

## Dietary Fiber and Health

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Dietary Fiber has been associated with health implications from the time of Hippocrates, and may be earlier of that. English Physicians of sixteenth century has elaborated the laxative properties of the whole grain bread. These health personnel observed the regular gut problems as present in Western nations were infrequent in rural Africa and Asia. They tried to find out relationship between gut problems and diet pattern, specifically the marked difference in intake of unrefined carbohydrate. This lead to the scientific discovery of dietary fiber in relation to health and largely discussed in medical literature. In that era, the discovery stories of dietary fiber mimics the discovery of vitamins for their health related functions. Both have vital functions related to health and complement each other to maintain the digestion and metabolism of the body. Later on, based on vital health implications, most of the health agencies all over the world underline the need for intake of dietary fiber in recommended amounts.

There is a big gap for recommended amount and consumed amounts of dietary fiber broadly documented in the scientific literature. This gap is recognized in both genders and for every age group in the United States and other developed nations. Institute of Medicine and some other recognized institutes recommends a daily amount of 20 - 35g dietary fiber on daily basis in different age group. Developed and industrialized countries is consuming much lower amount of dietary fibers than recommended on daily basis. For Instance, in USA dietary fiber intake is half of the recommended level. Nutritionists recommend an amount of 14g dietary fiber per 1000 kcal on daily basis as dietary reference intake. This is essentially required to avoid cardiovascular and related problem, it is advisable to consume at least 25g of dietary fiber daily for adult woman and 38 g per day by adult men. By increasing dietary fiber intake at global level among the increasing population, the risk for diabetes, coronary heart disease, hypertension, obesity, stroke, colon cancer and certain gastrointestinal diseases may be lowered [1,2].

There are evidences that consumption of dietary fiber in recommended amounts is associated as prophylactic measure to reduce the risk of colorectal cancer. Numerous mechanisms are reported in literature to elaborate the preventive action against carcinogenic growth, that may include: fermentation of dietary fiber in large intestine by colonic microflora result in formation of short chain fatty acids thus reinforcing the defense mechanism; controlling the bile acid and conjugates in human body and supporting probiotic microflora.

Traditionally, these fibers may be classified either on the basis of source or solubility. The nature of these dietary fibers may vary in different sources and thus the physiological responses. For instance, dietary fiber from wheat will be responsible mainly for better gut health and provide relief in constipation. On the other side, dietary fiber from barley and oat will be valuable to reduce the cholesterol and other risk factors of cardio vascular disease to a significant level [3]. These differences are due to variable chemical nature of dietary fibers in these sources, the dietary fiber from wheat is mainly composed of hemicellulosic material whereas for barley and oat that mainly composed of  $\beta$ -glucan [4,5]. Some non-starch polysaccharides, celluloses, arabinoxylans also serve as dietary fiber and can be associated with cereal sources as well as mushrooms and selective microbial sources. Some researchers also showed the potential of exopolysaccharides from microbial source to have dietary fiber properties [6].

There is a big history of defining the dietary fiber, in different eras it is defined variably by various researchers in the past. The most acceptable definition of dietary fiber that lasts for decades in 20<sup>th</sup> century, talks about fraction of food that resists hydrolysis process by digestive enzymes present in human small intestine and mainly comprises of polysaccharides and lignin. This definition does not talk about physiological health benefit associated with the consumption of dietary fiber. A more refined version of this definition appeared in year 2008. In this definition, Dietary fibers are defined as substances containing ten or more monosaccharide units in the polysaccharide structure and that should not breakdown by the endogenous enzymes in the small intestine of humans. This may include: Food edible carbohydrate polymers in its natural form, natural carbohydrate polymers that are altered by physical, enzymatic or chemical means and have physiological health benefits. This definition also includes synthetic carbohydrate polymers with demonstrable physiological health benefits [7,8]. Still there is need of more research in the field of dietary fiber. One of the important area of research should focus on analytical method for the identification and characterization of dietary fiber based on the new definition of dietary fiber. Development of new low cost techniques for the extraction of dietary fiber from conventional and non-conventional source is also the need of the time. Characterization of dietary fiber using sophisticated analytical techniques is also a big avenue of research that will make use of dietary fiber for development of value added nutraceutical products.

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