

Public Abstract

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Title:PHENOLICS IN RED WINE POMACE AND THEIR POTENTIAL APPLICATION IN ANIMAL AND HUMAN HEALTH

Grape pomace by-products, from wine-making, have some beneficial antioxidant compounds left in them after vinification and could be a cheap source of these compounds for value added products. One of the most common antioxidant groups found in grapes are the phenols. Grape pomace possesses a high amount of polyphenols, particularly flavonols. These antioxidants have the potential to reduce cardiovascular disease, prevent some cancers, have chemoprotective roles, reduce signs of skin aging, aid in glucose transport, and prevent other diseases such as iron storage disease (ISD).

In this research, five Missouri red wine pomace samples were evaluated; Chambourcin, Grenache, Michigan, Norton and Vincent varieties. They were analyzed for total phenolic content using the Folin-Ciocalteu assay, total condensed tannin content using the Vanillin-HCl assay, procyanidin degree of polymerization using normal-phase HPLC, iron-binding potential using the iron-binding phenolic capacity assay, and antioxidant activity using the ABTS and ORAC assays.

The results showed that the vinification method applied to the grape variety greatly affected the pomace properties and composition. The Vincent variety pomace, which was lightly pressed during vinification, had the highest levels of total polyphenols (62.18 ± 4.53 mg gallic acid equivalents per gram), condensed tannins (120.24 ± 2.64 mg of catechin equivalents per gram), iron-binding phenolic capacity (120.23 ± 0.25 mg catechin equivalents per gram), and the highest antioxidant activity (914.42 ± 75.86 μ M trolox equivalents per gram for the ORAC assay and 1605.52 ± 102.97 μ M trolox equivalents per gram for the ABTS assay).

The Norton variety pomace, because it was heavily pressed during vinification, was found to have the lowest values in all assays. It had the lowest total polyphenols (25.12 ± 1.34 mg gallic acid equivalents per gram), condensed tannins (10.18 ± 0.41 mg of catechin equivalents per gram), iron-binding phenolic capacity (19.62 ± 0.22 mg catechin equivalents per gram), and the lowest antioxidant activity (365.31 ± 72.57 μ M trolox equivalents per gram for the ORAC assay and 569.76 ± 18.87 μ M trolox equivalents per gram for the ABTS assay). The Chambourcin, Grenache, and Michigan varieties had values between the two extremes due to their moderate pressing during vinification.

Red wine pomace, produced from lightly pressed grapes, has higher phenolic and antioxidant activities. This type of pomace has the greatest potential for applications that will benefit animal and human health.