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Spent grape pomace as nutraceutical ingredient for fruit tea: distillation process, size and preparation technique effects on chemical composition, consumer acceptability and *in-vitro* functionality

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In 2018 the world production of wine was about 282 million hectolitres generating high amount of wastes which are generally discarded with significant economic and ecological problems. Grape pomace can be distilled but a considerable amount of by-products are still generated from it. Therefore, the aim of this study was to evaluate the use of grape skin (GS) coming from the distillation process as a nutraceutical ingredient for fruit tea production. Three samples were collected: pre-distillation GS (PGS), GS from a discontinuous distillation process (DDGS) and GS from a continuous distillation process (CDGS). All of them were ground to reach five sizes: above 4000 µm (PS1), 2000 - 4000 µm (PS2), 1000 - 2000 µm (PS3), 500 - 1000 µm (PS4), and 250 - 500 µm (PS5). The powders were used to produce fruit tea using two different home-made techniques: French press (a maceration technique) and Capsule (a percolation technique). The determination of sugars, organic acids, total phenolic compounds and antiradical capacity on beverages were carried out. The beverages obtained with PS1, PS3 and PS5 were *in vitro* digested to evaluate the bioaccessibility of the bioactive compounds. Furthermore, a consumer test on the beverages obtained from the PS3-PS5 was carried out with 70 tasters. The results displayed that for all powder sizes and extraction techniques the continuous distillation process allowed to obtain the most functional beverages. Again, reducing the powder size the extractive capacity increased. The percolation technique lead to the most promising beverage. Regarding the consumer acceptability, the beverage obtained with PS3 – CDGS trough Capsule process was the most appreciated. In conclusion, this work indicates that distilled grape skin could be an optimal ingredient for home-made functional beverages with potential health benefits for consumers.

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