

Phenolic Characterization of Red Dessert Wine

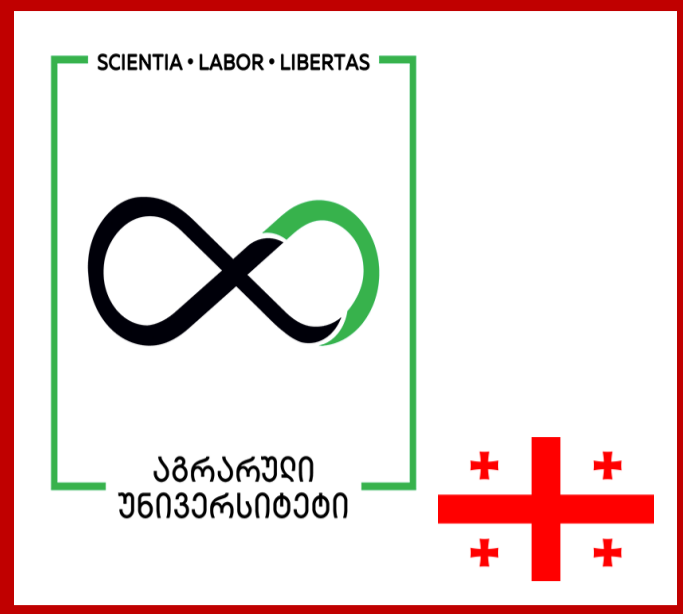
Produced with Innovative Technology

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Introduction

Phenolic compounds of red wines: catechins, flavonols, phenolcarboxylic acids, anthocyanins, resveratrol are characterized by high antioxidant activity and sharply reduce the risk of numerous diseases. Nowadays an increasing demand on red wines in the World market is conditioned by their antioxidant effect. However, according to antioxidant activity those red wines are distinguished which are characterized with high content of phenolic compounds. Their concentration in wine depends on the vine growing place, grape cultivar, techniques of fermentative maceration. Many oenologists underline that it is topical to optimize the polyphenol composition and antioxidant capacity of wines by modifying production practices.

We have elaborated innovative technology for red dessert wine with the aim of enrichment with antioxidant phenolic compounds.



Results

Concentration of phenolic antioxidants is the most of all increased in the Test sample prepared via combinatory use of maceration techniques: removal of the 1/3 part of juice from destemmed crushed must, heating of the remained must till 70°C, fermentation of the must to dryness, pressing, decantation of the dry winematerial; fortification till 16%ABV & sweetening (with concentrated grape juice) till 16%.

At the first time in red wines from Saperavi was identified & quantified by us caftaric acid (the main phenolic compound of curative plants), which was presented the most of all in our objects. The most of all among flavonols was quercetin-3-β-D-glucoside. Cinnamic acid was presented as traces; resveratrol was also low (1.5 mg/l). The amount of resveratrol in red wines was presented from traces to 1 mg/l in other authors works.

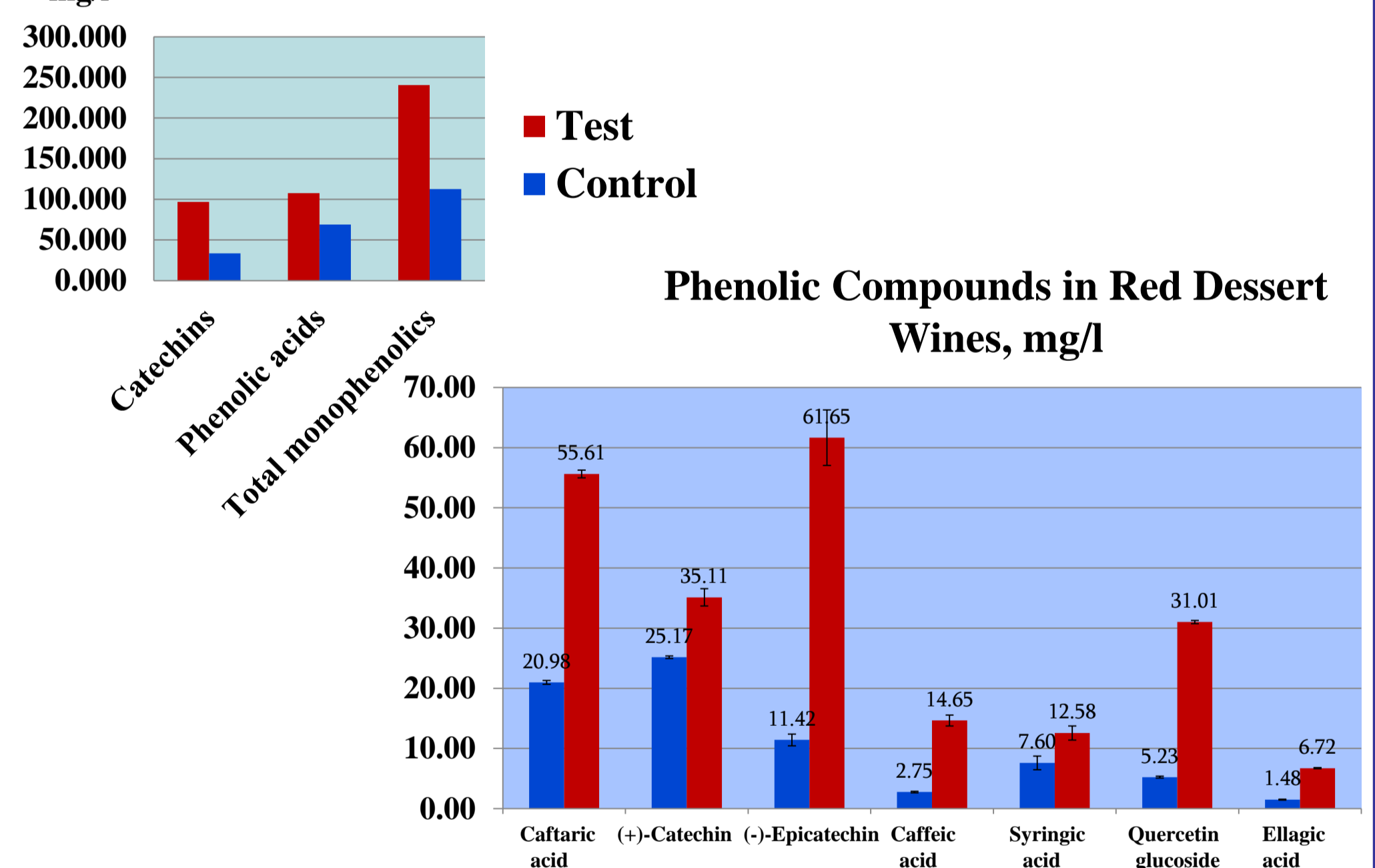
Materials & Methods

The research objects – Red Dessert Wines (Alc. 16%ABV, Sugar: 16%) - were prepared from the local grape cultivar Saperavi:

1. Test samples – via additional application of atypical techniques in separate and combination:
 - saignee,
 - fermenting to dryness,
 - fortification of fermented must up to 16% ABV,
 - postfermentative maceration for 1 week;
2. Control – by existing standard technology.

By the HPLC analysis, we determined the amount of phenolics on the Chromatograph Infinity 1200 (with UV-VIS detector), Agilent Technologies, USA.

- ❖ The separation of components was performed on the chromatographic column with RP sorbent Microsorb 100-5 C18 S250mm x 4.6 mm. The solvents & commercial standards were purchased from Sigma-Aldrich (Germany).
- ❖ The detection was performed at the wavelengths: 280 nm (catechins, phenolcarboxylic acids, phenolaldehydes), 360 nm (flavonols & ellagic acid); 310 nm (resveratrol). Identification was conducted by comparison of the retention time of standard substances & defined components, also by standard substances addition to the samples, known in special literature.



Test dessert wine had higher phenolic content than Control:

- (–)-epicatechin & caffeic acid - 5-times;
- ellagic acid – 4.5-times;
- caftaric acid – 2.6- times;
- syringic acid – by 65%;
- (+)-catechin – by 39.5%;
- quercetin glucoside - 5.9 times.

Total identified phenolics in the Test sample (240.6 mg/l) were twice as much in comparison with the Control (112.6 mg/l).

Sensory characteristics of the Test wine are better than of the Control.

Conclusions

The indicated increase in the content of phenolics in the Test red wine sample is explained by the application of our technology (combinative use of maceration techniques: saignee, fermenting to dryness), which provides far better extraction of these components from the grape must in the process of alcoholic fermentation compared to the existing technology.

The high concentration of phenolics enhances the antioxidant effect of the Test dessert wine sample, improves its quality and nutritive value.

Acknowledgements

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