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NATURAL DIETARY FIBER AND THEIR PROPERTIES

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ABSTRACT

The regular diet of humans may give about half of the dietary fiber demand recommended and generally it's the unnoticeable fiber through the constituents and raw accoutrements used for medication of foods. A great eventuality of dietary fiber in terms of its health benefits calls for new dietary fiber sources, their objectification into food products, for which numerous queries needs to be addressed and consumers should be induced. In this direction the natural fiber, their economy and vacuity may be more promising than the modified synthesized fiber factors. The dietary fiber has an important part in dietary operation with positive health benefits in the human system; still, development of fiber rich products isn't an easy task. Originally, the fiber content and the type of bit whether answerable or undoable bit is of significance. Secondly, the parcels similar as hydration capacity, oil binding capacity cation exchanges capacity etc., govern the objectification of applicable foods either hydrophilic nature foods i.e. Potables, authorities, ready- to- eat retort foods etc. or hydrophobic nature foods similar as fried foods, ignited foods etc. Thirdly, the uniformity in dissipation and effectiveness of the functionality for the particle size of fiber and their parcels is pivotal. Fourthly, the composition of the fiber factors similar as cellulose, hemicellulose, pectin etc. governs the parcels. Studies related to all these aspects still needs the attention of experimenters. With the recent studies, fairly, the answerable and undoable dietary fiber is more balanced in fruits and vegetables as compared to cereals dietary fiber. Thus, the proposed work has been planned to insulate the natural fiber from the vegetables not tried so far, similar as ash gourd, radish and pea peels and the by-products from cardamom, which may have the health promoting parcels. The main ideal is to explore the sources of fiber especially from routinely used vegetables spices. To cite an example, ash gourd, a health promoting vegetable is employed in curries, in medication delicacies similar as petha and ash gourd juice is a health drink. The pulp after birth of the juice is a by- product which is rich in fiber. Thus, main ideal is to use the by- products as a source of dietary fiber and study their parcels and felicity in various reused products for perfecting the good of humans.

Keywords: *Fiber, Food, Vegetable, Health, Dietary, Products, Source, Effectiveness, Insoluble*.

Introduction

'Dietary Fiber' is a general term that covers a wide variety of substances with different physical parcels and various physiological goods. The circumstance of the fiber depends on the sources, for example- in vegetables, fiber is substantially concentrated on the skin but infrequently in the rind too, while in cereals it's substantially set up in the bran portion, whereas in fruits it isn't only present in the skin but also in the gooey portion i.e. the mesocarp. Generally, the fiber in the dressed, trimmed or reused material is the one considered. Still, the by- products of natural sources also constitute a good source of dietary fiber. The new frontier in food exploration is the part of non-nutritive factors in human health. In the recent history, the significance of fiber in the diet has increased as a functional component which has opened up the implicit market for fiber rich products. The by- products available during

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processing of factory foods are considered as a promising source of functional composites. Till now, the by- products created a profitable and environmental problem. The main functionality of dietary fiber refers to the physiologically dietary conduct leading to better health conditions. The constant use of recommended dietary fiber in diet has possible goods right from teeth to control of normal situations of sugar, cholesterol, lipid metabolism, corrosiveness acid excretion to elimination of fecal waste.

Why Dietary Fiber is Important

Dietary fiber has gained significance during the last two decades as epidemiological studies related to the shy input of dietary fiber leads to the prevalence of a wide diapason of conditions. These polymers have unique functional parcels which can be effectively employed in formulating new foods. The same parcels can significantly affect physiological conduct within the body, and specifically the alimentary tract from mouth to anus. The intestinal density content in hamsters and rats and suggested that density is the top specific of dietary fiber, responsible for cholesterol lowering and that this effect is due to increased excretion of cholesterol from body. The health benefits coupled with functional parcels similar as hydration capacity have created a renewed interest in exploration work on dietary fiber. Research have been done on numerous fiber supplements which are attained from by- products performing from the processing of fruits, vegetables, spices, legumes and other food products. Increased use of fiber supplementation would thus not only ameliorate the health benefits and functional parcels of numerous foods, but could also give ecological benefits to food directors. still in view of adding significance of dietary fiber in human nutrition, the United States Food and Drug Administration and the National Advisory Committee in Great Britain have both recommended a dietary fiber input of 20- 35 g/ person/ day. Undoable fiber includes cellulose, lignin and numerous hemicelluloses. Certain Vegetables, whole grains, cereal brans, wheat and utmost grain products contain primarily undoable fiber. In the natural state, dietary fiber is a conglomeration of different factors. It's an important component in food, comprising a different group of factory substances similar as celluloses, hemicelluloses, lignins and other non-starch/non-cellulosic polysaccharides which are of chemical and morphological complexity. Dietary fiber also includes some non-structural factors (epoxies and bonds), as well as artificial complements similar as modified cellulose, modified pectin, marketable epoxies and algal polysaccharides.

Sources of Natural Fiber

Cereals, fruits, vegetables, legumes and indeed oil seeds contribute towards dietary fiber, besides being used as oil source. To produce dietary fiber amended medications, primarily the corridor of cereals, fruits and vegetables that are rich in non-digestible carbohydrates are being used. The starting accoutrements for the product of dietary fiber medications are bran, straw, sludge cobs and chaff, as well as the by- products or wastes from artificial processing of fruits and vegetables i.e. apple pomace, citrus fruits, carrot, tomato etc. Their application is accessible and cost effective and enables rational operation of worrisome wastes. Numerous experimenters have used wheat bran, oat bran, rice bran, sludge bran, whole grain rye, apple fiber, sugar beet fiber, carob fiber, psyllium cocoon fiber, flaxseed fiber, soya housing fiber etc as source of dietary fiber supplements in refined foods. In case of fruit dietary fiber, pineapple core dietary fiber can be prepared wherein fresh pineapple cores are washed, sliced, blended, washed several times with warm water (40 oC) and pressed with a hydraulic press to remove redundant water. The residue was dried at 70 oC in a hot- air roaster over night, grinded, settled and packed for farther analysis. The total dietary fiber was 99.7. Chau and Huang (2004) uprooted passion fruit seed fiber by collecting the seeds after juice birth. The seeds were gutted and finely ground to0.5 mm size. The seed oil was defatted with petroleum ether (14) four times and defatted sample was kept in a desiccator until used. Many common vegetables have also been used in medication of dietary fiber. Dietary fiber profile of carrot after juice birth and reported that the carrot residue contained 37- 48 dietary fiber. Many experimenters insulated fiber from anti choke, which is chemically characterized by high content of dietary fiber and absence of bounce. This vegetable sample was freeze dried and ground to gain oil, which was also passed through a 40- mesh sieve, placed in polythene bottles and stored in a still- air freezer at-40 oC until analysis. Someone has extracted the cauliflower fiber by separating the upper stem and boutonnieres of the cauliflower factory and studying its drying kinetics. Alcohol undoable remainders were prepared by rooting the dry sample in boiling ethanol and drying by solvent exchange.

Functional Parcels of Fiber

The functional parcels comprise of physicochemical and structural parcels, which have an impact on their functionality when incorporated into the products. The major fragments of dietary fiber i.e. Undoable and answerable fiber have differed parcels and physiological conduct, but the functional

parcels are altered by the processing styles espoused, will have an impact on their part in supporting the health benefits. The nutritive goods of dietary fiber are related to its indigestibility in the small intestine, and to the physico- chemical parcels of its constituent polysaccharides. The water holding capacity of individual dietary fiber may be affected by their chemical composition. Cellulose and lignin tend to have lower water holding capacity, while hemicellulose and pectins have fairly advanced water holding capacity. Other characteristics similar as pH, ion exchange and particle size also impact water holding capacity and ion binding capability. The density and gelatinizing characteristics of various fiber determine their apparent solubility. These parcels may hamper intestinal motility, thereby dwindling the mixing of essential nutrients, digestive enzymes and other necessary intestinal factors needed for fat immersion. Dietary fiber can also act as antioxidants, precluding numerous infections and decelerating down the aging process. It also binds oil and the capability to bind oil is more a function of the porosity of the fiber structure than of the affinity of the fiber motes for oil (as in case of hydration capacity). The mango dietary fiber and studied the chemical composition, dietary fiber profile, polyphenols, hydration capacity, oil binding capacity and anti-radical effectiveness. They suggested that the mango fiber can be used in development of products with balanced dietary fiber factors and low glycemic response. Dietary fiber oil from external leaves of cabbage contained high quantum of bioactive agents with antioxidant exertion. The dominant antioxidant substances i.e. phenolic content and vitamin C, as well as total antioxidant exertion were estimated. Fresh cabbage was set up to have 532 mg/ 100 g of vitamin C, while antioxidant exertion was 69. They reported that the bleached samples dried at 80 oC could retain the loftiest phenolic content, vitamin C and antioxidant exertion.

Isolation of Fiber

Dietary fiber substantially refers to answerable and undoable fiber fragments. Answerable fiber encompasses pectins, epoxies, some hemicellulose and storehouse fiber polysaccharides, while undoable fiber includes cellulose, lignin and numerous hemicellulose. The parcels of this fiber are greatly told by the factors of fiber, presumably because of their structural differences and functional groups. The objectification of fiber in foods has a direct bearing on the physical parcels of fiber factors similar as hydration capacity, oil binding capacity, ion binding capacity, particle size, swelling capacity, etc, which are told by the process espoused. Thus, the information on the fiber factors gives a more picture for farther application to give dietary affects. Dietary fiber has set up its pride of place through the dietary physiological conduct. The recommended position of fiber in diet is 25- 35 g per day. Still, considering the indigenous variation, environmental goods, provident variations and food habits, the normal diet may give fiber lower than 15- 20 g, which calls for the fiber rich foods. Several experimenters have tried the development of fiber rich products and their impact on functional parcels. Some of the compliances out of the fiber food study is reflected below

- Natural fiber, as analysed by image analyzer revealed that the periphery of 30 m and 40- 110 m, followed by 140- 230 mesh fiber patches ranged between 250- 410 m for 60 and 100 mesh, independently.
- Natural fiber, as analysed for micro structures by Scanning Electron Microscopy, showed that the 30 mesh patches were large and irregular in shape as compared to 60 and 100 mesh patches, which were small and more invariant in structure.
- The micro structure of ash gourd fiber, radish fiber, pea peel fiber and cardamom peel fiber showed varying results after hydration and snare size told the structural parcels. On hydration, ash gourd and radish fiber of 30 and 60 meshes showed swelled patches, while 100 mesh samples were mashy. still, pea peel fiber showed smooth face for 30 mesh, stretched for 60 mesh and disintegrated structure for 100 mesh patches, while cardamom peel showed a peculiar fiber structure after hydration, suggesting typical ‘honey comb’.
- Amongst the natural fiber samples, the total fiber was 66.35, 53.11, 79.93 and 84.57 for ash gourd; radish, pea peel and cardamom peel fiber, independently. Ash gourd and radish fiber, showed a balanced rate of undoable dietary fiber and answerable dietary fiber bit, recording43.59 &35.36 undoable dietary fiber and 22.76 & 17.75 answerable dietary fiber in 60 mesh samples, independently.
- Amongst these natural fiber samples, the dietary fiber profile of the samples (60 mesh) showed that ash gourd fiber contained maximum answerable fiber bit i.e. 20.49, while the undoable bit was maximum in case of cardamom peel fiber i.e. 81.31.

- Amongst these natural fiber samples, water holding capacity and water binding capacity were fairly advanced in cardamom and radish fiber than ash gourd and pea peel fiber. The water holding capacity and water binding capacity were loftiest in 30 mesh patches and dropped in case of 60 and 100 mesh patches.
- Amongst these natural fiber samples, ash gourd fiber displayed excellent lump capacity, followed by radish fiber, cardamom peel fiber and pea peel fiber. It was loftiest in case of 30 mesh size patches followed by 60 and 100 mesh bones.
- Amongst these natural fiber samples, particle viscosity showed a rear pattern as compared to other functional parcels. The 100 mesh pea peel fiber patches showed loftiest particle viscosity, while the 30 mesh patches of the same fiber had low particle viscosity.
- The results of the study inferred that affinity of dietary fiber towards water was a property dependent on the botanical origin of dietary fiber as well as on the particle size. All the parcels i.e. water holding capacity, water binding capacity, oil binding capacity, swelling capacity and cation exchange capacity except particle viscosity, displayed dwindling trend with drop in particle size.

Conclusion

The end of the present study was to explore new, natural dietary fiber sources, estimate their functional parcels, dietary fiber profile, isolation of major fiber factors and objectification of this natural fiber in reused foods. In the present study, routinely used vegetables legumes spices similar as ash gourd, bottle gourd, radish, pea peels, cardamom peels etc, were explored. Webbing of the dietary fiber source was done on the base of the dietary fiber profile (answerable, undoable and total dietary fiber), flavor, color, destruction amount and convenience for incorporating them in different comestible products. Therefore, ash gourd, radish, pea peels and cardamom peels were the promising named sources for farther study. The fibers from the separate sources were insulated wherein the drying kinetics revealed that the rate of dehumidification could be appreciatively identified to the answerable dietary fiber bit. The major fiber factors i.e. neutral soap fiber, acid soap fiber, cellulose, hemicellulose, pectin and lignin were estimated in the fiber. Further, the major factors (cellulose, hemicellulose and pectin) of the most promising fiber i.e. ash gourd fiber, were insulated and studied for their major functional parcels, so as to understand the part of each insulate collectively. Six fiber rich products i.e. pea peel fiber grounded sweet eyefuls, ash gourd fiber grounded relish eyefuls, cardamom peel fiber grounded kheer, radish fiber grounded relish vermicelli, ash gourd fiber grounded roasted snack and radish fiber grounded fried snack, were developed using combination and statistical styles (RSM). The proximate composition and dietary fiber profile of these products were compared with the control samples. The effect of different processing conditions on the dietary fiber profile was also observed. The quality parameters of these fiber rich products proved that these products were relatively stable and veritably well accepted till 6- 8 months, especially in tri laminated PFP sacks, at room temperature and handed 15- 30 fresh fiber in the diet.

References

~ Arora, A. and Camire, M.E. 1994. Performance of potato peels in muffins and cookies. Food Research International. 27: 15-22.

~ Boby, R.G. and Leelamma, S. 2003. Blackgram fibre (Phaseolus mungo): Mechanism of hypoglycemic action. Plant Food for Human Nutrition. 58: 7-13.

~ Chaudhary, A. and Awasthi, P. 2009. Quality evaluation of biscuits containing parboiled rice bran. Journal of Food Science and Technology. 46 (1): 83-34.

~ Dasgupta, N. and Bratati, D. 2004. Antioxidant activity of Piper betle L. leaf extract in vitro. Food Chemistry. 88: 219-224.

~ Gujral, H.S.; Mehta, S.; Samra, I.S. and Goyal, P. 2003. Effect of wheat bran, coarse wheat flour and rice flour on the Instrumental. International Journal of Food Properties. 6 (2) 329-340

~ Leelavathi, K. and Rao, P.H. 1993. Development of high fibre biscuits using wheat bran. Journal of Food Science and Technology. 30 (3): 187-190.

~ Madhura, C.V; Premavalli, K.S., Arya, S.S. 1998. Studies on traditional Indian foods III. Development and storage stability of Rava Idli mix. Indian Food Packer. 3: 33-37.

~ Majumdar, T.K; Vasudesh, C.R.; Premavalli, K.S.; Bawa, A.S. 2008. Studies on processing and storage stability of ashgourd-mint leaves juice. Journal of Food Science and Technology. Early View (Published on Oct 2009).

~ Prasad, N.N.; Khanum, F.; Siddalingaswamy, M. and Santhanam, K. 1995. Proximate composition and dietary fibre content of various foods/rations processed to suit the Indian palate. Food Chemistry. 52: 373-378.

~ Raghavendra, S.N.; Ramachandra Swamy, S.R. and Rastogi, N.K. 2006. Grinding characteristics and hydration properties of coconut residue: A source of dietary fiber. Journal of Food Engineering. 72, 281-286

~ Sharma, G.K.; Madhura, C.V.; Arya, S.S. 1992. Studies on preparation, packaging and storage of Besan (Bengalgram flour) burfi. Journal of Food Science and Technology. 29 (5): 289-292.

~ Sudha, M.L.; Vetrimani, R.; Leelavathi, K. 2007b. Influence of fibre from different cereals on the rheological characteristics of wheat flour dough and biscuit quality. Food Chemistry. 100: 1365-1370.

~ Vasanthan, T.; Gaosong, J.; Yeung, J. and Li, J. 2002. Dietary fibre profile of barley flour as affected by extrusion cooking. Food Chemistry. 77: 35-40.