



Title: “Dietary fiber in wine”

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Got fiber? While grapes and grape pomace are rich in dietary fiber, it is generally assumed that wine contains no dietary fiber. The authors believed that perhaps a significant part of the fiber in grape berries may be passing into the wine during winemaking, so they carried the present study to test this possibility.

- Polysaccharides in wines are derived from both grape cell walls and yeast cell walls. From a chemical point of view, these polysaccharides are divided into 1) acidic polysaccharides (homogalacturonan, rhamnogalacturonan), and 2) neutral pectic substances (arabinogalactans, arabinogalactan-proteins).
- Researchers have shown that polysaccharides play several important roles in winemaking: 1) they modify the polymerization of tannins, 2) they affect tartrate precipitation, 3) they are able to chelate heavy metals, and 4) they decrease volatile thiols through the formation of mannoprotein-thiol disulfide bonds, among other roles.
- Even though polysaccharides have been studied in the above contexts, and in relation to their sensory properties, a nutritional approach has been lacking. From a nutritional point of view, food polysaccharides can be divided into 2 groups: 1) digestible (have α -bonds that can be hydrolyzed by digestive enzymes), and 2) indigestible (lack these bonds and cannot be hydrolyzed). **Indigestible polysaccharides are the major constituents of dietary fiber.**
- Dietary fiber, the indigestible part of vegetables, food, and beverages, can be further classified on the basis of their solubility in the human digestive system into 1) insoluble dietary fiber (cellulose, some hemicelluloses, lignin, cutin), and 2) soluble dietary fiber (pectins, some hemicelluloses, β -glucans, galactomannans). **Soluble dietary fiber (SDF) plays a particularly important role in nutrition and health.**
- To find out whether wines had soluble dietary fiber, the authors used a separation method developed in their lab, which comprised 4 steps: 1) concentration of wine by vacuum distillation, 2) enzymatic treatment (pepsin, α -amylase, amyloglucosidase), 3) dialysis (12-14 kDa cut-off membrane), and 4) chemical fiber determination of the dialysates. Individual neutral sugars were analyzed through gas liquid chromatography to give a qualitative idea of the type of polysaccharides present.
- The authors tested the fiber content of 7 Spanish wines (5 reds, 3 whites) comprising varying proportions of the following varieties: Tempranillo, Merlot, Monastrell (=Mourvedre), and Cabernet Sauvignon in reds; Macabeo, Viura and Verdejo in whites. These wines represented the following Spanish appellations of origin (D.O.'s): Ribera del Duero, La Mancha, Rioja, Jumilla, Penedés, and Rueda).

• The authors' finding was that wines do contain dietary fiber. And red wines have about four times more (0.94-1.37 g/L) than white wines (0.19-0.39 g/L).

• The monosaccharide composition results suggested that arabinogalactan (from the grapes, rich in arabinose and galactose) and mannans (from the yeast mannoproteins, rich in mannose) are the main components in wine dietary fiber. Acidic polysaccharides (rich in uronic acid) were the only fiber components that were found to be higher in whites than in reds.

In conclusion, the results suggest that soluble dietary fiber is a quantitatively important constituent of wine that has been largely ignored. In the near future, food composition tables may need to stop reporting zero dietary fiber content in wine. As a reference, dietary fiber consumption in Spain is reported as 5 g/person/day, but of course, wine and other beverages were not taken into account in these studies. The authors believe that the presence of dietary fiber, coupled to other beneficial phenolic compounds -like resveratrol- give wines unique physiological and nutritional properties.

As a reference, the following table reporting dietary fiber content in several foods is included in the article.

Food	Soluble dietary fiber (%) ^a
White bread	2.12
Chickpeas	2.06
Potatoes	1.67
Bananas	1.36
Apples	0.71
Tomatoes	0.16
Beer	0.20
Orange juice	0.19
Red wine	0.14

^aPercent fresh matter (solids) or percent weight/volume (liquids).

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