



Differential Content of the Total Polyphenols and Flavonoids in Three Romanian White Grape Cultivars

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(Received 10 Dec 2015; accepted 17 Jan 2016)

Dear Editor-in-Chief

Among 60 vining species growing almost exclusively in the Northern hemisphere, only the grapevine (*Vitis vinifera* L.) (*Vitaceae*) is the single species largely used in the global wine industry. Grapes are important sources of antioxidants, such as phenolic compounds. The antioxidant activity of these polyphenols is considered much higher than that of the essential vitamins, thus contributing significantly to the dietary benefits of grapes (1). In addition, phenolics are the most important fraction involved in quality parameters of wines.

It has been reported that the unique mix of phenolic compounds has many biological activities, including cardioprotective, anti-inflammatory, anti-carcinogenic, antiviral and antibacterial properties attributed mainly to their antioxidant activity (2).

The major components of grape skins and seeds include phenolic acids, flavonoids and stilbenes. These grape seed and skin constituents have been shown to have health functional activities (3).

In this context, the main aim of this study is to investigate the content of total polyphenols and flavonoids in three grape cultivars from the Cotnari vineyard (Romania) and provide information about their accumulation in skin, pulps and seeds. Three samples of mature white grape cultivars (*Grasă de Cotnari*, *Fetească* and *Tămâioasă*) were collected from the Cotnari vineyard during harvesting period (vintage September, 2014). The components

of grape cultivars (from three different plants) were dried at 60°C and measured until constant weight.

The samples of grape berry seeds, skins and pulp were extracted with methanol; the supernatants were collected and used for extraction. Total polyphenolics and flavonoids, in the selected extract samples were determined (4, 5).

The content of total phenolics from methanolic extracts of grapes cultivars varies within seeds, skin and pulp components (Table 1). From all of these, the highest content of phenolics was recorded in seeds, in all three investigated cultivars; in pulps and skins, there are no significant differences among the three cultivars. However, for the skin of *Tămâioasă* cultivar, only a slight increase was detected, comparatively with skins and pulps of the two other cultivars.

In the case of flavonoids, the same pattern was identified, as in the case of polyphenols accumulation. Thus, the highest content was recorded in the case of seeds, followed by skins and pulps, consequently. Within the three cultivars, no important differences were measured; *Grasă de Cotnari* shown a small increased value in terms of seeds, while *Tămâioasă* cultivar displayed a slight increase in skins and pulps.

Overall, there was no considerable variation in the amounts of total polyphenols and flavonoids among the three grape berry cultivars; however, these levels do differed significantly within the three analyzed parts.

Table 1: Total polyphenols and flavonoids contents in grapes cultivars

Cultivars	Total polyphenols (mg GAE g ⁻¹ DW)			Flavonoids (mg CE g ⁻¹ DW)		
	Seeds	Pulp	Skin	Seeds	Pulp	Skin
<i>Grasă de Cotnari</i>	124.38±16.27	24.13±1.96	24.65 ±1.198	35.14 ± 4.15	2.60 ± 0.32	3.64 ± 1.06
<i>Fetească</i>	118.84±5.44	29.88±3.63	30.56 ± 2.05	26.55 ± 5.33	2.95 ± 0.50	4.00 ± 0.25
<i>Tămâioasă</i>	123.43±17.82	30.40±0.15	43.57±4.35	34.64± 2.58	3.07 ± 0.17	5.45 ± 1.27

As expected, the seeds of all tested cultivars have significantly higher concentrations of polyphenols and flavonoids than those determined for pulp and skin. Most likely, the colour of grapes skin greatly influences the total phenolic content. Thus, the total phenolic of red grape skins is greatly higher than that of white grapes, because of the loss of the ability of the skins of white grapes to produce anthocyanins (6). The highest values for dark purple skin colour grapes, followed by red and green skins was reported.

Grape phenolic profile depends greatly on the grape variety (7), but in our study, the tested cultivar differs very much in this direction. However, grape berry contain tannins and pigments in various amounts in seeds, pulps and skin (8), but for total polyphenols and flavonoids it seem that there are not so many available data.

Nevertheless, large variations of total phenolics have been registered within different grapevine cultivars (9) and in spite of relatively abundant literature dealing with many limitations in comparing results arise due to different methods used in this direction.

The phenolic compounds composition of fruits depends on genotypes, environmental factors and postharvest processing conditions. The phenolic compounds serve in plant as defense mechanisms, countering oxygen species, and preventing cellular and molecular damage (10).

Acknowledgements

The authors declare that there is no conflict of interests.

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