The Pharma Innovation Journal 2021; 10(5): 158-162

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2021; 10(5): 158-162

www.thepharmajournal.com
Received: 02-03-2021
Accepted: 10-04-2021

Sangeeta Rotela
Lovely Faculty of Technology and Sciences, Lovely Professional University, Phagwara, Punjab, India

Shivdutt Borkar
Lovely Faculty of Technology and Sciences, Lovely Professional University, Phagwara, Punjab, India

Dr. Anjan Borah
Lovely Faculty of Technology and Sciences, Lovely Professional University, Phagwara, Punjab, India

Corresponding Author:
Dr. Anjan Borah
Lovely Faculty of Technology and Sciences, Lovely Professional University, Phagwara, Punjab, India

Health benefits of millets and their significance as functional food: A review

Sangeeta Rotela, Shivdutt Borkar and Dr. Anjan Borah

DOI: https://doi.org/10.22271/tpi.2021.v10.i5c.6192

Abstract
Functional foods are gaining popularity among group of people and millets have been considered as potential candidate for the same, Millets are reported to be a major source of nutrients because of its antioxidant, anti-aging, antimicrobial, and anti-carcinogenic properties and some essential vitamins i.e., beta carotene (yellow pearl millets), niacin, riboflavin, thiamine and minerals (Ca, Zn, Mg, Fe, and Cu). Millets are found to have numerous health benefits and effective against Celiac Disease, *Diabetes mellitus*, cardio vascular disease (CVD), alimentary tract disorder, Malnutrition and many more. Millets are still main food for millions of poor population in Africa and Asia. Globally millet is not currently listed as one of the most important foods in North American and European food baskets, but highlights its value as an ingredient in multigrain and gluten-free grain products. In this review significance of millets and their role in disease management has been discussed in detail.

Keywords: Millets, functional food, disease, health benefits

Introduction
Millet is a staple food for millennia worldwide, has a mild growing season and is well adapted to harsh and relatively dry climates (Habieremy *et al*., 2016) [16] Challenges such as climate change, water scarcity, rising global populations, rising food prices and other socio-economic impacts pose a major threat to agriculture and food security around the world, especially to poor people living in poor and arid regions. (Saleh *et al*., 2013) [27] Distinctive grain texture and hardened seed coat of millet enhances their keeping quality, but also makes them harder to process and cook. Lack of adequate primary processing technologies to make ready-to-use or ready-to-cook (RTC) products, and tertiary processing to prepare value-added products, as well as secondary products for major limiting factors diverse food consumption and improved economic conditions (Malleshi, 2014) [23] Drought tolerant crops, such as sorghum and millet, work well against climate change. According to a review of various climate models, in terms of yield, the lawn is more resilient to climate change than millet and both are more resilient than maize. Dry, hot weather in eight ESA countries can reduce sorbet yields by up to 5% and millet yields by up to 15% (Adhikari *et al*., 2015) [1] These crops are high in nutrients and are considered weak crops (Taylor & Dudu, 2015) [31] in which these nutrient and nutrient benefits are not used adequately. Pearl millet and sorbates contain a high percentage of nutrients *viz*. protein, fatty acids, vitamins and bioactive compounds *viz*. hydroxybenzoic and hydroxynamic acid derivatives (Gong *et al*., 2018; Girard and Avika, 2018) [12] In India, rising revenues, changing consumer preferences and reduced prices for rice and wheat have reduced the demand for sorbet and millet as staple food crops, and now half of the production using millets as an alternative to raw materials such as poultry feed and wine (Bhagwat *et al*., 2013) [4].
The most important thing for them is that these plants are small-grained grasses grown in difficult production areas especially at risk of drought. Millet is not currently listed as one of the most important foods in North American and European food baskets, but highlights its value as an ingredient in multigrain and gluten-free grain products. However, in many parts of Africa and Asia, sorghum is a staple in a variety of foods and beverages, such as breads (boiled or unleavened), oatmeal and whole grain snacks, especially in low-nutrient areas (Chandrasekhar *et al*., 2010) [9].
While cereals, oats, amaranth, buckwheat, and quinoa have now been approved as a precautionary measure against people with celiac disease, they have never been seen that way.

Typical millet protein is having great amount of essential amino acids particular the sulfur amino acids *viz.* cysteine and methionine. There is an effect of the processing millet by milling or another method to eliminating the germ and bran layers that are high in phytochemicals and fiber that is caused remarkable loss. Millet are "energy house of nutrients" known for excellent source of retinol (Vit A) especially high in yellow pearl millets, and micronutrients such as Fe, Zn and Cu. Millets are rich in cystine, methionine and other essential amino acids that is good for human health. They are also gluten free, high in fiber, protein content than other cereals. Thus this review is focused on the significant role of millets grain as functional food for health eating.

Health benefits of millet

Millet is superior to rice and wheat in terms of their mineral composition. Each millet contains more fiber than rice and wheat. Finger millet contains thirty times more calcium than rice, while the rest of the millet contains at least twice as much calcium as rice. Each millet exceptionally high for wheat and rice and hence it is the solution to the malnutrition that affects the majority of the Indian population. These are rich in B-complex vitamins and millet is rich in whole grains and is also rich in protein, minerals and lecithin. And those people are allergic, millet is the least aggressive of all grains.

Additionally, for their agricultural benefits, millets are preferred over staple rice and wheat. White rice breaks down to glucose very fast which in turn raise the blood sugar level, while the millets slowly break down because of the less glycemic index value range that of from 54 to 68 for millets are include foxtail millet, little millet, finger millet, and pearl millets and also reported that sorghum GI is recorded 70. Millets contain 65% carbohydrates, most of which are in the form of non-starch polysaccharides and dietary fiber, which help prevent constipation, lower blood cholesterol and lower glucose into the bloodstream. These include valuable vitamins such as riboflavin, thiamine niacin and folic acid. Millet is high in fatty acids along with some minerals compared to staple grains, such as wheat and rice. As part of the amylopectin and amylose content, there is variation in the high constitution of carbohydrate, which ranges from 72-84% and 16-28%, respectively.

However, Millet is more than enough in terms of nutrition which can make an interesting alternative to the more usual cereal grains because they are high in essential nutrients. The food ranking system has qualified it as a great source of few nutrients i.e., manganese, phosphorus, magnesium.

Millet defensive to celiac disease

There is overall developing demand for novel, tasty, and healthy foods, with raising a number of people who are suffering from celiac disease, has permitted new market containing of cereal based products which is made from millet grains other than wheat and rye. In this competitive market, sorghum, oats and millet have attained a certain position (Angioloni and Collar, 2012) [3] Celiac disease is a common hereditary disease which is genetically lead to people suffer a reaction with gluten proteins such as glutenin and gliadin that are found in wheat and other crops. It is caused through malfunctioning of the immune system gluten proteins and can lead to severe abdominal pain. For those who suffer from its disease in the form of gluten-free diet, millet may be a healthy food. Millet-based products are unable to modify the amount of anti-transglutamine antibody after prolonged use. (Carolina *et al*., 2007) [7].

In the past decades, this was referred as a rare disorder, mainly pretending youngster of European region. Currently, research studies have examined that celiac disease is one of the most common life-lasting disorders affecting human beings in numerous zone of the globe. (Catassi and Fasano, 2008) [10] Replacing of wheat, barley, and rye- based foods, with gluten- free grains, such as rice, corn, sorghum, millet, amaranth, buckwheat, quinoa, wild rice, and oats must consumed. (Thompson, 2009) [32]

However, this review make focus on gluten free diet which is possible if those people are ailing with celiac disease that they can add millet-based-food, and gluten free, whole grain other cereals.

Millet against cardiovascular disease

Being high sources of Mg mineral, minor millets can help in lower down BP and threats of heart attacks particularly in atherosclerosis. Also, presence of K mineral in millets that can be helped in keep blood pressure down and help to lowering cardiovascular problem. Plant lignin in the millet which is having capability to changing into animal lignans by helping of presence of microbiome in the digestive system and has been fight with certain types of cancer and heart disease. Millets are high in fiber which are plays a main role in reduce cholesterol and remove out LDL (low density lipoprotein) to the system and enhancing the good type cholesterol effects HDL (high density lipoprotein). In relation, lignin and phytochemicals in pearl millet which is act as a strong antioxidant so that it can be prevented heart related issue. Because of this, pearl millet is referred as good food for heart wellbeing. The proso millets and finger millet have shown that reduction of remarkably the mass of serum free fatty acids. According to (Lee *et al*. (2010) [23] millets do play a significant role in reduction of cardiovascular disease, serum triglycerides, LDL cholesterol, and also exhibition of lipid peroxidation.

Millet against diabetes mellitus

Diabetes is a long-term metabolic disease which identify by hyperglycemia (high blood sugar level) related with conversion of protein, lipid and carbohydrates metabolism. It is referred as one of the commonest endocrine gland disorder which is caused insufficiency of insulin hormone production. In addition, though the chemical synthetic inhibitors of the pancreatic amylase and alpha-glucosidase have been played a important part in the healing of postprandial hyperglycemia, and also natural interdictor are possibly prudent.

Although, presence of the significant levels of magnesium in millets which is helped to regulate of insulin and glucose receptors in the body and then prohibiting diabetes. Finger millet-based foods have been conveyed to having low glycemic index because of rich in fiber and also alpha amylase prohibition qualities that is studied to reduction of polymeric carbohydrates digestion and absorption (Kumari and Sumathi, 2002) [22]

Millet against alimentary tract disorder and malnutrition

The presence of high fiber in millets can be beneficial to help in healing disorders such as constipation, excess gas, bloating, and cramping. Digestive system fixing can rise maintenance nutrients and possibly lowering more severe gastrointestinal situations such as gastric ulcers or colon cancer. Celiac disease is referred to as an immune-mediated enteropathic

disease that is often stimulated by the intake of gluten protein in a sensitive person (Catassi and Fasano, 2008) [10] Finger millet is high in a combination of soluble and insoluble fiber which of soluble and insoluble fiber which resist breakdown at the time of digestion process and help to heal alimentary tract disorder, heart disease, colon cancer (Anderson *et al*., 2009) [2] The soluble fibers which are helped in smooth and calming a swelled digestive tract. Additionally, to the fibers and the polyphenols can also be prevented lower down peptic swelling and eliminating anti-ulcerative traits. (Chethan and Malleshi, 2007) [6]

However, Gluten-free grains addition in diet to those that follow a rice, corn, sorbet, millet, amaranth, quinoa, wild rice, gluten-free diet, wheat, barley, and gluten-containing rye-based foods (Thompson, 2009) [33] are possible. Many people suffer from protein malnutrition.

Millet with anti-oxidant and anti-aging properties

There are many common diseases associated with diabetes, heart disease, diabetes, cognition disease, some cancers in humans and oxidation of biological molecules by nitrogen and oxygen reactive species. Many phytochemicals act as antioxidants to protect against oxidative destruction and maintain proper physical stability. For a long time now, food plant polyphenols have been widely focused on nutritionists, health professionals and consumers for their health benefits such as reducing the risk of cancer plants, neuro-degenerative and cardiovascular diseases, aging, many infections and diabetes (Kaur and Kapoor, 2001; Scalbert *et al*., 2005; Tsao, 2010) [21] Millets are reported to have numerous bioactive compounds responsible for providing wide range of health benefits. In addition, kodo millet, small millet, finger millet, sorghum, fox millet and white varieties of these varieties such as Free Radical Demolition Off (DPPH) 2,2-dip electron are cultivated in India. -L-Picrilhydrozyle using paramagnetic resonance (EPR) (Hegde and Chandra, 2005) [19] In addition, a strong radical-scavenging molecule was found in finger millet extracts compared to rice, wheat and other millet species (Dykes and Rooney, 2006) [11].

However, the 55% finger millet diet can enhance antioxidant enzymes activity that is catalase, glutathione reductase, glutathione peroxidase, they play protective character (Hegde *et al*., 2005) [16] And this can also be stop cross-linked of the collagen. There by which is decline aging by decreasing rigidness of elasticity in the skin, periodontal ligament, tendon, and fetal tissue. Therefore, antioxidants and plant-based phytochemicals are two especially nutraceutical constituents which have substantial anti-carcinogenic properties which take action as destroyer for singlet oxygen species and free radicals. (Shahidi *et al*., 1992) [30] However, this review has been illustrated that millet can promise for reduction of oxidative stress by acting as antioxidant scavengers in the body.

Millet with anti-cancerous properties

It is rich in antioxidants including phenolic compounds and may also have anticancer properties. (Sripriya *et al*. 1996) [27] showed that sorbet and pearl millet had a phenolic content of 43.1mg and 51.4 / 100g DW, respectively. Phenol in pearl millet cereal was reported to be 608.1mg / 100g and pearl millet flour was reported to be 761mg / 100g. Phenolic compounds have been specifically flavonoids obtained to prevent tumor growth. (Huang and Ferraro 1992) [17] Sorghum with anti-cancer property has been well reported. *In vitro* and *In vivo* studies have been reported that intake of sorghum is leading positive effect on cancer. The tannins and polyphenol have been found in sorghum containing anti-carcinogenic and anti-mutagenic properties (Grimmer *et al*., 1992) [14] and this may take action against human melanoma cells and also having positive melanoma properties. (Gomez-Cordovez *et al*., 2001) Parbhoo *et al*., 1995) [15] Millets grain is well known for high level of tannins, phenolic compounds and phytate. All of these nutrients reduce the risk of breast and stomach cancer in animals (Graf and Eaton, 1990) [13] The presence of fiber and phenolic compounds in sorghum and millet species has been reported to be more likely to cause esophageal cancer than those who eat wheat, rice or corn. (Van Rensberg, 1981) [36] Thus it was found that the fiber in millet is currently the best and simplest for breast cancer prevention in women. They can reduce the risk of breast cancer by more than 50% by consuming more than thirty grams of fiber all days.

Millet based functional food

Functional foods are commonly used for health-promoting foods and plant foods to prevent diseases such as diabetes, cancer, Parkinson's disease, and cataracts due to the effect of bioactive phytochemicals. Promote health. The term nutraceuticals (such as pharmaceuticals) used to refer to bioactive compounds such as vitamins, minerals, and essential fatty acids that have a protective effect against degenerative diseases. Epidemiological studies indicate that people with a millet-based diet are less likely to suffer from degenerative diseases such as heart disease, diabetes, and high blood pressure (Roberfroid, M.B. 1999) [26]

Millets have attracted attention for their potential role as functional foods due to health promotion phytochemicals. Millet is safe for people with gluten allergies and celiac disease. They are non-acidic and non-allergenic and therefore easy to digest (Saleh *et al*., 2013) [28] Millet is an excellent source of nutrition for people suffering from malnutrition. To get effective health benefits of both millet and low-fat dairy based products, it is recommended to have breakfast by platting a balmy dish of millets, low-fat milk along with seed or nuts, dried fruits, respectively. Millets are reported to have a number of essential amino acids (valine, methionine, and tryptophan, cysteine) and high protein (7–9%), rarely found in a vegetarian diet. In addition millets are high in calcium, phosphorus, potassium and minerals such as iron, magnesium and vitamins, thiamine, niacin and riboflavin. Pearl millet is a drought resistant and short growing seasonal crop when compared to another major cereal. Due to it contains carbohydrate, dietary fiber, protein with essential amino acids, minerals, vitamin and antioxidants need for human being health are received as nutraceutical and functional food. (Charalampopoulos *et al*., 2002) [5]

In particular high amylose and high-molecular weight prolamins varieties produced refreshing GF (gluten-free) pasta with low cooking losses and low viscosity scores. On the other hand, the millet sample with the lowest amylose and prolamine content had the lowest quality pasta yield (Cordelino *et al*., 2019) [7] These alleged observations suggest that interacting with the protein in the proso millet during the pasta preparation process improves cooking quality, which is better than the latest GF pasta currently available on the market. Noodles are one of the most preferred foods of all ages with a long shelf life and good commercial value. Bernard Millet has a low carbohydrate content (58.56%) with

25.88% digestibility. This health benefit of millet is used to develop plain flour, lentils and vegetable noodles respectively to combine different levels of plain flour, lentils and bingle gram flour (Surekha *et al*., 2013) [29] Made by making low glycemic index noodles.

Kodo Ko Jawar is the most common fermented alcoholic beverage made from dried millet seeds in the Darjeeling hills and eastern Himalayas in Sikkim, India. Chang is a popular finger millet drink in the Ladakh region of India. Kuz is another fermented drink made with pearl or finger millet flour and rice, eaten by ethnic groups in Tamil Nadu (Ilango and Antony, 2014) [20] Fura is a traditional black dough ball made mainly from sorghum or sorghum which is very common in Northern Nigeria. It is eaten with 'nono' (local yogurt) or dipped in water before eating in the form of porridge. Fura has a limited shelf life of 3-4 days in the refrigerator (5 ºC), 1-2 days at room temperature (25 ºC) and 18 h at 35 ºC being a single derived product is limited to essential amino acid lysine. The inclusion of soy as a basic ingredient in the production of 'fodder' by extrusion can improve protein content and performance. Interest in the soy diet has increased with consumer awareness of its health benefits, especially with soy-related ingredients used as one of the major sources of protein-rich supplements (United Soybean Board, 2006; Yeu *et al*., 2008) [37] The seed coat often incorporates black color, unwanted texture and the smell of food markers on food products and these substances greatly hinder their acceptance by unusual grain buyers. Other health benefits associated with a common breast diet, such as hypo-cholesterolemic, hypoglycemic, and anti-ulcerative properties indicate the extent of its use by a breast consumer that can be reused.

Therefore, providing cereals such as rice, wheat or cereals suitable for cooking will improve their acceptance and access to the sorghum method used for this. The reduction of symptoms reduces their content and thus improves the history of nutrient availability. However, there are no reports of duplicate working properties compared to other grains. The purpose of this study was to examine antioxidant activity, antihypertensive activity and functional properties of quinoa and amaranth, which are non-allergenic compared to other grains.

Conclusion

Millets are rich in minerals like Ca, Mg and K and reported to have numerous health benefits such as maintaining blood sugar level, blood pressure and cholesterol levels and they are easy to digest due to high fiber and it contain high lecithin which is great for building up the nervous system. Millets are gluten free and can be great choice for people who have for celiac disease or follow gluten free diet. Regular consumption of millets can give a healthy life. Production of functional food by fortification or supplementation of the millet is a successful method that can be utilized to get rid of nutrients deficiencies. Since India is the world leader in millet production maximum focus should be given to develop functional food by fortification or supplementation.

References

1. Adhikari U, Nejadhashemi AP, Woznicki SA. Climate change and eastern Africa: a review of impact on major crops. Food and Energy Sec 2015;4(2):110-132.
2. Anderson JW, Baird P, Davis RH, Ferreri SJr, Knudtson M, Koraym A *et al*. Health benefits of dietary fiber. *Nutr. Rev*. 2009;67:188-205.
3. Angioloni A, Collar C. Promoting dough viscoelastic structure in composite cereal matrices by high hydrostatic pressure. J Food Eng 2012;111:598-605.
4. Bhagavatula S, Parthasarathy Rao P, Basavaraj G, Nagaraj N. Sorghum and Millet Economies in Asia – Facts, Trends and Outlook. International Crops Research Institute for the Semi-Arid Tropics, Andhra Pradesh, India. Patancheru 2013.
5. Charalampopoulos D, Wang R, Pandiella SS, Webb C. Application of cereal and cereal components in functional food: a review. Internat. J. Food Microbiol 2002;79:131-141.
6. Chethan S, Malleshi NG. Finger millet polyphenols: optimization of extraction and the effect of pH on their stability. Food Chemistry 2007;105:862-870.
7. Carolina C, Luigi M, Nicola C, Cristina B, Luigi DG, Domenica RM *et al*. Celiac disease: *In vitro* and *in vivo* safety and palatability of wheat-free sorghum food products. Clinical Nutrition 2007;26:799-805.
8. Cordelino I, Tyl C, Inamdar L, Vickers Z, Marti A, Ismail B. Cooking quality, digestibility, and sensory properties of proso millet pasta as impacted by amylose content and prolamin profile. LWT – Food Science and Technology, 2019;99:1-7.
9. Chandrasekara A, Shahidi F. Content of insoluble bound phenolics in millets and their contribution to antioxidant capacity. J Agric Food Chem 2010;58:6706-14.
10. Catassi C, Fasano A. Celiac disease. In: Gallagher E, editor. Gluten-free cereal products and beverages. Burlington, MA: Elsevier. 2008, 1-27.
11. Dykes L, Rooney LW. Sorghum and millet phenols and antioxidants. J Cereal Sci 2006;44:236-51. Edge MS, Jones JM, Marquart
12. Gong L, Cao W, Chi H, Wang J, Zhang H, Liu J, Sun B, Whole cereal grains and potential health effects: involvement of the gut microbiota. Food Res. Int. 2018;103:84-102.
13. Hassan AB, Graf E, Eaton JW. Antioxidant functions of phytic acid. Free Radical Biology and Medicine 1990;8(1):61-79.
14. Grimmer HR, Parbhoo V, McGrath RM. Antimutagenicity of polyphenol-rich fractions from Sorghum bicolor grain. Journal of the Science of Food and Agriculture 1992;59:251-256.
15. Gomez-Cordoves C, Bartolome B, Vieira W, Virador VM. Effects of wine phenolics and sorghum tannins on tyrosinase activity and growth of melanoma cells. Journal of Agricultural and Food Chemistry 2001;49:1620-1624.
16. Hegde PS, Rajasekaran NS, Chandra TS. Effects of the antioxidant properties of millet species on oxidative stress and glycemic status in alloxan-induced rats. *Nutr. Res*. 2005;25:1109-1120.
17. Huang MT, Ferraro T. Phenolics compounds in food and cancer prevention. In: Phenolic Compounds in Food and Their Effects on Health II, ACS Symposium Series 507, 8-34.
18. Habiyaremye C, Matanguihan JB, D'Alpoim Guedes J, Ganjyal GM, Whiteman MR, Kidwell KK, *et al*. Proso millet (Panicum miliaceum L.) and its 2016.
19. Hegde PS, Chandra TS. ESR spectroscopic study reveals higher free radical quenching potential in kodo millet (Paspalum scrobiculatum) compared to other millets. Food Chemistry 2005;92:177-182.

20. Ilango S, Antony U. Assessment of the microbiological quality of *koozh*, a fermented millet beverage. African Journal of Microbiological Research, 2014;8(3):308-312, DOI: 10.5897/AJMR2013.6482.
21. Kaur C, Kapoor HC. Antioxidants in fruits and vegetables-The millennium's health. Int. J Food Sci. Technol. 2001;36:703-725.
22. Kumari PL, Sumathi S. Effect of consumption of finger millet onhyperglycemia in non-insulin dependent diabetes mellitus (NIDDM) subjects. Plant Foods Hum Nutr 2002;57:205-13.
23. Lee SH, Chung I-M, Cha Y-S, Parka Y. Millet consumption decreased serum concentration of triglyceride and C-reactive protein but not oxidative status in hyperlipidemic rats. Nutr Res 2010;30:290-6.
24. Malleshi NG. Post-harvest processing of millets for alue addition 2014. http://isites.harvard.edu/fs/docs/icb.topic868074., cited on 21.07.2014.
25. Manach C, Mazur A, Scalbert A. Polyphenols and prevention of cardiovascular diseases. Curr. Opin. Lipidol. 2005;16:77-84.
26. Roberfroid MB. What is beneficial for health? The concept of functional food. Food Chem. Toxicol 1999;37:1039- 1041.
27. Sripriya G, Usha, Antony, Chandra TS. Changes in carbohydrate, free amino acids, organic acids, phytate and HCL extractability of minerals during germination and fermentation of finger millet. Food Chem 1996;58(4):345-350.
28. Saleh ASM, Zhang Q, Chen J, Shen Q. Millet Grains: Nutritional Quality, Processing, and Potential Health Benefits. Comprehensive Reviews in Food Science and Food Safety 2013;12:281-295.
29. Surekha N, Rohini Devi, Naik RS. Development of value added low glycemic index barnyard millet (*Echinochloa frumentacea* link) noodles. International Journal Food and Nutritional Science 2013;2(3):20-24.
30. Shahidi F, Janitha PK, Wanasundara PD. Phenolic antioxidants. Crit. Rev. Food Sci. Nutr 1992;32:67-103.
31. Shobana S, Malleshi NG. Preparation and functional properties of decorticated finger millet (Eleusine coracana). Journal of Food Engineering, 2007;79(2):529-538.
32. Taylor JRN, Duodu KG. Effects of processing sorghum and millets on their phenolic phytochemicals and the implications of this to the health-enhancing properties of sorghum and millet food and beverage products. J. Sci. Food Agric 2015;95:225-237.
33. Thompson T. The nutritional quality of gluten-free foods. In: Gallagher E, editor. Gluten-free food science and technology. Oxford, UK: John Wiley and Sons, Ltd. 2009, 42-51.
34. Thompson T. "The nutritional quality of gluten-free foods," in Gluten-Free Food Science and Technology, ed. E. Gallagher (Oxford: John Wiley and Sons Ltd.) 2009, 42-51.
35. United Soybean Board, Consumer attitudes about nutrition; insights into nutrition; health and soyfoods. 13 th Annual National Report. Chesterfield, Mo: USB 2006.
36. Van Rensburg SJ. Epidemiological and dietary evidence for a specific nutritional predisposition to esophageal cancer. Journal of the National Cancer Institute 1981;67:243-251.
37. Yeu K, Lee Y, Lee SY. Consumer Acceptance of an Extruded Soy-Based High-Protein Breakfast Cereal. J Food Sci 2008;73(1):S20- S25.