vinetur

Review Finds Grape Pomace Remains Largely Unproven Beyond the Lab

The paper examined 110 studies on extracting compounds from winery waste and found little evidence that the results translate to commercial use

Tuesday, November 24, 2026



A systematic review in the journal Discover Food found that grape pomace, the skins, seeds and other solid material left after winemaking, remains a promising source of bioactive compounds, but most of the evidence still comes from laboratory studies rather than industrial or clinical validation.

The paper analyzed 110 studies and mapped research trends around methods used to recover and protect those compounds. According to the review, the main techniques examined included fermentation, ultrasound-assisted extraction, supercritical CO2 extraction and encapsulation, which is used to help stabilize sensitive ingredients after they are recovered.

The study focused on a question that has drawn growing attention in food science and agricultural processing: whether a major byproduct of winemaking can be turned into higher-value ingredients for food, supplements and other commercial uses instead of being treated mainly as waste. Grape pomace is produced in large volumes by wineries, and researchers have long viewed it as a possible source of ingredients with antioxidant and other functional properties.

The review found that green extraction methods are attracting interest because they aim to reduce the use of conventional solvents and make better use of food industry byproducts. Fermentation is being studied as a way to improve the release or transformation of compounds already present in the pomace. Ultrasound-assisted extraction is being tested for its ability to speed up extraction and improve yields. Supercritical CO2, another method covered in the review, is often studied as a cleaner alternative for obtaining specific compounds under controlled conditions.

The authors also examined encapsulation, which is increasingly paired with extraction in research on grape pomace. Encapsulation can help protect recovered compounds from heat, oxygen and other conditions that reduce stability during storage or use in finished products. The review suggests that this step may be important if manufacturers want to move from laboratory extracts to ingredients that can be added to foods or beverages in a more consistent way.

Even so, the paper points to clear limits in the current research. The review says industrial validation remains scarce, meaning that many of the reported results have not yet been demonstrated at commercial scale. It also flags limited clinical validation, a sign that evidence is still thin on how these compounds perform in people, beyond their chemical properties or behavior in controlled experiments.

That gap matters because laboratory success does not always translate into viable production. Processes that appear efficient in small-scale studies can become more expensive, less stable or harder to standardize when moved into large facilities. For producers, the challenge is not only extracting compounds from pomace, but doing so at a cost, purity and volume that fit real market demand and regulatory requirements.

The findings may be especially relevant to the beverage industry, where wineries are under pressure to reduce waste and find new revenue sources from production residues. If the techniques highlighted in the review can be scaled and validated, they could support a more circular model in which byproducts from winemaking are turned into ingredients for new beverage, food or supplement applications. At the same time, the review draws a clear line between early-stage scientific promise and uses that are ready for broad commercial adoption.

By combining a systematic review with bibliometric analysis, the paper also offers a picture of how fast this field is growing and where attention is concentrating. That kind of mapping can help researchers identify which methods are being studied most heavily and where the main evidence gaps remain, especially around scale-up, reproducibility and end-use performance.

The study adds to a wider body of work examining how food processing waste can be reused more effectively, but it suggests that grape pomace research is still in a transition period. Interest is strong, the number of studies is growing and several extraction and stabilization methods appear technically promising. The harder step, according to the review, is moving from experimental results to products and processes that are reliable enough for industry and supported well enough for health-related claims.