Sourcing nutritionally adequate alternative proteins: Promotion of market diversity and consumer choice leadership

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Framework: The global nutrition, epidemiology and demographics shifts underscore the urgent need for sustainable food systems, especially innovative protein sources that preserve ecosystems and biodiversity [1]. Underutilized crops, edible insects, algae, and microorganisms offer sustainable alternative proteins, addressing dietary needs while reducing reliance on conventional sources amid population growth and environmental challenges [2]. Protein is an essential macronutrient required for growth, development, muscle strength gain in individuals, and musculoskeletal maintenance throughout life [3]. Animal-based proteins provide all essential amino acids (EAAs) and key micronutrients such as iron, zinc, and vitamin B12, which can be difficult to obtain from plant sources alone. This is because plant-based sources have lower bioavailability of these nutrients, along with other factors that affect their absorption and utilization by the body [4]. However, epidemiologic data demonstrate that replacing animal proteins with plant-based proteins is correlated with lower cardiovascular and diabetes risk, and metabolomics may shed light on their differential associations with cardiometabolic risk [5]. **Objectives and methodology:** This systematic review aimed to: (i) evaluate and compare alternative protein sources regarding their nutritional composition, health benefits, and sustainability, and (ii) disseminate current research to promote food market diversification and facilitate informed consumer decision-making on sustainable protein options. **Results and conclusions:** Significant advances in food systems, including large-scale development and purification of alternative protein sources, are critical to ensure sustainable protein production for future generations. Efficient production techniques, improved functionality, and strategic policy interventions are key to integrating novel protein commodities into mainstream markets [7]. Consumer acceptance remains a major challenge, requiring targeted education on the nutritional and environmental benefits of protein diversification. Rigorous allergenicity and safety assessments are also important to build confidence [8]. Further research, investment and regulatory frameworks are also demanded to ensure a sustainable, affordable and nutritionally adequate protein supply that supports both human and planetary health [9].

Palavras-chave: Sustainable food systems; Alternative proteins; Nutritionally adequate protein supply; Food market diversification; Consumer decision-making.

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