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REVIEW ARTICLE

Talbina as a functional food and a source of health-beneficial ingredients: a narrative review

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Abstract

During the past two decades, several researchers have claimed that traditional foods are healthier products and better sources of micronutrients. *Talbina* is a well-known traditional food in North Africa, Middle East and South East Asia. *Talbina* is made by adding 1-2 tablespoons of barley (100% wholegrain barley) to cup of water. Cook on low heat for15 minutes in a water bath. After that a cup of Laban (fermented milk) or milk is added. It can be sweetened with honey. This broth can be used as a stock for soups or stews or as a thickener. *Talbina* is a healthy food helps in depression and stress relief. It has high antioxidant activity as well as anti-inflammatory. Its consumption regularly proves to be an effective and safe strategy for treating different chronic diseases. It is a rich source of different essential nutrients and antimicrobials, both of which have been linked to a reduction in chronic disease. However, *Talbina* has not been well studied or defined by the scientific community. This review defines *Talbina* and discusses the various bioactive compounds in this food and their health benefits.

Keywords: Barley wholegrain; fermented milk; natural honey; functional food; nutraceutical ingredients.

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1 Introduction

Functional foods and nutraceuticals provide an opportunity to improve the human health, reduce health care costs and support economic development in rural communities. The phrase "Let food be the medicine and medicine be the food," coined by Hippocrates over 2500 years ago is receiving a lot of interest today as food scientists and consumers realize the many health benefits of certain foods. Research has proved a relationship between functional components of food, health and well-being. Thus, functional components of food can be effectively applied in the treatment and prevention of non-transmissible diseases [1-4]. In recent years, the demand for functional foods has increased due to the raised prevalence of chronic diseases and improved public awareness [5, 6]. Traditional foods are recognized as functional foods because of the presence of functional components such as body-healing chemicals, antioxidants, dietary fibers, and probiotics. However, it seems that role of traditional food as functional food in promoting good health goes beyond merely the provision of nutrients; there is much evidence to suggest that regular consumption of traditional food, specifically cereal-based, may have a role in the prevention of chronic diseases such as cardiovascular diseases, diabetes and colon cancer [7, 8]. Traditional foods are an important part of the culture, history, identity and heritage of a region or country and are key elements in dietary patterns [9–11]. *Talbina* is a well-known traditional food in North Africa (Tunisia, Algeria, Libya, Morocco…), Middle East (Bahrain, Cyprus, Egypt, Turkey…) and Southeast Asia (Malaysia, Indonesia, Thailand…) that has many nutritional benefits [12]. *Talbina* is a meal made from barley wholegrain adding fermented-milk and natural honey [13]. Current scientific evidence indicates that *Talbina*, play an important role in lowering the risk of chronic diseases, such as coronary heart disease, diabetes, and cancer, and also contribute to body weight management and gastrointestinal health [12–14]. Health benefits provided by *Talbina* are due to the presence of bioactive compounds such as carbohydrates, protein and fiber as well as vitamin E, some of the B vitamins, sodium, selenium, magnesium and Zinc. Barley is the key ingredient in *Talbina*. It is preferred not only for its nutritional importance but also for its nutraceutical properties. Consumption of diets high in barley whole grains has been highly recommended. Our ancestors depended on barley as a staple food more than we do now [13]. Studies have shown a reverse relationship between regular consumption of barley and the risk of developing certain non-infective diseases [15]. The other ingredient of *Talbina* is fermented milk. It possesses various nutritional and therapeutic properties. Lactic acid bacteria (LAB) play a major role in determining the positive health effects of fermented milks. Fermented milk is redefined as a probiotic carrier food [16]. Probiotics promote a healthy balance of gut bacteria and have been linked to a wide range of health benefits. These include benefits for weight loss, digestive health and immune function. Probiotics exert their benefits through several mechanisms; they prevent colonization, cellular adhesion and invasion by pathogenic organisms, they have direct antimicrobial activity and they modulate the host immune response [17, 18]. The last ingredient of *Talbina* is natural honey. Depending on its quality, honey can contribute to the

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health and nutritional status of humans [19–23]. In most countries there is limited information on the nutritional composition of such foods and therefore there is a need to investigate and promote this traditional food. However, *Talbina* has not been well studied or defined by the scientific community. In the present review, the composition of *Talbina* in terms of bioactive components and their health benefits has been reviewed.

2 *Talbina* as a functional food ingredient

Talbina is a meal made by mixing 2 spoons of barley wholegrain and a cup of water, cooked for 15 min low heat in a water bath, after that a cup of laban (fermented milk) and bee's honey (natural honey) are added (Fig. 1A). It consumes preferably warm, but it can also be consumed hot or cold. To bring crisp, you can add just before serving, according to your desires, dried fruit (almond, walnut, hazelnut, apricot, dates, figs ...) or fresh fruit (Fig. 1B). The energy, macronutrients, ash, moisture, and mineral content of *Talbina* were summarized in Table 1 [24].

These authors showed that *Talbina* contains a high amount of total carbohydrates and high levels of minerals (especially zinc and iron) and will be able to make good balanced amino acids composition required for human nutrition. Asma *et al.* [25] showed that *Talbina* could be a food product with high potential applications as a functional food. This study was carried out in an attempt to clarify the nutritional assessment of *Talbina* as a functional food in fortifying biscuits. Furthermore, this study was carried out on biscuits prepared by incorporating *Talbina*. The biscuits were evaluated for their physical, chemical, nutritional and sensory characteristics. In general, biscuits samples recorded high protein, fiber, ash and minerals contents as compared to that made from 100% wheat flour (control). Moreover, the biscuits recorded rather slight decrease in crude fat content. The data revealed that biscuits enriched with *Talbina* recorded the best sensory values, which including color, texture, taste, odor and overall acceptability.

Table 1: Nutritional value of *Talbina* h per serving[a] [24]

Item	Content
Energy	94 Kcal
Carbohydrates	21.6 g
Protein	1.2 g
Fat	0.2 g
Ash	0.6 g
Moisture	1.3 g
Sodium	3.1 mg
Magnesium	14.5 mg
Calcium	12.7 mg
Zinc	5.2 mg
Iron	0.34 mg

Note: Per serving per 25 g of dry ready to mix formula.

Figure 1: Different stages of preparation *Talbina* (A); After preparing *Talbina* , just before serving, adding dried fruit (pistachios (a), almond (b)…) or fresh fruit (dates (c), banana (d)...)

2.1 Form available in market

Talbina is usually available in powder form (Fig. 2 A). It can be prepared in two forms: a soup (Fig. 2B) or drink (Fig. 2C).

Figure 2: Form of *Talbina* available in market (A); *Talbina* soup (B); *Talbina* drink (C)

2.2 Barley wholegrain

Barley (Hordeum vulgare L.) is the fourth most important cereal crop plant that belongs to family Poaceae. Barley is an ancient cereal grain, has evolved from largely a food grain to a feed and malting grain upon domestication. Barley is staple food that provides essential nutrients to many populations of the world. Besides, there is a renewed interest throughout the world in barley food thanks to its nutritional value [26]. Recently, the interest in barley as a functional food has been revived because of the presence of constituents in barley that are known to prevent and to alleviate certain diseases [27–31]. Barley is an excellent source of both soluble dietary fiber such as beta-glucan and insoluble dietary fiber, the physiological benefits of which include improvements in gastrointestinal health, weight management and glucose tolerance, as well as a reduction in cardiovascular diseases, colorectal cancer, blood cholesterol and glucose level [32]. Traditionally, barley whole grains were consumed but most current foods are derived from refined fractions of barley crops. Consumption of processed or refined products may reduce the health benefits of food. In barley-based processed foods, the removed 40% of the grain (mainly the bran and the germ of the barley grain) contains the majority of the health beneficial components. These components, particularly polyphenols and dietary fiber, have been shown to reduce the risk of major chronic diseases [33]. Such bioactive components are therefore good candidates for ingredients of nutraceuticals and functional foods [34]. If the bran, germ and endosperm components are retained during the milling process, the resulting wholegrain will be classified as whole grains [35]. Whole grains contain all the essential parts and the same balance of nutrients that are found in the original grain seed. Compared to refined whole grain, the whole grains are nutritionally richer in dietary fiber, protein, antioxidants, dietary minerals and vitamins. Diet rich in wholegrain foods has been associated with decreased risk of cardiovascular disease, diabetes, obesity and certain cancers [36, 37]. In fact these are the reasons behind the consumption of barley wholegrain why should attract more and more attention.

Barley wholegrain contained 70.03 g/100g dry matter (DM); 11.37 g/100g DM; 3.82 g/100g DM and 3.60 g/100g DM carbohydrates, crude protein, fat and ash, respectively [38] (Table 2). The dietary fiber of barley is 32.20 g/100g DM total dietary fiber, 12.58 g/100g DM soluble, 19.62 g/100g DM insoluble, and 6.64 g/100g DM β-glucan. The β-glucan is a soluble dietary fiber component and that is present in the highest amounts in the endosperm of barley which has major biological effects of β-glucan include lowering blood cholesterol level, blood sugar and enhancing the immune system. As well, it can reduce plasma cholesterol levels and postprandial blood glucose levels [39–41]. So that it is recognized that the high viscosity of β-glucan can prevent the absorption of lipids or the reabsorption of bile acids and their metabolites. Thus, it brings about a reduction of plasma cholesterol level [42]. The β-glucan is so important to overall bowel health by supporting the growth of healthy bacteria in the gut and promoting regularity [43]. Ultimately, several studies were recommended to use barley wholegrain in the human diet compared to other wholegrain due to pharmaceutical and nutraceutical properties. Therefore, barley has the potential functional food on chronic diseases prevention for the global population [44].

2.3 Fermented milk (*Laban*)

Milk is an important source of nutrients, including macronutrients (as sugars, lipids and proteins), micronutrients and various vitamins and minerals [45–48]. There are some other minor constituents present in milk like enzymes, hormones and compounds (as alcohols, sulfides, diols and acrolein) that are formed via the disintegration degradation of macronutrients during milk processing [47, 49].

The role of fermented milk in human nutrition is well documented and the virtues of these products were known to man even during the ancient days of civilization. However, the scientific community gave impetus to these beliefs in 1910, when Eli Metchnikoff suggested that man should consume milk fermented with lactobacilli to prolong his life. He postulated the desirable bacteria in the Bulgarian milk that could help in suppressing the undesirable and disease-causing bacteria in the intestine of human beings [50, 51]. Recent research is showing that the bacteria and the products of the fermentation process

Table 2: Nutritional value of barley wholegrain (100g DM) [38]

Contents	Quantity
Dry Matter (DM)	88.82 g
Fat	3.82 g
Crude Protein (N x 6.25)	11.37 g
Carbohydrates	70.03 g
Ash	3.60 g
Total sugar	0,26 g
IDF[a]	19.62 g
SDF[b]	12.58 g
TDF[c]	32.20 g
β-glucan	6.64 g
SFA[d]	18.50 g
MUFA[e]	28.72 g
PUFA[f]	52.78 g
Fe	0.098 mg
Mg	49 mg
Ca	70 mg
Na	78 mg
K	480 mg
P	570 mg

Note: [a]Total Dietary fiber, [b]Insoluble Dietary fiber, [c]Soluble Dietary fiber, [d]Saturated Fatty Acids, [e]Monounsaturated Fatty Acids, [f]Polyunsaturated Fatty Acids.

participate in a variety of functions that are positive for health and wellness of all age groups [46–55].

Traditional fermented milk products are widely consumed in the entire world. These products are an important supplement to the local diet and provide vital elements for growth, good health and an appreciate flavour. Several of these traditional products were industrially manufactured using selected bacterial strains and a standardized process [56]. Laban is a fermented milk product traditionally prepared from cow's milk in some countries [57]. It is an accompanying drink at lunch, and also at other meals. Recently, *Laban* has been produced in pasteurized form by most dairy factories. Two main kinds of starters are used to manufacture *Laban*: artisanal starters consisting of an unknown number of undefined strains for the production of traditional *Laban* (TL) and industrial starters characterized by well-defined lactic acid bacteria (LAB) strains for the production of industrial *Laban* (IL). LAB are employed to produce fermented milk products, including yogurt, *Laban*, *dahi*, *kefir* and *koumiss* [58]. Among the LAB, *Lactococcus lactis* is the primary constituent of many industrial and artisanal starter cultures used for the manufacture of different varieties of fermented dairy products [59]. The yeasts could contribute to the traditional fermentation process of fermented milk products [60]. Traditional fermented milks are considered safe because of the low pH and the production of antimicrobial substances by fermenting organisms. However, some pathogens such as *Escherichia coli* 0157:H7, *Salmonella enteritidis* and *Staphylococcus aureus* have been reported to survive and grow in some traditional fermented milk [61, 62]. The dairy industry uses selected industrial cultures in order to obtain safety fermented milk and to provide the product with the desired characteristics that result from the metabolic activity and the technological properties of the strains during their growth in milk. This leads to a standard quality of the products and a high level of reproducibility of the process as it has been reported by Chammas *et al.* [63]. Nevertheless, consumers prefer traditional fermented milk since artisanal starters give these products more typical flavors [60]. As we are aware, some traditional technologies for the production of fermented milks and their properties will eventually be lost together with the associated microorganisms. It is therefore imperative to characterize traditional fermented products, including preservation and characterization of indigenous microbiota. Traditional process is described in Fig 3a: 5 L of raw milk was left spontaneously at 25 ± 2°C until coagulation, which may take up after ~18 h. During the gelation step, the product will be called "*rayeb*". By churning during 40 min, the "*rayeb*" is separated into aqueous fraction giving *Laban* (TL) and fatty fraction called "raw butter". Churning takes place in a leather bag called "*Checoua*" (Fig. 4). The latter is manufactured from a goat in one piece; the openings of the "*Checoua*" are subsequently tied up with a string to avoid leakage when filled. The churning is achieved by hanging the "*Checoua*" filled with "*rayeb*" to a wooden tripod or to a cottage roof and vigorously shaking it back and forth till the coalescence of the fat globules. Industrial process is indicated in Fig 3b: Industrial Laban (IL) samples were produced by adding mesophilic starter cultures (industrial starter cultures) of L. *lactis* subsp. *lactis*, L. *lactis* subsp. *diacetylactis* and L. *lactis* subsp cremoris (Rhodia, France) in pasteurized and standardized milk (15 g/L of fat), during 10 h at 27°C fermentation temperature [65].

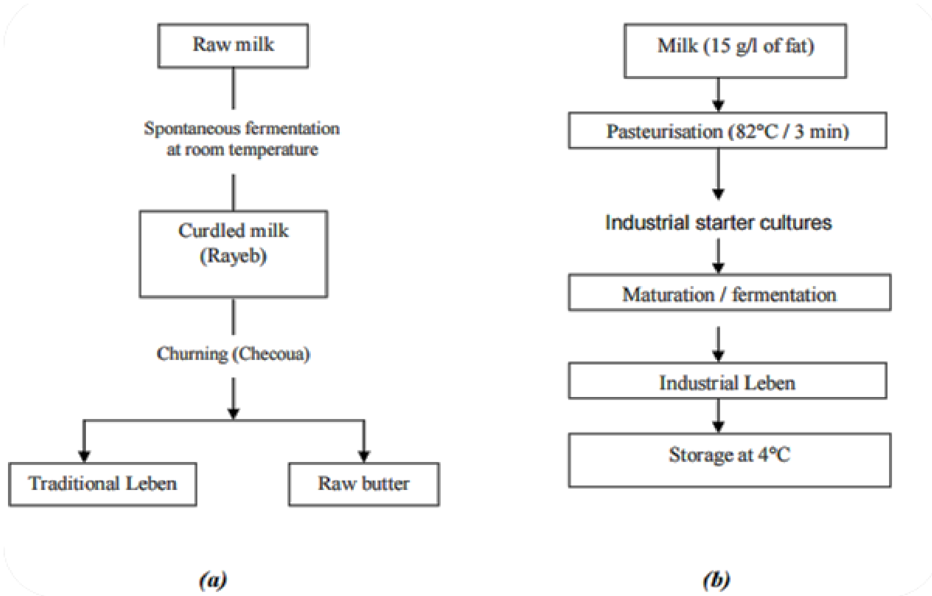

Figure 3: Schematic preparation of fermented milk in Tunisia. (a): traditional process; (b): industrial process [65]

Fermented milk plays an important role in the nutritional status of populations all over the world, as well as it may contribute to reduce hunger by adding nutritional value to food and increasing the bioavailability of nutrients [66].

Figure 4: Photo of the traditional churning process in Tunisia

Fermentation is a cost-effective way to enrich food with essential amino acids and vitamins that can help preventing malnutrition[67]. The fermented milk often includes LAB strains with probiotic properties. The FAO/WHO defines probiotics as live micro-organisms which confer health benefits on the host, when administered in adequate amounts [68]. The probiotics has benefits on humans' health including: protection against inflammatory bowel diseases and gastrointestinal infections. The probiotics can be used instead of antibiotics in the treatment of enteric infections and simultaneously reduces diarrhea which is caused by antibiotics. The probiotic cultures regulate human intestinal bacteria and inhibit harmful bacteria that can be present in the intestines [69]. They also support the body's immune system, modulation of allergic diseases and treatment of infections formed during pregnancy [70, 71]. These are examples of LAB in laban that have probiotic properties: *Lactobacillus acidophilus*, *Lactobacillus casei* and *Bifidobacterium bifidum* [63]. The Consumption of dairy products is the best way to provide the human body with probiotic bacterial strains [70, 71].

2.4 Natural honey

Honey is one of the nature's wonders mainly used in the world thanks to many positive effects. Firstly, the use of natural honey (NH) as a nutraceutical agent is associated with nutritional benefits and therapeutic promises [72]. NH is widely accepted by both ancient and modern (generations, traditions and civilizations) not only as food but also as medicine [73]. Honey is a sweet natural product produced by honey bees (*Apis mellifera*) that collect the nectar from flowers and convert it into a delicious food product that is known to be a more health beneficial nutritional option than plain sugar [74]. It is mainly composed of beneficial "bio-natural" sugars as fructose and glucose (65%) as well as water (18%), with minimal protein and lipid contents [75, 76]. The composition of NH is variable and depends on the floral source and external factors as season, environmental conditions and processing. NH composition includes also broad spectrum of minerals, such as, magnesium, potassium, calcium, iron, phosphate and zinc. Depending on the nature of the nectar and pollen, NH may also contain a broad spectrum of vitamins, such as, vitamins B1, B2, C, B6, B5 and B3 [77] (Table 3). Concerning polyphenols, the flavonoids are the most abundant and they are closely related to its biological functions [78, 75]. The identity and quality parameters of honey are analyzed by several authors in honey samples from different continents worldwide. The quality and authenticity of food perform an important role for both consumers and producers around the world. For honey, authenticity is related to the determinations of geographical and floral origins and the detection of unauthorized substances.

Table 3: Nutritional value of natural honey per 100 g [77]

Contents	Quantity
Carbohydrates	82.4 g
Sugars	82.12 g
Dietary fiber	0.2 g
Protein	0.3 g
Riboflavin (Vitamin B_2)	0.038 g
Niacin (Vitamin B_3)	1.121 mg
Pantothenic acid (Vitamin B_5)	0.068 mg
Vitamin B_6	0.024 mg
Folate (Vitamin B_9)	2 µg
Vitamin C	0.5 mg
Calcium	6 mg
Iron	0.42 mg
Magnesium	2 mg
Phosphorus	4 mg
Potassium	52 mg
Sodium	4 mg
Zinc	0.22 mg
Energy	300 Kcal (1270 Kj)

Table 4 shows a compilation of articles on the physico-chemical characteristics of honeys from *Apis mellifera* L. from different continents. As seen in this table, the honeys from different continents presented similar values and they are in accordance with the law for reducing sugars. European, Asian and American honeys presented values above those permitted by the Codex Alimentarius Committee on Sugars [79] for moisture content, but Asian honeys also had the lowest moisture content, with a value of 7.99 g 100 g^{-1}. Regarding free acidity, the honey of all continents had values below those allowed by the Codex Alimentarius Committee on Sugars [79].

Table 4: Compilation of articles on honeybees *Apis mellifera* L. [89]

Continents/Countries	Sugars (g 100 g^{-1})			Moisture (g 100 g^{-1})	Free acidity (meq kg^{-1})	Electrical conductivity (lS cm^{-1})	Color (Pfund scale)	5-Hydroxymethylfurfural (5-HMF) (mg kg^{-1}	Diastase activity (Göthe units)	References
	Fructose	Glucose	Sucrose							
European Spain	37.75–41.40	26.80–38.30	0.15–1.43	15.40–17.38	20.10–35.20	0.24–0.99	Light amber–dark amber	5.36–15.00	11.50–45.80	80
European/ Romania	39.30–49.20	29.25–33.08	0.60–2.20	15.30–17.50	–	0.17–0.80	Water white–light amber	3.30–23.40	8.70–19.10	81
European/Greece	–	–	–	10.47–20.47	22.31–41.54	0.81–1.75	L: 60.78–72.74 (dark honeys); a: –5.05 to–1.95;	–	–	82
African/Tunisia	35.78–37.84	25.93–35.98	0.47–1.86	17.27–19.80	7.11–27.20	0.39–0.89	L: 36.64–51.37 (dark honeys); a: –0.67 to 4.41;	12.07–27.43	–	83
Asian-European/ Turkey	29.80–44.49	25.93–35.98	2.85–8.44	7.99–17.40	3.86–30.42	–	L: 8.88–18.54 (dark honeys); a: 2.64–8.04;	0.00–4.12	–	84
Asian/Indian	43.30–65.50		0.40–8.80	17.20–21.60	–	0.33–0.94	L: 26.3–36.8 (dark honeys); a: 0.12–4.9;	–	–	85
American/Argentina	67.70–73.5		0.40–5.6	14.10–18.80	9.00–36.8	0.12–0.68	Extra white–dark amber	4.00–26.30	–	86
American/Uruguay	–		–	16.60–18.61	–	0.41–0.99	Extra light amber–amber	5.25–13.40	–	87
American/Brazil	33.30–38.60	21.00–26.35	0.12–0.50	17.10–20.50	23.60–45.50	–	–	2.80–7.40	10.55–12.40	88

The African and Asian continents had the lowest free acidity values compared to European and American continents. All continents described in Table 4 presented values above those permitted by the Codex Alimentarius Committee on Sugars [79] for electrical conductivity. The European, American and Asian continents presented darker honeys; however, the American continent also presented the lighter honeys. Regarding 5-HMF, the African and American continents showed the highest values, but even so, every continent showed 5-HMF values below the level stipulated by law. Concerning diastase activity, although few articles reported their values, the European continent had the highest values in the presence of this enzyme and the African continent presented honeys with values below those stipulated by law [89]. The honey may positively affect risk factors for cardiovascular diseases by inhibiting inflammation, improving endothelial function and the plasma lipid profile, as well by increasing low-density lipoprotein resistance to oxidation [90]. Honey displays an important anti-tumoral capacity, in which polyphenols are present and responsible for its complementary and overlapping mechanisms of chemo-preventive activity in multistage carcinogenesis, through inhibiting mutagenesis or inducing apoptosis [90]. The NH modulates the glycemic response positively by reducing blood glucose, serum fructosamine or glycosylated hemoglobin concentrations [90]. In addition, NH inhibits the growth of micro-organisms and fungi [91–93]. Khalil *et al.* [75] highlighted the relevance of honey as a healthy foodstuff and an antioxidant source for a better human health and nutrition.

3 Health benefits of *Talbina*

Talbina is considered as an ancient traditional food that could be so nutritious and beneficial in case of coughing and the stomach inflammation. Furthermore, the *Talbina* has the ability to expel toxins from the body and act as a good diuretic. It contains carbohydrates which make a complete meal for large, small and natural tonic. Oraif [94] showed that *Talbina* methanolic extract has toxicity activity against HT-29 colon cancer cell line. The use of *Talbina* in patients with type 2 diabetes with dyslipidemia reduces the severity of hard exudates and subfoveal lipid migration in clinically significant macular edema [95]. Ahmed [96] showed that supplementation of traditional *Talbina* containing barley with date palm syrup (*debis*) and date palm seeds can produce simple and healthy meal to provide a good source of daily dietary antioxidants and micronutrients. Date palm seeds as well as barley give high antioxidants components which protect cells from oxidative stress and help to reduce the risk of cancer and heart disease as well as natural anti-depressant. Moreover, increasing the antioxidant activity in the formulated *Talbina* may play a role for reducing power, radical scavenging activity and the lipid peroxidation inhibition.

Barakat *et al.* [97] showed that *Talbina* is a prebiotic source. These authors revealed the capability of *Talbina* to enhance the bacterial growth of highly beneficial bacteria as *Bifidobacterium longum*, *Lactobacillus acidophilus* and *Lactobacillus palantarum*. Prebiotics are generally defined as non-digestible polysaccharides and oligosaccharides which promote the growth of beneficial lactic acid bacteria in the colon and exert antagonism to *Salmonella sp.* or *Escherichia coli*, limiting their proliferation [98]. Prebiotics are being implicated in starter culture formulation, gut health maintenance, colitis prevention, cancer inhibition, immunopotentiation, cholesterol removal, reduction of cardiovascular disease and prevention of obesity and constipation[99]. Crittenden *et al.* [100] reported that barley grain provides essential vitamins and minerals to promote growth of probiotic and intestinal bacteria. Patel *et al.* [101] found that fecal *Bifidobacterium* was significantly increased by the addition of barley. Moreover, Ouwehand and Vesterlund [102] reported that addition of barley extract had a great positive effect on viability and enhanced the growth of *L. acidophilus* and *L. plantarum*. Lactic acid bacteria and Bifidobacteria are natural components of gastrointestinal microbiota. They produce antimicrobial substances which inhibit the growth of pathogenic bacteria in the intestine. Also, Mitsou *et al.* [103] showed that the daily intake of a cake containing barley β-glucan is well-tolerated and demonstrated significant bifidogenic properties in older healthy volunteers consuming their usual diets.

Talbina contains some LAB strains present in fermented milk. These have been used as probiotic due to their resistance to host gastrointestinal conditions, adhesion to host intestinal epithelium and prevention of the growth or invasion of pathogenic bacteria into the animal intestine [104]. The most important LAB species are of the genera *Lactobacillus* and *Bifidobacterium*, which are involved in food microbiology and human nutrition [105]. Multiple reports have described the health benefits of probiotic bacteria on gastrointestinal infections as a kind of improvement in lactose metabolism, reduction in serum cholesterol, immune system stimulation, antimutagenic properties, anticarcinogenic properties, anti-diarrheal properties, improvement in inflammatory bowel disease and suppression of Helicobacter pylori infection in case of the addition of selected strains to food products [106, 107]. Many different species and strains of LAB have been tested for the removal of aflatoxins and other mycotoxins from aqueous solution and food model. It has been shown earlier that LAB detoxify aflatoxin B1, which is the most potent known human carcinogen that has binding effects with other fungal toxins such as zearalenone, trichothecenes and fumonisins. Also, they have been observed in chemical analytical investigations [108-110]. LAB provides a high preservative effect especially at low temperature <6°C and causes longer shelf life to the product over 21 days. Consequently, it is obvious that the potential of LAB can inhibit the growth of common food spoiling fungi and open up new perspectives for the bio-preservation of food products. *Talbina* is a nutritious food that could reduce depression, relieve stress, and enhance mood among the elderly. *Talbina* may potentially be safely used as a sedative drug because the content of neurotransmitters is increased as a result of daily oral administration of *Talbina*, this effect may be via the presence of peptide and cyclopeptide alkaloids. *Talbina* gives rest to the heart of the patient and makes it active and relieves some of his sorrow and grief. The high carbohydrate composition, zinc content and high tryptophan: branch chain amino acids (trp:BCAA) ratio may be the reasons underlying these effects. Researchers in Malaysia conducted a 7-week cross over designed, randomized clinical trial to determine the effect of *Talbina* on mood and depression in elderly people. They have found a statistically significant decrease in depression, stress, and mood disturbances scores among the group given by *Talbina* compared with the controls [24]. Ingestion of functional foods as the *Talbina* may provide also a mental health benefit to elderly people [111]. These authors showed that chronic administration of *Talbina* caused a significant increase in dopamine (DA), gamm-aminobutyric acid (GABA) and serotonin (5-HT) content in different brain areas at different time intervals. The increase observed may be caused thanks to the important role of GABA that inhibits the release of these neurotransmitters. In addition, Bawazir [111] showed that *Talbina* elevated the plasma levels of testosterone, increased active spermatogenesis with a significant rise of number of mature sperms. That's why the *Talbina* is considered as an effective and beneficial for the male reproductive activity.

4 Conclusions

In fact, it is very obvious that *Talbina* is not only a functional and beneficial food that can be easily digested but also it could nourish and give the body a significant amount of its needs because it is a good source of basic macronutrients. As well there are nutraceutical effects of *Talbina* that might be attributed contributed by some components as the barley whole grain, natural honey and fermented milk. For all these reasons *Talbina* remains one of the best traditional foods for its nutritional benefits. However, there is little scientific evidence regarding the use of *Talbina* in reducing many diseases. So that, it has not been well studied or defined by the scientific community. In this way, we are encouraging scientists to work on this traditional food.

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