



Innovative Bioprocessing: Food-Grade Polyphosphate Synthesis from Deoiled Seeds and Bran for Sustainable Functional Foods

Poudel Aryal*

Department of Food Processing, University of Idaho, Moscow, USA

DESCRIPTION

Polyphosphates are essential compounds widely used in the food industry for their multifunctional properties, including moisture retention, texture improvement, and as emulsifiers. Traditionally, the production of polyphosphates involves chemical processes that may have environmental and health implications. However, recent advancements in biotechnology offer a more sustainable and environmentally friendly alternative through the extraction of polyphosphates from Deoiled seeds and bran. Deoiled seeds and bran, by-products of oil extraction processes, are rich in phosphorus compounds. These materials often go to waste, contributing to environmental concerns. Biotechnological processes provide an opportunity to utilize these by-products efficiently, transforming them into valuable food-grade polyphosphates.

Biotechnological production process

The biotechnological production of food-grade polyphosphate involves the use of microorganisms, such as bacteria or yeast, capable of accumulating polyphosphates within their cells. Through fermentation processes, these microorganisms assimilate phosphorus from Deoiled seeds and bran, converting it into polyphosphate. The resulting polyphosphate can then be extracted and purified for use in the food industry.

Environmental sustainability

Unlike traditional chemical methods, biotechnological processes are more environmentally sustainable. They reduce the dependence on synthetic chemicals and minimize the generation of hazardous by-products. Additionally, the use of Deoiled seeds and bran as a raw material promotes the circular economy by turning waste into a valuable resource.

Functional benefits of biotechnologically derived polyphosphates

The polyphosphates obtained through biotechnological processes exhibit similar functional properties as those produced through

traditional chemical methods. These include improved water retention, enhanced texture, and stabilization of food products. Moreover, biotechnologically derived polyphosphates may offer additional health benefits, as they are produced through natural processes and may contain fewer impurities.

Regulatory considerations and safety

As with any food ingredient, regulatory bodies play a critical role in ensuring the safety and compliance of biotechnologically derived polyphosphates. The production process must adhere to established standards, and thorough testing should be conducted to confirm the absence of any harmful substances. Communicating the safety aspects of these biotechnologically produced polyphosphates is essential for gaining regulatory approval and consumer acceptance.

Potential applications in the food industry

The versatility of food-grade polyphosphates makes them valuable in various food applications. From bakery products to processed meats, the inclusion of these polyphosphates can improve the overall quality and shelf life of food items. Furthermore, the clean and sustainable production process aligns with the growing consumer demand for environmentally friendly and ethically produced food ingredients.

Despite the potential benefits, challenges exist in scaling up the biotechnological production of polyphosphates. Issues such as optimizing fermentation conditions, increasing yield, and ensuring cost-effectiveness need to be addressed. Collaborative efforts between researchers, industry stakeholders, and policymakers are essential to overcome these challenges and establish a robust and economically viable biotechnological process for polyphosphate production. The biotechnological production of food-grade polyphosphate from deoiled seeds and bran represents a sustainable and innovative approach to meeting the food industry's demand for functional ingredients. By

Correspondence to: Poudel Aryal, Department of Food Processing, University of Idaho, Moscow, USA, E-mail: aryal67@gmail.edu

Received: 27-Nov-2023, Manuscript No. JFPT-23-24443; **Editor assigned:** 30-Nov-2023, PreQC No. JFPT-23-24443 (PQ); **Reviewed:** 14-Dec-2023, QC No. JFPT-23-24443; **Revised:** 21-Dec-2023, Manuscript No. JFPT-23-24322 (R); **Published:** 28-Dec-2023, DOI: 10.35248/2157-7110.23.14.1080

Citation: Aryal P (2023) Innovative Bioprocessing: Food-Grade Polyphosphate Synthesis from Deoiled Seeds and Bran for Sustainable Functional Foods. *J Food Process Technol.* 14:1080.

Copyright: © 2023 Aryal P. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

harnessing the potential of microorganisms and utilizing agricultural by-products, this method not only reduces environmental impact but also contributes to a more circular and resource-efficient food production system. As research

continues to refine the process and address challenges, biotechnologically derived polyphosphates have the potential to revolutionize the way we produce and perceive essential food additives.