IMPACT OF CEREALS ON HEALING COMMON DISEASES

Rashida Ali'

Abstract

The Cereals, major part of the diet have demonstrated their effective contribution in controlling the nutritional deficiency diseases. Cereal products also play the key role in decreasing ailments due to the over consumption of the calories and the ill impacts of the intake of the unbalanced diet. Thus fortification, enrichment, modification and nutrification has further upgraded the status of cereal products in healing the diet-borne-diseases. The role of the insoluble fibers of the rice bran has been found significant in decreasing blood cholesterol with reference to LDL (Low Density Lipoprotein) to reduce the risk of the cardiovascular disease. The cereal fibers from different grains are known to heal gall stone, gastro-intestinal ailments, cancers, allergies, diabetes, coronary heart diseases (CHD) obesity and other disorders due to over weight. The β-glucan or the soluble fiber of the oats has shown multiple positive physiological responses in overcoming chronic and simple ailments. The specific components of the rye, barley, wheat and corn have been identified in extending the beneficial effects to cure certain diseases. The present review deals with the machnism of the active components of the cereals in the treatment of the common diseases of the modern age.

Introduction

The bran of the cereals is full of nutrients and comprises approximately 8-14% of the kernel. A modern serving of the rice bran provides half of the RDA for magnesium. The whole grain or the bran consists of numerous such active components which take part either in curing the diseases directly or reduce the risk of many ailments indirectly. Some of these biologically active primary or secondary metabolites such as the dietary fibers, bran oil, flavonoids, carotenes, bran proteins, minerals, vitamins and other natural antioxidants responsible for prevention and control of the diseases are briefly discussed here.

The bran is composed of 12-30% fat, 6-32% fiber, 8-18% ash, 11-17% protein and 1-10% of the available carbohydrates. The micro ingredients include non saponifiable matter as sterols, terpenes, vitamins (fat soluble) and other antioxidants. Although endosperm is the larger portion of the cereals, the present discussion is limited to the bran only because of the high concentration of the nutrients localized in the outer skin and to emphasize the ignorance about the medicinal value of the bran. Unfortunately the cereals in Pakistan are generally consumed free of bran due to the unawareness about the high nutritive value of the cereal components.

Fiber

The fiber consisting of both soluble and insoluble portion is the major component of the bran ranging from 6-32%. The soluble (SF) and insoluble fibers (IF) consisting mostly hemicellulososes and celluloses respectively play significant part in controlling variety of the diseases. The SF of the bran are β-D-glucan composed of glucose units linked at 1-3, 1-4 carbons shows high water absorption capacity (WAC). The increased fluid viscosity facilitate reduction in serum cholesterol level. The IF are found efficient in catching the bile acids in the GI which emulsify the fat for further metabolism. As the cholesterol is synthesised from fat, its concentration in blood is lowered. The cholesterol also gets converted into bile acids in hypobileaidic condition. Thus hypcholesterolemic activity of the both kinds of the fibers involves complex mechanism. In the absence of the lipids the process of the formation of the LDL (Low Density Lipoprotein) and HDL (High Density Lipoprotein) also slows down the synthesis of LDL which is more adversely affected. The wheat, rice, barley and oat brans have similar effects in controlling the blood cholesterol fat and LDL levels in the serum.

* Professor of Nutrition and Food Technology, Faculty of Health Sciences, Baqai Medical University, Karachi.
Anticarcenogenic behavior

The research in the last few decades has shown that the fiber rich diet has reduced the risk of breast cancer while butyrates produced in the fiber degradation in the large intestine by colonic bacteria have recently been recognised as cancer inhibiting compounds. The appropriate ratio between soluble and insoluble fiber is essential to absorb the carcinogens otherwise the protective effect of the fiber may not be effective. The GI disorders as constipation, diarrhea, reduction in the bowel transit time; rapid fecal expell, diverticulitis etc. are gradually healed with the constant intake of the high fiber diet.

Bran Oil

Rice bran oil is an excellent supplement food in the quality where palmitic, oleic and linoleic acid represent 95% of the fatty acid. Rice bran wax with long chain fatty acid and high melting point is a good coating agent for nuts, fruits and vegetables. Although rice bran oil is rich in oleic (monounsaturated fatty acid) and lenoleic acids (the essential polyunsaturated fatty acid) the hypocholesterolemic property is believed to be related to the unsaponifiable matter (UM) of the lipids. The UM consists of several phytosteroles and triterpene alcohols which decreases cholesterol absorption and enhances the excretion of the bile acids in the stools, as both of the activities are against CHD the rice bran oil is now thought as a superior therapeuetic food. The oryzanols particularly Gama oryzanols and tocotrienols promote transfer of LDL cholesterol from blood to liver for further output.

The qualitative and quantitative status of the rice bran proteins has been widely accepted recently and they are included in the diet for fortification.

Antidiabetic Activity

The β-glucan fractions of the oat and other bran have the unique property of increasing the viscosity of the gut fluid or the luminal viscosity which directly effects the nutrient’s absorption and the glucose entry in the blood also slows down. The soluble fibers thus keeps the blood glucose and insulin level at the lower side.

The bran being rich in minerals is a good natural resource of the magnesium - a blood pressure - modulator which also promotes the synthesis of vitamin D. The bran also supplies phosphorus, iodine and selenium in the reasonable quantity.

Conclusion

The rapid developments in focussing the functional and nutraceutical properties of the biologically active components of the common cereals as the potent health promoters appear as the most dynamic tool for natural healing. The research interests of the nutritionists, food scientists, and processors in recognizing the cereals as the medicinal food is justified in view of the fact that about 60% of the daily calories requirement are supposed to be provided by the cereals according to the concept of the balance diet. The elaboration and elucidation of the beneficial impact of multigrain has also enhanced the consumption of variety of cereals in the developed part of the world. However more research input is needed to pronounce the effects of interaction of nutrients at molecular level. Never the less at this stage it can be easily concluded that advanced cereal reseach should exacrbate the beneficial impact on human health.

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