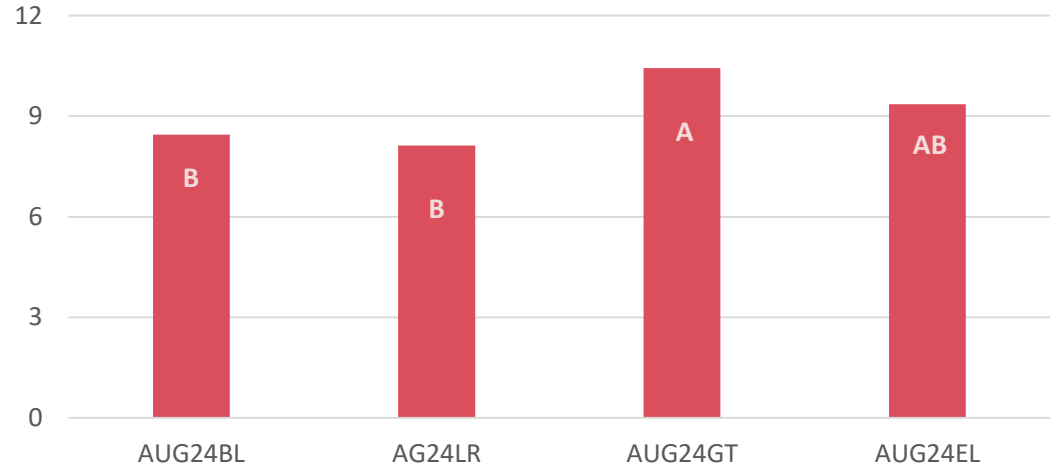
AUG24EL

Leaf removal

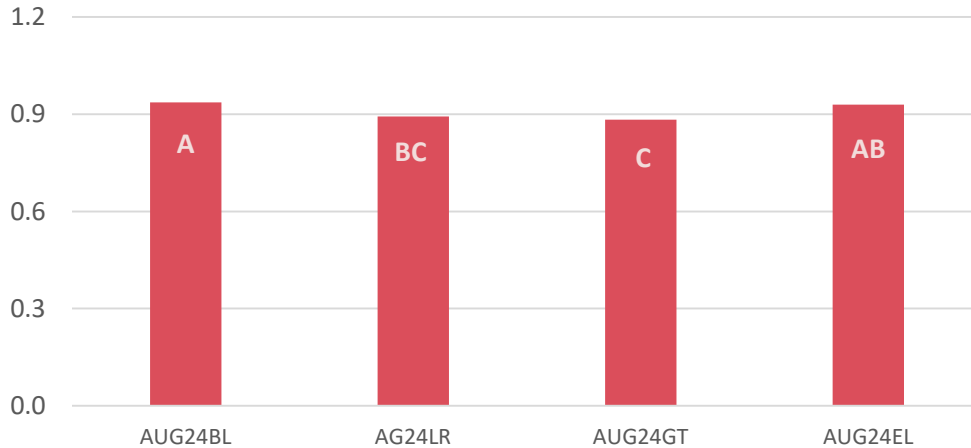
AUG24LR

Grape tannins significantly enhanced the colour of the wine, while leaf removal treatment showed the lowest colour intensity

Colour Intensity

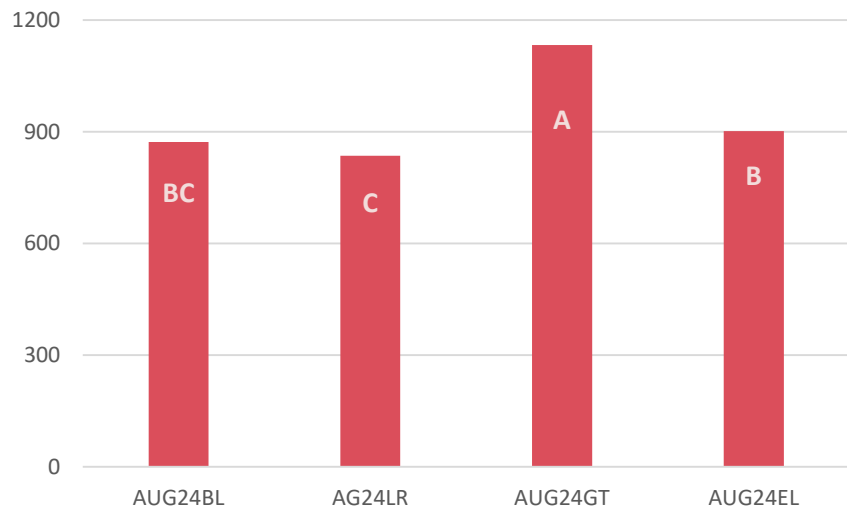


Hue

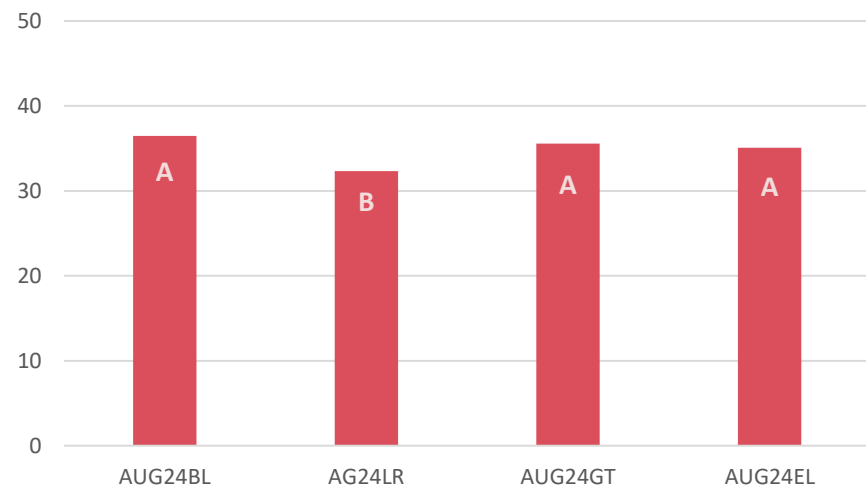


Despite the statistical differences, no significant change in hue is observed (balanced colour stability).

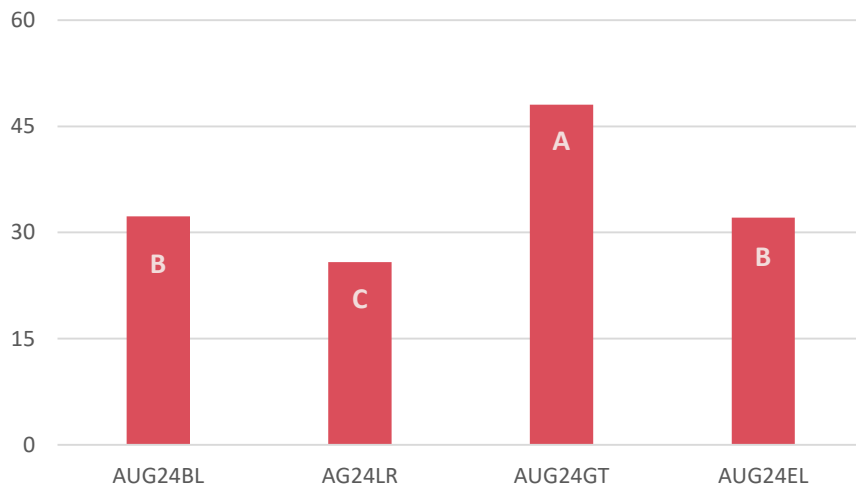
Total Phenols (mgGAE/L)



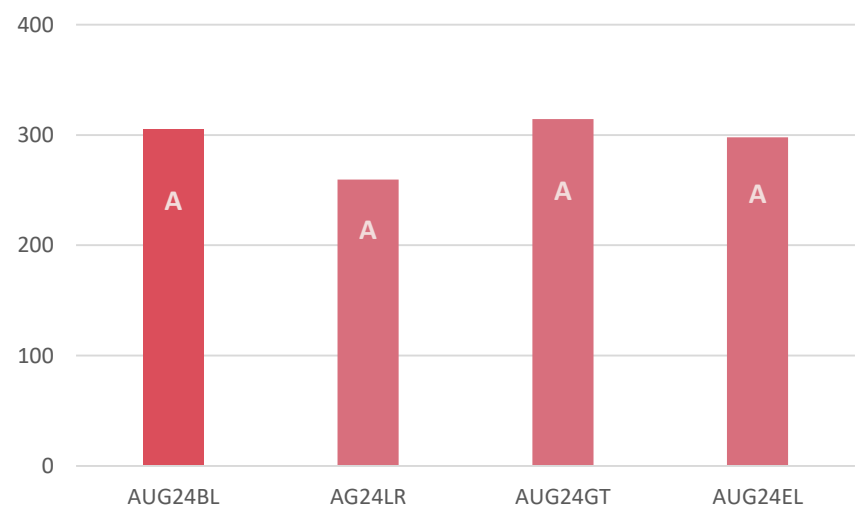
TPI



BSA



MCP

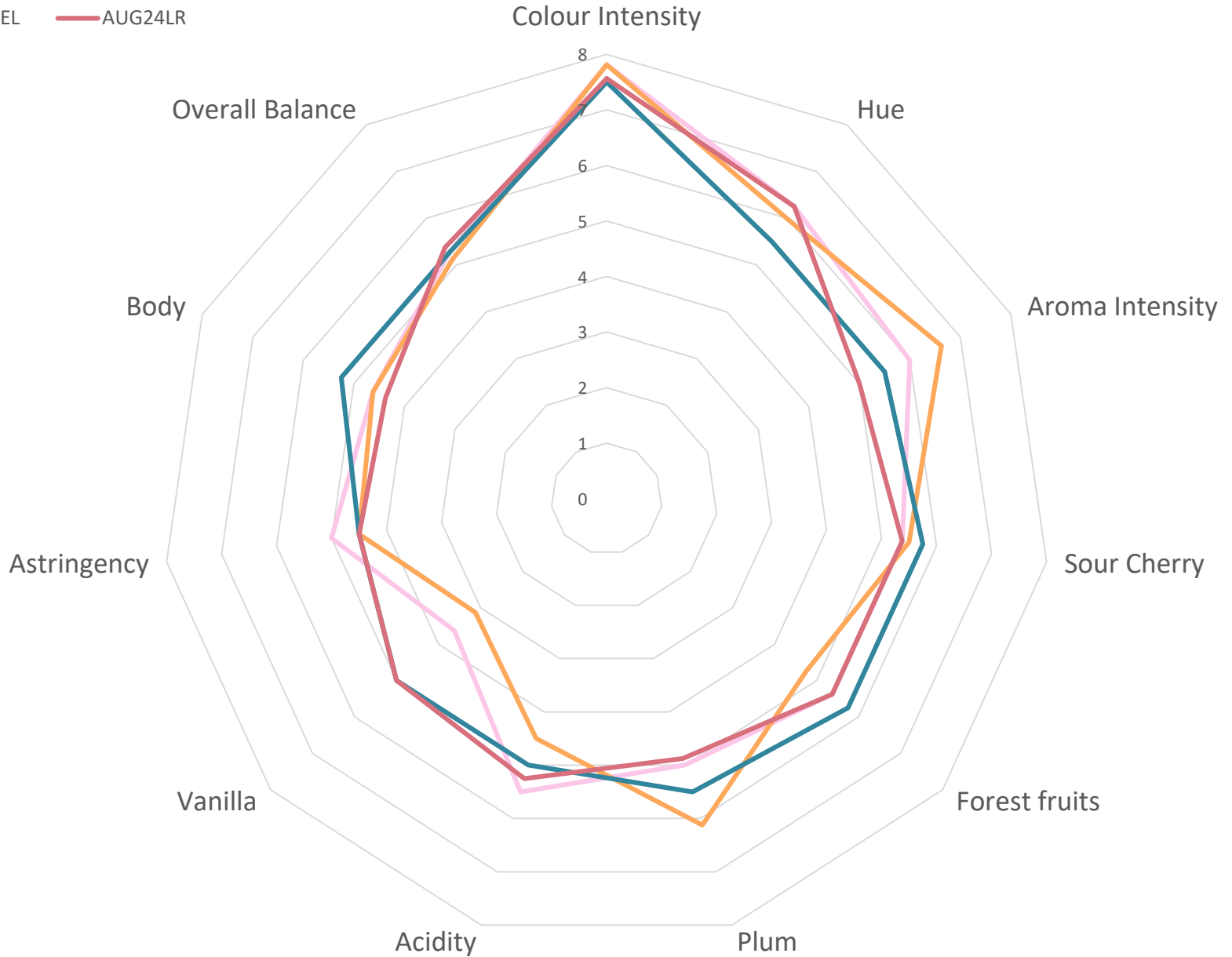


RESULTS

SAMPLE	INTENSITY	TOTAL PHENOLICS	TPI	BSA	MCP	INTERPRETATION
CONTROL	8,4	872,5	36,5	32,3	305,3	Moderate colour intensity and phenolic content, no difference in MCP.
LEAF REMOVAL	8,1	835,5	32,3	25,8	259,7	Lowest values in every analysis.
GRAPE TANNINS	10,4	1133	35,4	48	315	Highest colour intensity and phenolic content, high TPI and BSA, MCP unaffected.
ELLAGIC TANNINS	9,4	902	35,1	32	298	Intermediate colour intensity, high TPI, moderate BSA, no change in MCP.

SENSORY EVALUATION

AUG24BL AUG24GT
AUG24EL AUG24LR



CONCLUSION



- **Skiadopoulo:** Glutathione-treated wines scored highest for freshness and higher aroma intensity in sensory analysis. Glutathione delayed oxidation.
- **Avgoustiatis:** Grape tannin-treated wines showed richer mouthfeel and aroma complexity in sensory analysis. They also, enhanced colour and structure.
- Leaf removal must be reconsidered due to climate impact, as it gives wines with poor phenolic content, lower intensity and poor aroma profile.

LEAF REMOVAL TECHNIQUE



- Leaf removal is a viticultural technique used to enhance technological maturity and phenolic composition in grapes
- Under high summer temperatures, defoliation did not yield the expected increase in phenolic compounds.

BUT

- Under current climate extremes, excessive exposure may lead to grape sunburn and phenolic degradation.
- Climate-resilient strategies are needed to balance grape exposure and vine protection.
- Recommendation: use leaf removal cautiously in Mediterranean climates with intensified heatwaves.



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