

Non-alcoholic Beverages and Lactic Acid Bacteria-Fermentable Cereal, Microorganisms

Bender Jocher*

Department of Plant Biology, Genomics of Legume Plants, Institute for Genome Research and Systems Biology, Center for Biotechnology, Bielefeld University, Germany

INTRODUCTION

Cereal grains are high in bioactive health-promoting compounds and thus an important food source. Consumption of whole grains and their products has been linked to a lower risk of developing chronic diseases such as cardiovascular disease, type 2 diabetes, obesity, and cancer, all of which are major causes of death and morbidity. Cereals have recently received a lot of attention as a raw material for nonalcoholic and functional beverage production, particularly for medical reasons such as lactose intolerance, cow's milk allergy, or as a lifestyle choice [1].

Plant beverages are gaining popularity, and fermented cereal- or pseudocereal-based beverages are increasingly being used as substitutes for fermented products made from cow milk. The purpose of this review was to describe the basic components of cereal- or pseudocereal-based beverages and to assess the feasibility of fermenting them with lactic acid bacteria (LAB) to produce products with live and active LAB cells and increased dietary value. The technology used to produce cereal- or pseudocereal-based milk substitutes primarily entails the extraction of selected plant material, and the resulting beverages differ in chemical composition and nutritional value due to the chemical diversity of the cereal and pseudocereal raw materials and the operations used to produce them. Beverages made from cereals or pseudocereals provide an excellent environment for the growth of LAB, and lactic acid fermentation not only results in desirable changes in the flavour of fermented beverages and the biological availability of nutrients, but it also contributes to the formation of functional compounds [2].

Cereal-based beverages are classified as non-fermented or fermented based on the processing steps involved. Non-fermented beverages can be used as stimulants like tea and coffee, refreshers like soft drinks and water, or nutritional drinks like dairy substitutes. Although cereal-based beverages are lacking in some basic components, such as the amino acid lysine, fermentation may be the most straightforward method of improving their nutritional values, sensory properties, and functional qualities. As part of the trend toward more health-conscious nutrition, there is a surge in interest in innovative nonalcoholic and functional cereal-based

beverages. The most important segments of functional foods are beverages with properties that improve gastrointestinal health, such as probiotics, prebiotics, and symbiotics [3].

Milk obtained from other mammals is an essential component of the human diet. Lactase, an enzyme produced by our bodies, facilitates nutrient absorption from milk by catalysing the hydrolysis of lactose, the primary milk carbohydrate. Lactase activity is highest in infants, but as the diet grows larger, the enzyme's activity gradually decreases. This is the most common cause of food intolerance associated with dairy consumption [4].

People with insufficient lactase activity are unable to consume cow milk or its products. People are increasingly adopting diets that exclude certain food products, such as milk and its products, e.g., hypoallergenic diets or vegan diets. Cow milk substitutes are gaining popularity as people transition to a plant-based diet and consumer awareness of food production, particularly protein sources, grows. Furthermore, the plant diet has been popular for several years, and people who want to follow the new nutrition trend and seek milk alternatives or new flavours turn to vegetable beverages, which are commonly referred to as milk-like beverages [5,6]. Plant beverages are becoming more popular, and researchers are working to improve the organoleptic properties, texture, and stability of these beverages, as well as their sustainability.

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*Correspondence to: Bender Jocher, Department of Plant Biology, Genomics of Legume Plants, Institute for Genome Research and Systems Biology, Bielefeld University, Germany, E-mail: bender.jocher@bug.edu

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