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Editorial

Persian Gum: A Novel Natural Hydrocolloid

Soleiman Abbasi *

Food Colloids and Rheology Lab., Department of Food Science and Technology, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran

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Over the past few decades, scientists have paid special attention to studying novel and natural hydrocolloids due to the growing demand for ready meals, public awareness on the importance of natural fibers in daily diets, and their wide range of application, especially in foods, pharmaceuticals and herbal medicine. Moreover, natural hydrocolloids are preferred to biotechnologic ones (*e.g.*, gellan, xanthan and curdlan) as they are usually non-toxic, natural, biodegradable, biocompatible and ecologically friendly. Persian gum (PG) is one of these natural hydrocolloids, which has been introduced and studied on mostly by the author and some other researchers during the past few years. The author attempted to name it Persian gum, representing its origin the Persia or Iran, as the competitor of the very well-known "gum Arabic", the exudate of acacia trees (*Acacia senegal* or *Acacia seyal*). Its botanical source, physicochemical, structural, rheological, functional properties, interaction with other macromolecules (proteins and polysaccharides), and possible applications in foodstuffs have been extensively reviewed (1–4).

Amygdalus scoparia Spach (Synonym: *Prunus scoparia* Spach) is one of the wild (mountain) almond species, which can be found along with other wild species mostly in semi-arid areas of the central Asia, Irano–Tourani and Zagrosi regions. It is appreciated mostly due to its role in the economy (the usage of its by-products in perfume, pharmaceutical and chemical industries), as a natural resource, as well as in soil erosion control. For those reasons, it is nowadays being widely used in breeding programs (to generate rootstocks that are adaptable to climate changes) and planting (seeds and seedlings) in mountains and deserts to control the rapidly happening desertification process in Iran (1).

These features make it very clear that *Amygdalus scoparia* Spach can be considered as a reliable and sustainable source for providing a natural exudate gum, PG, along other products (bitter almond, kernel oil, timber, and ornamentals). Iran, owing to its geographical and environmental situation, has traditionally been a great source for this product such that, at present, it annually exports over 400,000 kg of PG. It is predicted that this number will tremendously increase in a matter of a few years or so once the artificial population of seedlings is established (1, 3).

The growing demand in food and pharmaceutical industries for safe, low price, easily accessible and sustainable, biodegradable, biocompatible, ecologically friendly and renewable natural sources for stabilizers and emulsifiers has persuaded scientists to investigate the potential capabilities of existing natural gums and mucilages, as alternatives for the current ones, which are getting more and more expensive (*e.g.*, gum tragacanth), unsustainable (*e.g.* gum Arabic) due to the periodical crisis in the producing countries like Senegal, Sudan and Somalia, or with health concerns (*e.g.*, bio-based gums). To this end, PG is a relatively unknown natural hydrocolloid but with abundant production and countrywide distribution, so that it has been considered as a potential alternative, and its characteristics and applicability have been extensively studied (1).

PG, in its natural state, is used as herbal remedy (*e.g.*, as a poultice for swollen joints), an anti-parasite, teeth pain healer, appetizer, anti-cough agent, hair conditioner, and skin glazer in Iran and

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***Address for correspondence:** Soleiman Abbasi, Food Colloids and Rheology Lab., Department of Food Science and Technology, Faculty of Agriculture, Tarbiat Modares University, P.O. Box: 14115-336, Tehran, Iran . E-mail address: sabbasifood@modares.ac.ir

some other countries (1–4). Apart from these traditional applications, it has other potentials in stabilization of acidic milk-based drinks (5–8), flixweed seeds drink (9), orange peel essential oil nanoemulsions (10), partial replacer of gelatin in formulation of jelly or gummy candies (11), edible films (12), dairy products, emulsions, tomato ketchup, mayonnaise, salad dressings, milk and dark chocolate, bakeries, low-fat cheese, and many other applications (*e.g.*, in personal communications).

All in all, it is a competitively low cost, novel, and natural hydrocolloid, which can potentially be used as a desirable substitute for microbial or other natural but expensive plant hydrocolloids. However, its partial solubility (70 %w/w insoluble) is a major challenge, particularly when it is needed to be used in liquid or semi-liquid formulations (foods, pharmaceuticals, and cosmetics) or as an emulsifier for which fractionation (separation of the soluble and insoluble parts) is a must. Therefore, further investigation of its chemical characterization as well as the solubilisation of its insoluble fraction by various methods is needed (13–14). This could improve and expand its functionality. Furthermore, the preservative function of special fractions of PG, as a natural hydrocolloid, also needs to be investigated.

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