COMPARTIVE PHENOLIC PROFILE AND ANTIRADICAL ACTIVITY OF SYRAH WINE AND ITS MANUFATURE BY-PRODUCTS

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INTRODUCTION

More than 67 million tons of grapes are produced worldwide every year, and about 66% of them are used for making wine and other alcoholic beverages. However, the winemaking industry generates great amounts of by-products. In fact, winemaking by-products account for more than 30% of the grape production, but this unexpansive feedstock has no practical application. About 20 million tons of winemaking by-products are discarded every year. These by-products are mainly constituted of rachis, seeds and skins (pomace), and solid sediments recovered after wine decanting. About six million liters of wine are produced each year in the São Francisco Valley region in the Northeast of Brazil where Syrah is the most used cultivar for wine production. The aim of the present study was to characterize the phenolic profile and evaluate the antiradical activity of winemaking by-products produced with Syrah grapes grown in São Francisco Valley, Brazil.

MATERIAL AND METHODS

Winemaking process

SAMPLES

Syrah fresh grape (3 samples: skin, skin and seed, seed)

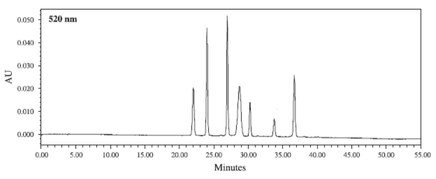
Rachis

Pomace (3 samples: skin, skin and seed, seed)

Solid sediments recovered after wine decanting

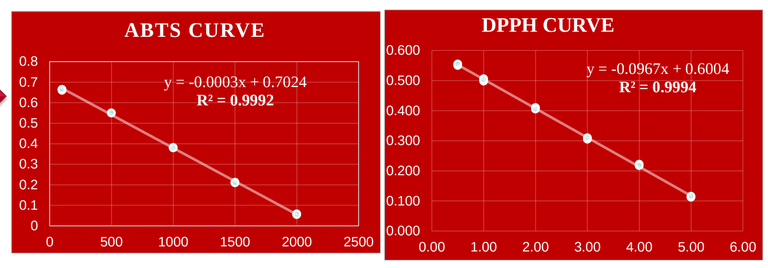
Syrah red wine

High performance liquid chromatography (HPLC) simultaneously coupled to diode array (DAD) and fluorescence (FLD)



21 phenolic compounds were determined

Antiradical activity was evaluated by DPPH radical and ABTS radical cation



Calibration curves of ABTS and DPPH analysis using the standard Trolox

RESULTS AND DISCUSSION

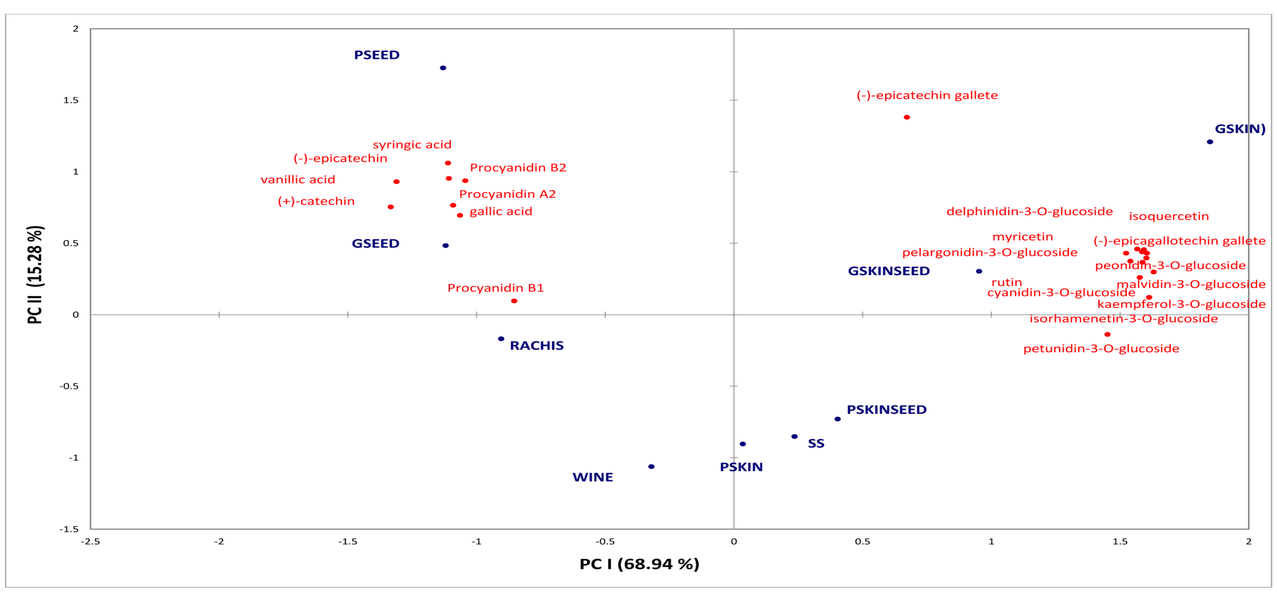


Figure 1: PCA generated with the phenolic compounds data quantified in the samples of Syrah fresh grape skin (GSKIN), fresh grape skin and seed (GSKINSEED), fresh grape seed (GSEED), rachis, pomace skin (PSKIN), pomace skin and seed (PSKINSEED), pomace seed (PSEED), solid sediments recovered after wine decanting (SS) and wine.

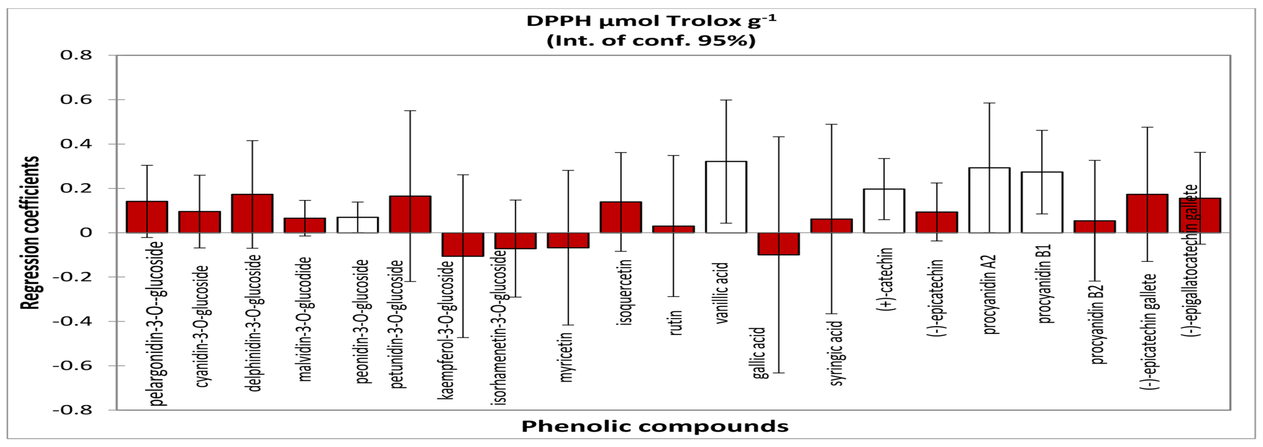


Figure 2: 95% jackknife confidence intervals of the Partial Least Squares regression coefficients for the prediction of antioxidant activity (by DDPH) based on 21 phenolic compounds quantified in the samples evaluated.

- The fresh grape skin (GSKIN) was the primary source of the following six anthocyanins: pelargonidin-3-*O*-glucoside, petunidin-3-*O*-glucoside, malvidin-3-*O*-glucoside, delphinidin-3-*O*-glucoside, cyanidin-3-*O*-glucoside, and peonidin-3-*O*-glucoside. Solid sediments recoverd after wine decanting (SS) and pomace (skin and skin + seed - PSKINSEED) rendered significantly greater anthocyanin contents than the wine
- The skins from fresh grapes (GSKIN) had greater quantities of flavonols, which include isorhamnetin-3-*O*-glucoside, rutin, myricetin, kaempferol-3-O-glucoside, and isoquercetin. In general, grape pomace (skins and skin + seeds - PSKINSEED) and the solid sediments (SS) showed higher contents of flavonols than the wine.
- The following flavanols were detected: procyanidins (B1, B2, and A2), epicatechin, catechin, epicatechin gallate, and epigallocatechin. Rachis were the best sources of procyanidins A2 and B1. The red wine showed a lower content of flavanols as compared with its by-products
- Seeds from winemaking by-products (PSEED) were good sources of phenolic acids.
- Rachis rendered the highest antiradical activity in both methods (ABTS and DPPH) with values up to 10-fold higher than found for wine.
- PLS regression showed that peonidin-3-*O*-glicoside, vanillic acid, (+)-catechin, procyanidin A2 as well as B1 were positively correlated ($p < 0.05$) with the antiradical activities.

CONCLUSIONS

The present study suggests the industrial application of all test materials as sources of phenolic compounds with antiradical activity.

ACKNOWLEDGEMENTS: