Whole Grains and Health: Perspective for Asian Indians

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Abstract
Grains are a part of human diet for about 10,000 years. Grains are the most important food source of Indian population, due to this carbohydrate consumption constitute approx. 60-70% of total food intake. Variety of grains are available in India, and different grains form staple diets of people in different part of the country. Whole grains are now recognized as an important source of fiber and other nutrients like trace minerals and vitamins. Grains have shown to have a role in prevention and reducing the risk of Type 2 Diabetes, Coronary Heart Disease, Cancer and Obesity.

INTRODUCTION

Whole grains became part of the human diet about 10,000 years ago. It is only within the past 100 years that a majority of the population have started consuming refined grain products. Widespread use of the roller mill fuelled an increasing consumer demand for refined grain products and was a significant factor in the dramatic decline in whole-grain consumption observed from about 1870 to 1970.1

Grains have been the most important food source of the Indian population and therefore the carbohydrate consumption constitute to about ~60-70% of the total food intake. Several investigators have shown that the Asian Indians in India consume a high carbohydrate diet (60-67%) as compared to the Asian Indians settled in UK and USA. 2-4 Even in Asian Indians belonging to the low socio-economic stratum living in urban slums, a higher percentage of energy from carbohydrate intake was shown.5

This is due to the fact that the dietary pattern is highly influenced by the west therefore an increase in carbohydrate intake in the form of burgers, pizzas, french fries, chips etc can be seen in the upper class. Whereas in economically deprived people with non-existent or a low level of education, poor intake of fruit and vegetables can be seen and therefore their diets are cereal based which is comparatively cheaper. Currently foods made with the whole grains as such are recognized as important source of fiber and other nutrients like trace minerals and vitamins. Research suggests that diets containing whole grains are helpful in prevention and reducing the risk of coronary heart disease (CHD), type 2 diabetes mellitus (T2DM), certain types of cancers and obesity.

The major cereal grains include wheat, rice, and maize, with oats, rye, barley, triticale, sorghum, and millet as minor grains. In the USA, the most commonly consumed grains are wheat, oats, rice, maize, and rye, with wheat constituting 66–75 % of the total. Buckwheat, wild rice, and amaranth are not botanically true grains but are typically associated with the grain family due to their similar composition. Whereas in India the commonly used grains are wheat, rice, bajra, jowar, etc.

Cereal consumption pattern in different parts of India

North zone: States like Kashmir, Punjab and Uttar Pradesh fall into this zone. Rice is the staple food for the people from Kashmir and varieties of wheat are commonly consumed in Punjab and Uttar Pradesh.

South zone: Cooking pattern in four states of south zone namely Andhra Pradesh, Karnataka, Kerala and Tamil Nadu largely remains the same with rice being the staple diet.

West zone: It includes the states like Maharashtra, Gujarat and Rajasthan. The staple foods consumed here are rice, wheat, jowar, bajra and corn.

East zone: Bengal is the main region in this zone and rice and fish make up the main part of Bengali diet.

State wise food grain production in India

Food grain productions among various states in India have gained momentum in the recent years. Uttar Pradesh tops in the ranking food grain production ranking with a total volume of 41.7 million tones for 2006-07 (Fig. 1).6

The states which produce the lowest amount of food grains are Uttarakhand, Jammu & Kashmir and Himachal Pradesh. This is due to the fact that cultivation in hills is carried out under varied altitude, climate, topography and
soil variations, requiring different technologies. Poor socio-economic status of the farming communities coupled with small and fragmented holdings are the major bottleneck in adoption of improved technologies. Nearly 90% cultivated area is rainfed having poor productivity. In addition, lack of timely availability of fertilizers and adequate knowledge at grass root level are the major reasons for low crop productivity. Lack of entrepreneurship and low risk capacity of cultivators further complicate the problem. Non-availability of marketing infrastructure hamper marketing of the produce. Due to lack of regional centers, difficulty exists in testing the advance lines and technology in the different agro-ecological conditions in the hills.7

Structure and Definition of whole grain

All grains have a bark-like, protective hull, beneath which are the endosperm, bran, and germ (Fig. 2). The germ contains the plant embryo. The endosperm supplies food for the growing seedling. Surrounding the germ and the endosperm is the outer covering or bran which protects the grain from its environment, including the weather, insects, moulds, and bacteria. About 50–75% of the endosperm is starch, and it is the major energy supply for the embryo during germination of the kernel. The endosperm also contains storage proteins, typically 8–18%, along with cell-wall polymers. Relatively few vitamins, minerals, fibre, or phytochemicals are located in the endosperm fraction. The germ is a relatively minor contributor to the dry weight of most grains.8

Therefore, a whole grain consists of the entire grain seed of a plant. This seed, also known as the kernel, is made up of three key parts: the bran, the germ, and the endosperm (Fig. 2). Whole grains may be eaten whole, cracked, split, flaked, or ground. Most often, they are milled into flour and used to make breads, cereals, pasta, crackers, and other grain-based foods. Regardless of how the whole grain is handled, a whole grain food product must deliver approximately the same relative proportions of bran, germ, and endosperm found in the original grain.9

Grain refining process

In the grain refining process, most of the bran and some of the germ is removed resulting in the loss of dietary fiber, vitamins, minerals, lignans, phytoestrogens, phenolic compounds and phytic acid. Some manufacturers add bran to the grain products to increase the dietary fiber content. Refined grains are the resulting product of the grain refining process. Most refined grains are enriched before being further processed into food. Manufacturers may fortify whole grain where regulations permit the addition of folic acid. Currently, a number of whole grain, ready to eat breakfast cereals are fortified with folic acid. It is advisable to include some folate fortified foods, in the wholegrain choices. Whole grains cannot be identified by the color of the food label. Therefore reading skills and knowledge are required to get complete and right information from the labeling.10

Health benefits

The bran and germ fractions derived from conventional milling process provide a majority of the biologically active compounds found in a grain. These nutrients include high concentrations of B vitamins (thiamin, niacin, riboflavin, and pantothenic acid) and minerals (calcium, magnesium, potassium, phosphorous, sodium, and iron), elevated levels of basic amino acids (for example, arginine and lysine), and elevated tocol levels in the lipids. Numerous phytochemicals, some common in many plant foods (phytates and phenolic compounds) and some unique to grain products (avenanthramides, avenalumic acid), are responsible for the high antioxidant activity of wholegrain foods.11 In developed countries, grains are generally subjected to some type of processing, milling, or other technique before consumption. In the same way commercial cereals are usually extruded, puffed, flaked, or otherwise altered to make a desirable product. Most research finds that the processing of whole grains does not remove biologically important compounds.12 Components in whole grains associated with improved health status include lignans (Hormonally active compounds in grains which may protect against hormonally mediated
diseases), tocotrienols, phenolic compounds, phytosterols (compounds are known to reduce serum cholesterol) and antinutrients (reduce the risk of cancer of the colon and breast in animals, lowers plasma glucose, insulin and/or plasma cholesterol and triacylglycerols) (Table 1).

Nutritive value of grains commonly used in India

The major cereals and millets consumed in India are rice, wheat, jowar (sorghum), bajra, ragi (millets). These grains are the major source of energy in Indian diets contributing to around 60-70% of the daily energy intake (Table 2).13

**Table 1: Health effects of some whole grains**

<table>
<thead>
<tr>
<th>Grain</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amaranth</td>
<td>Amaranth has a high level of very complete protein; its protein contains lysine, an amino acid missing or negligible in many grains.</td>
</tr>
<tr>
<td>Barley</td>
<td>The fiber in barley is especially healthy; it may lower cholesterol even more effectively than oat fiber.</td>
</tr>
<tr>
<td>Buckwheat</td>
<td>Buckwheat is the only grain known to have high levels of an antioxidant called rutin, and studies show that it improves circulation and prevents LDL cholesterol (bad cholesterol) from blocking blood vessels.</td>
</tr>
<tr>
<td>Oats</td>
<td>Scientific studies have concluded that like barley, oats contain a special kind of fiber called beta glucan found to be especially effective in lowering cholesterol. Recent research reports indicate that oats also have a unique antioxidant, avenanthramides, that helps protect blood vessels from the damaging effects of LDL cholesterol.</td>
</tr>
<tr>
<td>Jowar</td>
<td>A gluten-free grain, sorghum is especially popular among those with celiac disease.</td>
</tr>
</tbody>
</table>

**Some Common Products Of Whole Grains Commonly Used By Indians**

Whole wheat flour: It is obtained by grinding whole wheat. It contains the finely ground bran, germ and endosperm of the whole kernel.

Semolina: It is coarsely ground endosperm and its chemical composition is similar to that of white flour.

Broken wheat: Broken wheat is whole wheat coarsely ground into large particles. As the losses during milling are little, it is a very nutritious food.

Rice bran oil: Rice bran oil is obtained by extracting edible grade oil from rice bran. This oil is rich in vitamin E. In addition, it has cholesterol lowering effects.

Rice flakes: Rice flakes are made after soaking the paddy in hot water, parching it by roasting and then flattening it by force while it is hot to form flakes. It retains a large part of iron and B-vitamin of the aleurone layer.

Bajra (whole): It is used for the preparation of khichri in many parts of Rajasthan.

Bajra and Jowar flour: In Rajasthan, crisp rotis, called bhakri, of bajra and jowar are made on a griddle. The current staple foods of Gujarat also includes thick baked rotis of jowar, bajra and maize.

**Whole Grains And Health**

**Obesity**

Several factors may explain the influence of whole grains on body-weight regulation. The high volume, low-energy density and the relatively lower palatability of whole grain foods may promote satiation. Additionally, whole grains may enhance satiety for up to several hours following a meal. Grains rich in viscous soluble fibre (for example, oats and barley) tend to increase intraluminal viscosity, prolong gastric emptying time, and slow nutrient absorption in the small intestine. Newby et al.14 report that a healthy eating pattern, including the consumption of whole grains, is associated with smaller gains in body mass index (BMI) and waist circumference (WC) in the ongoing Baltimore longitudinal study of aging.15 In the coronary artery risk development in young adults (CARDIA) study, whole grains were inversely associated with BMI and waist: hip ratio at baseline and 7 years later.16 UK researchers pooled data from fifteen studies on whole grain intake and BMI or adiposity, and found that in 119,829 male and female subjects aged 13 or older, a higher intake of whole grains (about 3 servings/day) was associated with lower BMI and
Insulin Resistance

People who eat three or more servings of whole grains a day, especially from high-fiber cereals, are less likely to develop insulin resistance and the metabolic syndrome, common precursors of both T2DM and CHD.18

Rave and Roggen investigated the potential of a whole-grain based dietary product (WG) in comparison to a nutrient-dense meal replacement product (MR) in a randomized two-way cross-over study with two 4-week treatment periods separated by a 2-week wash-out. The comparison between both groups revealed that fasting serum insulin (P = 0.031) and HOMA insulin resistance score (P = 0.049) improved better with WG than with MR. It was concluded that WG favourably influences metabolic risk factors (like insulin resistance) for T2DM independent from the amount of body weight lost during a hypo-energetic diet.19

Dyslipidemia

The most common patterns of dyslipidemia in people with the metabolic syndrome and diabetes include elevated serum triglycerides (TG), low HDL cholesterol (HDL-c) and predominance of small dense LDL cholesterol (SD LDL-c). Increasing soluble fiber through consumption of barley in a healthy diet can reduce cardiovascular risk factors. Lipids significantly reduced by diets containing barley in moderately hypercholesterolemic men.20

Diets rich in whole grain foods tend to decrease LDL cholesterol, triglycerides, blood pressure, and increase HDL cholesterol.21

Diabetes

A team of German researchers followed over 16,000 adults for a period of seven years and found that those who

Table 2: Nutritive value of grains commonly consumed in India
Source: Indian Council of Medical Research; 2004

<table>
<thead>
<tr>
<th>Nutrients</th>
<th>Bajra</th>
<th>Italian millet</th>
<th>Jowar</th>
<th>Ragi</th>
<th>Wheat, whole</th>
<th>Whole wheat flour</th>
<th>Whole wheat bread</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein (gm)</td>
<td>11.6</td>
<td>12.3</td>
<td>10.4</td>
<td>7.3</td>
<td>11.8</td>
<td>12.1</td>
<td>8.8</td>
</tr>
<tr>
<td>Fat (gm)</td>
<td>5.0</td>
<td>4.3</td>
<td>1.9</td>
<td>1.3</td>
<td>1.5</td>
<td>1.7</td>
<td>1.4</td>
</tr>
<tr>
<td>Carbohydrates (gm)</td>
<td>67.5</td>
<td>60.9</td>
<td>72.6</td>
<td>72</td>
<td>71.2</td>
<td>69.4</td>
<td>49</td>
</tr>
<tr>
<td>Energy (Kcal)</td>
<td>361</td>
<td>331</td>
<td>349</td>
<td>328</td>
<td>346</td>
<td>341</td>
<td>244</td>
</tr>
<tr>
<td>Calcium (mg)</td>
<td>42</td>
<td>31</td>
<td>25</td>
<td>344</td>
<td>41</td>
<td>48</td>
<td>18</td>
</tr>
<tr>
<td>Phosphorous (mg)</td>
<td>296</td>
<td>290</td>
<td>222</td>
<td>283</td>
<td>306</td>
<td>355</td>
<td>—</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>8.0</td>
<td>2.8</td>
<td>4.1</td>
<td>3.9</td>
<td>5.3</td>
<td>4.9</td>
<td>2.2</td>
</tr>
<tr>
<td>Magnesium (mg)</td>
<td>137</td>
<td>81</td>
<td>171</td>
<td>137</td>
<td>138</td>
<td>132</td>
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<tr>
<td>Sodium (mg)</td>
<td>10.9</td>
<td>4.6</td>
<td>7.3</td>
<td>11</td>
<td>17.1</td>
<td>20</td>
<td>—</td>
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<tr>
<td>Potassium (mg)</td>
<td>307</td>
<td>250</td>
<td>131</td>
<td>408</td>
<td>284</td>
<td>315</td>
<td>—</td>
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<tr>
<td>Copper (mg)</td>
<td>1.06</td>
<td>1.40</td>
<td>0.46</td>
<td>0.47</td>
<td>0.68</td>
<td>0.51</td>
<td>—</td>
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<tr>
<td>Zinc (mg)</td>
<td>3.1</td>
<td>2.4</td>
<td>1.6</td>
<td>2.3</td>
<td>2.7</td>
<td>2.2</td>
<td>—</td>
</tr>
<tr>
<td>Chromium (mg)</td>
<td>0.023</td>
<td>0.030</td>
<td>0.008</td>
<td>0.028</td>
<td>0.012</td>
<td>0.006</td>
<td>—</td>
</tr>
<tr>
<td>Essential amino acids</td>
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<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>~ Total Nitrogen content/100 gm</td>
<td>1.86</td>
<td>1.97</td>
<td>1.66</td>
<td>1.17</td>
<td>1.89</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Arginine</td>
<td>300</td>
<td>220</td>
<td>240</td>
<td>300</td>
<td>290</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Histidine</td>
<td>140</td>
<td>130</td>
<td>160</td>
<td>130</td>
<td>130</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Lysine</td>
<td>190</td>
<td>140</td>
<td>150</td>
<td>220</td>
<td>170</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Tryptophan</td>
<td>110</td>
<td>060</td>
<td>070</td>
<td>100</td>
<td>070</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Phenylalanine</td>
<td>290</td>
<td>420</td>
<td>300</td>
<td>310</td>
<td>280</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Tyrosine</td>
<td>200</td>
<td>-180</td>
<td>220</td>
<td>180</td>
<td>180</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Methionine</td>
<td>150</td>
<td>180</td>
<td>100</td>
<td>210</td>
<td>090</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Cystine</td>
<td>110</td>
<td>100</td>
<td>090</td>
<td>140</td>
<td>140</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Threonine</td>
<td>240</td>
<td>190</td>
<td>210</td>
<td>240</td>
<td>180</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Leucine</td>
<td>750</td>
<td>1040</td>
<td>880</td>
<td>690</td>
<td>410</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Isoleucine</td>
<td>260</td>
<td>480</td>
<td>270</td>
<td>400</td>
<td>220</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Valine</td>
<td>330</td>
<td>430</td>
<td>340</td>
<td>480</td>
<td>280</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Saturated fatty acids</td>
<td>1.24</td>
<td>0.57</td>
<td>0.32</td>
<td>0.32</td>
<td>0.50</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Monounsaturated fatty acids</td>
<td>1.2</td>
<td>1.0</td>
<td>0.7</td>
<td>0.7</td>
<td>0.3</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Polyunsaturated fatty acids</td>
<td>2.33</td>
<td>1.55</td>
<td>0.35</td>
<td>1.27</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Oxalic acid</td>
<td>21</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>8</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Phytin P</td>
<td>141</td>
<td>198</td>
<td>172</td>
<td>209</td>
<td>238</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Total dietary fiber</td>
<td>11.3</td>
<td>9.7</td>
<td>11.5</td>
<td>12.5</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Insoluble dietary fiber</td>
<td>9.1</td>
<td>8.0</td>
<td>9.9</td>
<td>9.6</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Soluble dietary fiber</td>
<td>2.2</td>
<td>1.7</td>
<td>1.6</td>
<td>2.9</td>
<td>—</td>
<td>—</td>
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</tr>
</tbody>
</table>
Hypertension

Research shows that higher whole-grain intake was associated with a reduced risk of hypertension in middle-aged and older women, which suggests a potential role for whole-grain intake in the primary prevention of hypertension and its cardiovascular complications. The DASH diet, consisting of whole-grain products and other healthy foods, substantially lowered blood pressure in 459 adults with baseline SBP ≤ 160 mm Hg and DBP 80–95 mm Hg. It has been suggested that a diet low in saturated fat and high in fibre from predominantly low-glycemic-index-carbohydrate foods is recommended. Because PCOS carries significant metabolic risks, more research is clearly needed.

Components of whole grains, including magnesium, fiber, vitamin E, phytochemicals, lectins, and phenolic compounds, are believed to contribute to risk reduction of T2DM as well as lowering blood glucose and blood insulin levels. In studies that examined the source of fiber, researchers found that fiber from whole grains, but not from fruit or vegetable sources, appears to exert the protective effect in reducing risk for developing T2DM.

Certain whole grain products can help control blood glucose for up to ten hours. After testing four types of grains, it was found that barley had the strongest effect, but that whole grains in bread controlled blood glucose better than grains in boiled porridge.

For this study cereals, with at least 25% whole grain or bran by weight were classified as whole grain.

Professionals at the Harvard School of Public Health analyzed diet and health records of over 27,000 men aged 40–75, over a period of 14 years, and found that those with the highest whole grain intake (about 40g per day) cut CHD risk by almost 20% – but even those eating just 25g cut their CHD risk by 15%.

Although investigators have not found the exact mechanisms for the positive effect of whole grains on cardiovascular health, it is likely that whole grain consumption is protective beyond what would be predicted if the effects of the individual components were simply additive.

**OTHER EFFECTS**

**CANCER**

Fiber and certain starches found in whole grains ferment in the colon to help reduce transit time and improve gastrointestinal health. Whole grains also contain antioxidants that may help protect against oxidative damage, which may play a role in cancer development. Other bioactive components in whole grains may affect hormone levels and possibly lower the risk of hormone dependent cancers. However, it remains unclear from current research what the association may be between whole grain intake and breast cancer.

**RECOMMENDED DIETARY ALLOWANCE (RDA)**

United States Department of Agriculture (USDA)

According to the USDA guidelines for Americans, the amount of grains needed by the body depends on the age, sex, and level of physical activity. At least ½ of all the grains eaten should be whole grains. The recommendations are as under (Table 3). These amounts are appropriate for individuals who get less than 30 minutes per day of moderate physical activity, beyond normal daily activities. Those who are more physically active may be able to consume more while staying within calorie needs.
What is ounce equivalent?

An ounce is just over 28 grams. A whole grain serving is either one ounce (28g) of a 100% whole grain food in its ready-to-eat form or the amount of food containing 16g of whole grain ingredients. For e.g. A slice of 100% whole grain bread weighing one ounce, for instance, contains about 16 grams of whole grains – with the other 12 grams being water, sugar, fat and other ingredients. The slice is an “ounce-equivalent” of bread – but it contains 16g of whole grain ingredients.10

What counts as a serving?

According to Dietary Guidelines for Americans 2005,10 a serving of whole grain is defined as 1/2 cup cooked brown rice or other cooked grain, 1/2 cup cooked 100% whole-grain pasta, 1/2 cup cooked hot cereal, such as oatmeal, 1 ounce uncooked whole grain pasta, brown rice or other grain, 1 slice 100% whole grain bread, 1 very small (1 oz.) 100% whole grain muffin and 1 cup 100% whole grain ready to eat cereal.

One can count a serving of whole grains as 16 grams (16g) of whole grain ingredients.

United States Food and Drug Administration (USFDA)

The USFDA approved of “The Healthy People 2010 report” (US Department of Health and Human Services, 2000) which designates that a specific number of wholegrain servings (3) be included in an individual’s daily diet.40 Indian Council of Medical Research (ICMR)

According to the ICMR guidelines for Asian Indians, 350-400 gm/day of cereals/millets can be taken by vegetarians and non-vegetarians in order to have a balanced diet along with the amounts of other food groups. One can choose a varied diet, choosing some foods from each major group in amounts appropriate for activity and lifestyle.41

Reading food labels

Reading labels can help make wise food choices. Most packaged foods in the grocery store list nutrition information on the package in a section called the Nutrition facts.

The nutrition facts tell the serving size and the amount of various nutrients such as total fat, saturated fat, cholesterol, sodium and fiber per serving.

Nutrient content claims such as “low fat” provide a reliable description of the product.

Foods that are exempt from the label include foods in very small packages, foods prepared in the store, and foods made by small manufacturers.

Nutrition information sources to find a whole grain product

Product packaging is a primary source of nutrition information for consumers. But thorough knowledge about how to read the packaging becomes mandatory because not all products can be used by everyone. The whole grain council has created an official stamp called the “Whole grain stamp” (since 2005) that helps consumers find the real product (Fig. 3). 100% whole grain stamp ensures that the product contains full/more servings (16 gm) of the grain and all of it is whole grain. Basic stamp ensures that at last ½ serving (8 gm) is whole grain per labeled serving. But in case there is no stamp few things can be checked. If the very first item on the list is a whole grain then it is likely that the product is predominantly whole grain. Always read the ingredient labels even if the packaging says “made with whole grain”. This product may only contain miniscule amounts of the whole grain. Descriptive words in the product’s name, such as stone-ground, multi-grain, 100% wheat, or bran, do not necessarily indicate that a product is whole grain. Words to look for include “whole grain” or “100% whole wheat.” If there are several grain ingredients, the situation gets more complex. The ingredients might read “Enriched white flour, whole wheat, whole oat flour, etc. and it cannot be told from the label whether the whole grains make up 70% of the product or 7% of the product. In this case choosing product with a whole grain stamp is safe. Fiber content varies, in each whole grain. High-fiber products sometimes contain bran or other added fiber without actually having much of whole grain. Both fiber and whole grains have been shown to have health benefits. But they’re not interchangeable. So checking the fiber on a label is not a very reliable way to guess whether a product is truly whole grain. Based on FDA regulations, a food manufacturer may choose to include a health claim that links a diet rich in whole grains to reduced risk of certain diseases. To qualify for this claim, a product must contain all portions of the grain kernel, contain at least 51 percent whole grain by weight per reference amount, and meet specified levels for fat, cholesterol, sodium or other related ingredients.42 Whole grains and heart disease and cancer is the first health claim approved under the FDA Modernization Act of 1997).40

Newer trends in the food supply

Food manufacturers are offering more options for consumers who want to increase their intake of whole grains. Recent consumer research conducted by the International
Food Information Council (IFIC) Foundation shows that more than half of consumers (64%) are increasingly interested in consuming more whole grain foods.43

In response to the increase in consumer demand, food manufacturers are creating new products and reformulating existing products to contain increased levels of whole grains. The growing prevalence of obesity, diabetes and other chronic diseases has led the manufacturers to produce special foods for this group for e.g. high fiber biscuits, breakfast cereals, atta/flour, whole wheat noodles, pasta, bread, etc. Other traditional whole grains, such as oats, jowar, bajra and barley, are gaining popularity even with those consumers whose staple foods did not contain any of these.

Functional components of whole grains might be enhanced through hybridization, milling, processing and genomics. Research and development on the ideal taste, color and texture profile of wholegrain products is much needed from a government, academic and industry perspective.40

CONCLUSION

Whole grains are rich in components like dietary fiber, starch, fat, antioxidant nutrients, minerals, vitamin, lignans, and phenolic compounds that have been linked to the reduced risk of obesity, insulin resistance, dyslipidemia, T2DM, heart diseases, hypertension, cancer, and other chronic diseases. Also, some components in whole grains may be most important in this protection and should be retained in food processing. The USDA recommends that a minimum of six servings of grain foods should be eaten daily, with at least three of those servings as whole grains. The successful implementation of these recommendations would require the cooperative efforts of industry, government, health organizations/health professionals, and the media. As the market is flooded with a variety of products, thorough knowledge of reading the labels is necessary to choose the right product. Additional research is needed to confirm the health benefits of whole grains, develop processing techniques to improve the palatability of wholegrain products, and educate consumers about the benefits of whole-grain consumption through educational programs in schools, public places, TV channels, newspapers and health camps.

REFERENCES


Fig. 3 : Whole grain stamp.


40. Marquart L, Wiemer KL, Jones JM, Jacob B. Whole grain health claims in the USA and other efforts to increase whole grain consumption. Proc Nutr Soc 2003;62:151-60.