


Effect of almond processing on nutritional value and health outcomes

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ABSTRACT

The way almonds are processed can significantly impact their nutritional properties. Techniques such as roasting, blanching, or grinding can alter the availability of nutrients, including vitamins, minerals, and antioxidants. For example, roasting can decrease certain antioxidant levels but increase the availability of others. Blanching often reduces some vitamins' content but improves the digestibility of nutrients. Grinding almonds into flour increases their surface area, potentially improving nutrient absorption and affecting the fat profile. Understanding these effects is essential for maximizing the nutritional benefits of almonds in dietary practices. This paper will examine the impact of almond processing on their nutritional value, including changes in nutrient bioavailability, antioxidant capacity, and other significant attributes. It will also address the global surge in almond production and the associated health benefits. By providing a comprehensive overview of how various processing methods influence the nutritional profile and health outcomes of almonds, this review aims to identify key areas for future research. This will help clarify how processing techniques can be optimized to maximize the nutritional benefits of almonds and support their role in a healthy diet.

Introduction

The almond (*Prunus dulcis*) is a tree in the Rosaceae family. It is native to the Middle East and South Asia but is now widely cultivated in many parts of the world. The almond fruit is a drupe consisting of an outer hull and a hard shell with the seed, or nut, inside. The seed is edible and is often used in cooking and baking. Almonds are rich in nutrients, including healthy fats, protein, vitamins, and minerals. They are also a good source of dietary fiber and have been linked to various health benefits, such as benefits for cardiovascular health and blood sugar control (Sabaté & Ang, 2009).

Almonds' widespread use in products like dairy substitutes and gluten-free flour, and their role as a source of protein in vegetarian diets, contribute to their high consumption. They have been shown to help lower the risk of cardiovascular disease and improve vascular health because they contain high amounts of health-promoting substances like vitamin E. Almonds also contain trace amounts of cyanogenic glycosides and are the least allergenic tree nut. With 3.12 billion pounds of kernel meat produced in California alone in 2020, production has expanded dramatically over the last 20 years, prompting a renewed focus on the value-adding of coproducts (such as hulls, shells, skins, and blanch

water) (Tomishima et al., 2022). The world production of almonds has been on the rise in recent years. According to USDA Foreign Agricultural Service (FAS) data, global almond production reached a record 2.3 million metric tons in 2020 (USDA, 2023). This represents an increase of 6 % from the previous year and a continuation of the upward trend seen in recent years. Overall, the world production of almonds is expected to grow in the coming years, driven by increasing demand for nutritious nuts from domestic and international markets.

Almond consumption has been shown to have several health benefits (Jenkins et al., 2006; Sabaté et al., 2010). One of the most popular methods of consuming almonds is eating them as a roasted, soaked, ground, etc. snack, either on their own or mixed with other nuts and dried fruits. Almonds can also be added to salads, yogurts, and cereals for added crunch and flavor. Another popular method of consuming almonds is using almond butter, which is made by grinding almonds into a paste. Almond milk, made by blending almonds with water and straining the mixture, is also a popular way to consume almonds. Almond milk is a dairy-free alternative to cow's milk. Almond oil is also a byproduct of almond consumption. Overall, there are numerous ways to incorporate almonds into a diet, and their benefits make them a great choice for a healthy snack or ingredient.

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