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Recent Advances in the Modification of Underutilized Pseudocereal Proteins for Improving Their Functionality: A Practical, Comprehensive and Up-To-Date Review

Nisar A. Mir[a,b], Basharat Yousuf[a,b], and Adil Gani[a]

[a]Department of Food Science and Technology, University of Kashmir, Jammu and Kashmir, India; [b]Department of Food Technology, School of Engineering & Technology, Islamic University of Science and Technology, Jammu & Kashmir, India

ABSTRACT

Pseudocereal proteins are attracting lot of attention due to the presence of high-quality essential amino acids. However, due to their limited functional profile, commercial use of these crucial protein sources is still a long way off which restricts their application in a number of food products. From a technological viewpoint, protein functional characteristics are very critical. Modification approaches alter the conformational characteristics of proteins and can impart desirable functional properties particularly required in different food systems. Knowledge about the functionality, structure and modification of pseudocereal proteins is very scarce. Herein, this review aims to provide an up-to-date information about the functionality and latest approaches used to alter the conformation which in turn can enhance the functionality of pseudocereal proteins thereby increasing their potential use in a number of food products. The research summarized in this review reveals that different modificational approaches like physical, chemical and enzymatic have subsequently altered the conformational characteristics followed by denaturation of different pseudocereal proteins which in turn have significantly improved their physicochemical, functional and nutritional characteristics of these proteins. Pseudocereal proteins having essential amino acid profile coupled with improved functional properties can be used in place of animal and cereal proteins in the future.

KEYWORDS

Pseudocereal; proteins; conformation; denaturation; modification; functionality

Introduction

In living systems, proteins are the most common organic molecules and are typically required in huge amounts since they are the basic units of the organism and have a significantly greater variety of structures and functions than any other class of macromolecules. The core carbon atom known as alpha (α), which is joined to an amino group (NH2), a carboxylic group (COOH), and a hydrogen atom, is a component of all amino acid chains that make up proteins. Pseudocereals are classified as dicotyledonous plants that are not grasses but yet yield fruits and seeds that are used to make bread and other staple meals. Grain amaranth (*Amaranth caudatus, Amaranth cruentus*, and *Amaranth hypochondriacus*; family Amaranthaceae), quinoa (*Chenopodium quinoa* sub sp. quinoa; Chenopodiaceae), and buckwheat (*Fagopyrum esculentum*; Polygonaceae) are a few popular examples of pseudocereals that are now known. They are more nutrient-dense than the majority of monocotyledonous grains, including wheat, rice, and barley. Additionally, they are known as pseudocereals because their seeds mimic true cereals in function and content.[1] Food quality is mostly assessed based on the food's nutritional and functional qualities, which are largely determined by the kind of proteins

CONTACT Nisar A. Mir nisarmir89@gmail.com Hazratbal, Srinagar-190006, Jammu and Kashmir, India
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