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*Opinion*

# Impact of food matrix and processing on inhibitory action against-glucosidase encapsulation of grape seed phenolics from winemaking leftovers in hydrogel microbeads

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## Abstract

Grape seed phenolics recovered from winemaking by-products were encapsulated using hydrogel-based encapsulation methods. Grape seeds were extracted with 60 percent ethanol to extract proanthocyanidins, monomeric flavanols, flavonols, and anthocyanins. The efficiency of encapsulating solubilized grape seed phenolics in microbeads with alginate-Ca<sup>++</sup> or alginate-chitosan-Ca<sup>++</sup> was higher than that of pure catechin and proanthocyanidins, at 78 and 92 percent, respectively.

**Keywords:** Proanthocyanidins, Microencapsulation, Antioxidant, Microbeads.

## INTRODUCTION

Hydrogel-based encapsulation technologies were used to encapsulate grape seed phenolics recovered from winemaking leftovers. Proanthocyanidins, monomeric flavanols, flavonols, and anthocyanins were isolated from grape seeds using 60 percent ethanol. The efficiency of encapsulating solubilized grape seed phenolics in microbeads using alginate-Ca<sup>++</sup> or alginate-chitosan-Ca<sup>++</sup> was 78 and 92 percent, respectively, compared to pure catechin and proanthocyanidins (Goula and Adamopoulos, 2008).

Consumers are being pushed to consume more functional meals these days, which has resulted in an increase in the food industry's development of such goods. In this context, animal fats are being substituted in the diet by vegetable oils because of their health benefits. Grape seed oil could be utilised as an antioxidant in food preservation or to protect cells from oxidative damage caused by free radicals due to its high content of antioxidant compounds such as polyphenols (Keast and Breslin, 2002). Grape seed oil is also high in polyunsaturated fatty acid linoleic acid and monounsaturated fatty acid oleic acid. Grape seed oil could be added into food systems to raise the nutritional value and improve the favourable impacts on human health because monounsaturated (MUFA) and polyunsaturated (PUFA)

fatty acids have been linked to the prevention of numerous illnesses in humans. Grape seed oil, on the other hand, is chemically unstable and prone to oxidative destruction when exposed to light, oxygen, and high temperatures, resulting in nutritional value loss and the formation of unpleasant off-flavors (Beecher et al., 2008).

As a result, grape seed oil must be protected during handling, storage, and transportation.

Microencapsulation is a technology that can be used to slow lipid oxidation and reduce volatility, hence enhancing oil and taste stability. This method entails creating a continuous thin covering around solid particles, liquid droplets, or gases that completely encloses them within the capsule wall. The goal of microencapsulation is to build a physical barrier between the active chemicals and the food matrix in order to protect them from harmful environmental conditions. Spray drying is a popular method for microencapsulation because it transforms liquids into powders that are easier to handle, store, and transport, as well as allowing for more uniform mixing in food compositions.

Gum Arabic, with its outstanding emulsifying capabilities, high solubility, and low viscosity, is one of the most widely utilised wall materials for spray drying microencapsulation of hydrophobic substances. Despite its desirable features as an encapsulating agent, gum Arabic is a costly chemical

whose production is subject to climatic and political upheaval, causing supply issues. As a result, numerous researchers have proposed replacing gum Arabic entirely or partially with different wall materials. Because of their inexpensive cost, excellent solubility, and low viscosity at high concentration, maltodextrins have been widely employed for food microencapsulation (Peleq and Noble 1999). However, due to its low affinity for hydrophobic components, this encapsulating agent's main disadvantage is its lack of emulsifying ability. As a result, combining gum Arabic with maltodextrin may provide a reasonable balance of cost and effectiveness.

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