

Bioactive Potential of Chardonnay White Wines: Evaluation of Phenolic Compounds and Antioxidant Capacity Before and After *In Vitro* Digestion



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INTRODUCTION & AIM

The white wine segment has become increasingly relevant in the wine industry, with a significant rise in demand and production since the 2000s. Both still and sparkling white wines exhibit stylistic variations influenced by various factors, such as agronomic practices and production processes.

Although research has historically focused on red wines, particularly regarding bioactive properties like antioxidant potential, white wines also possess bioactive characteristics that warrant greater attention.

In vitro gastrointestinal digestion is a valuable tool for assessing changes in the bioaccessibility of phenolic compounds. The aim of this study was to analyze the total phenolic content before and after simulated digestion, as well as to investigate the overall antioxidant activity, allowing for the estimation of the remaining bioactivity after the digestive simulation of five white wines of varied styles.

METHOD



Before digestion

- ✓ Total phenolic compounds (Folin–Ciocalteu method)
- ✓ Antioxidant activity: Enzymatic kit. Reduction of Cu^{2+} to Cu^{+} (μM Trolox equivalent)
- ✓ Individual phenols: HPLC

In vitro gastrointestinal digestion

Gastric phase

Pepsin
→ pH 1.3
→ 37°C
→ 1 hour

Intestinal phase

Pancreatin
→ pH 6.7
→ 37°C
→ 2 hour



After digestion

- ✓ Total phenolic compounds
- ✓ Antioxidant activity
- ✓ HPLC

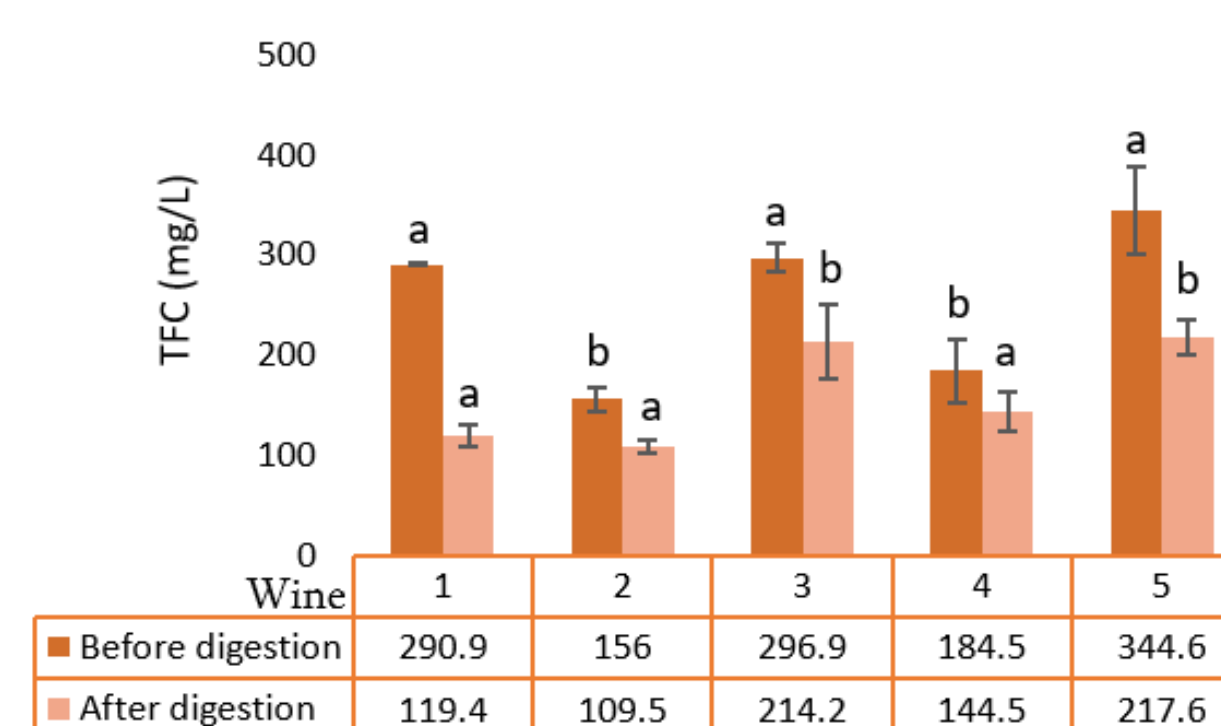
Bioaccessibility

&

Remaining Total Antioxidant Activity

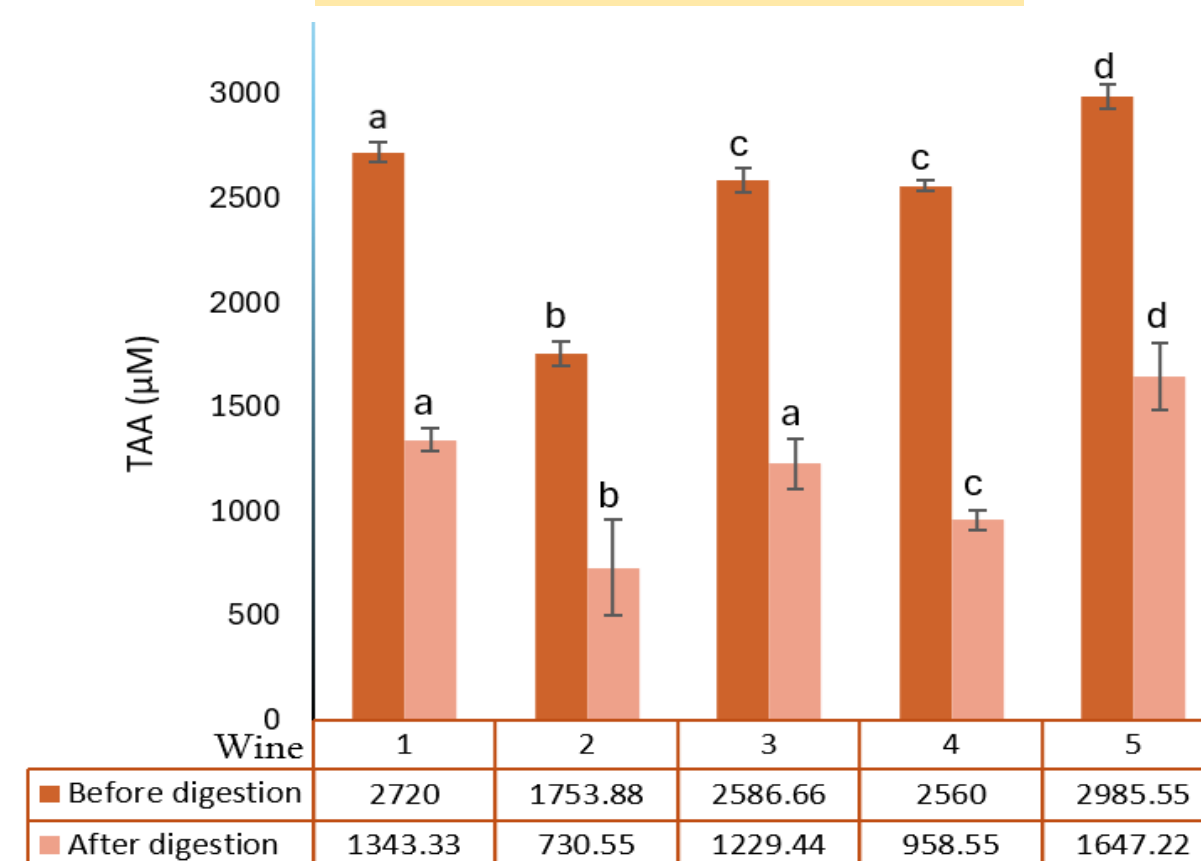
RESULTS & DISCUSSION

Total Phenolic Compounds



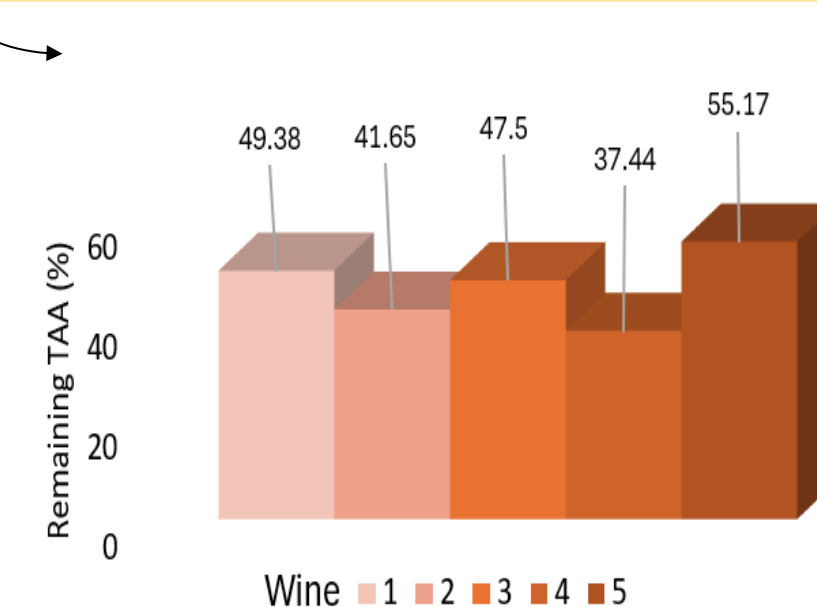
Total phenolic compounds (mg GAE/L) before and after *in vitro* digestion. Bars of the same color with different letters are significantly different for $p < 0.05$.

Total Antioxidant Activity

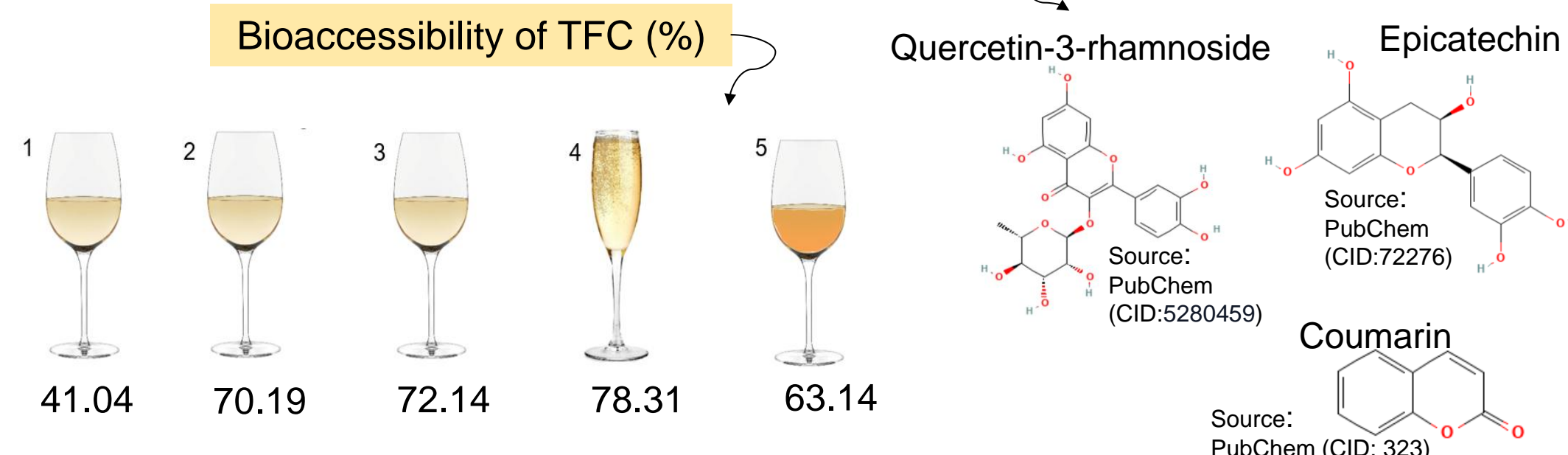


Total Antioxidant Capacity (μM Trolox equivalent) in wines before and after digestion. Bars of the same color with different letters are significantly different for $p < 0.05$.

Remaining Total Antioxidant Activity (%)



Most prominent phenolic compounds identified



Bioaccessibility of TFC (%)



CONCLUSION

In summary, the total antioxidant activity decreased after digestion but remained at significant levels, as did the bioaccessibility of total phenolic compounds, suggesting that white wines may contribute to the intake of bioactive compounds with antioxidant potential.

FUTURE WORK / REFERENCES

These findings emphasize the need for further investigation into the interaction between bioactive compounds in white wines, gut microbiota, and the synergy with other antioxidant molecules beyond phenolic compounds.

Focus: Evolution of the world wine production and consumption by colour (2023) In: Oiv.int. <https://www.oiv.int/press/focus-evolution-world-wine-production-and-consumption-colour>

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