

# REPORT

## Dietary fibre and human health - a roundtable discussion

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A roundtable discussion organized by Asia Pacific Clinical Nutrition Society and Zhejiang University, was held on 21<sup>st</sup>-22<sup>nd</sup> November 2009 in Hangzhou, China, to provide an updated information in dietary fiber and human health. Dietary fiber, chemically heterogeneous carbohydrate component, is of increasing interesting in relation to scientific and regulatory defining, isolating, identifying and quantifying in foods lies in its physiological and healthy beneficial effect such as the prebiotic effect, modifying the composition of gut microbial to provide healthy benefits to the host, postponing intestinal transit time and increasing stool bulk, postponing intestinal transit time and increasing stool bulk, reducing risk factors of cardiovascular disease such as blood pressure, serum/plasma total and LDL cholesterol, decreasing fasting and postprandial blood levels of glucose and insulin, satiety and healthy body weight management etc.

Sixty nutritionists, dietitian, healthy professions, food scientists and other young scientists participated the discussion. The opening ceremony was officially opened by Prof. Duo Li, Zhejiang University. Following the opening, Prof Jun Zhu, vice-chancellor of Zhejiang University; Prof Ibrahim Elmadfa, president of International Union of Nutritional Science and Prof Yiyong Cheng, president of Chinese Nutrition Society made the welcoming speech.

The roundtable discussion circumfused 6 sections with different specific topics, in which 3-4 speakers presented intensive plenary lectures. All the participants were encouraged to be equally involved in the discussion.

### ***Section 1: Dietary fibre: Definition, resources, classification, analysis, and intake status in China***

Prof. David P. Richardson introduced the definition and classification of dietary fibre as defined by different international organizations, including Compromise Codex Alimentarius Commission of FAO/WHO, European Union, and European Food Safety Authority. Dietary fibre definition remains a controversial issue in Codex. In June 2009, Compromise Codex Alimentarius Commission (CAC) adopted a definition of dietary fibre, in which carbohydrate polymers with ten or more monomeric units were accepted. CAC mentioned that the decision on whether to include carbohydrates with monomeric units from 3 to 9 should be left to national authorities. European Commission and European Food Safety Authority have accepted oligosaccharides with degrees of polymerization 3-9 as being fibre. In June 2005, Chinese nutrition experts had reached consensus on dietary definition, in which monomeric units from 3 to 9 has been accepted, however the official definition of dietary fibre should be constituted by Chinese Commission. Prof. Wenya Yin and Jing Wang's topics focused on the detection and analysis of dietary fibre. International standards for dietary fibre analysis include AOAC985.29, AOAC 994.13, AOAC 991.43 and AOAC 2001.03, in which AOAC991.43 is considered as Gold standard. Tantamount to the adoption of international standards AOAC 991.43 and AOAC 2001.03, "GB/T 22003-2008 Determination of Dietary Fibre in Foods Enzyme-Gravimetric Method and Liquid Chromatography" has been used as the National Standard Methods in China. Two methods in this standard simplify the preparation of buffer solution for enzymolysis, simplify the procedure of treating the samples

for liquid chromatography determination and reduce the analysis and determination time from 4 days to 3 days. Prof. Fengying Zhai introduced the dietary fibre intake status in China, which is 13.0g per day in male and 12.5g per day in females, insoluble dietary fiber is accounting for approximately 2/3 of the total dietary fiber intake. The total dietary fibre intake is below the 25-30g/day recommendation by the Chinese Nutrition Society.

### ***Section 2: Dietary fibre, prebiotics and intestinal health***

Prof. Guoqing He provided the research evidence of prebiotics on human health, specifically the reestablishment of the balance of colonic flora, the modulation of the immune system, the ease of allergic symptom, the inhibition of bladder cancer and the reduction of cholesterol. Prof. Xiaohong Zhang introduced the mechanisms of probiotic activity and summarised the prebiotic effect of various oligosaccharides. Ms. Muriel Berard presented the research study of resistant dextrin on the modulation of the gut environment and metabolic activity of the fecal content. Some participants suggested that future research work is needed to investigate dietary fibre as prebiotics on other microflora besides *Lactobacillus* sp and *Bifidobacterium* sp.

### ***Section 3: Dietary fibre and body weight control***

Prof. Aizhen Zhang reported the research studies of dietary fibre on body weight regulation by Chinese and international research groups. Her group found after modified citrus pectin with high-fat diet for 6 weeks, the body weight of rats is significantly lower than that of high-fat diet-induced obese rats. Dr. Yinghua Yu provided a mechanism of dietary fibre on body weight regulation via hormonal, intrinsic and colonic effects to decrease food intake, up-regulate fat oxidation and down-regulate fat storage. Effect of a resistant dextrin on satiety and weight management has been demonstrated by Ms. Laetitia Guerin-Deremaux. The results of her study suggests the resistant dextrin induces a progressive impact on satiety, inducing positive effects on the decrease of food intake, with a direct impact on the management of bodyweight and body fat. During the discussion, Prof. Ibrahim Elmadfa suggests that the effect of dietary fibre on energy expenditure needs to be examined in future research of dietary fibre on body weight control.

### ***Section 4: Dietary fibre and metabolic syndrome***

Mr. Daniel WILS' findings in hamsters and clinical studies suggest that the resistant dextrin disturbs the synthesis of endogenous cholesterol, decreases the triacylglycerol in blood, and lowers the body weight accompanied by a decrease of body fat and waist circumference, which are biomarkers of metabolic syndrome. Prof. Xu Lin introduced the research study about the beneficial effect of flaxseed on metabolic diseases. Flaxseed significantly reversed abdominal obesity, reduced fasting glucose levels and inhibited the increase of HbA1c levels. Prof. Chengyu Huang's research work demonstrated beneficial effects of Konjac food in diabetes patients by decreasing blood glucose and lipids level, improving diabetes symptoms and lowering body weight.

### ***Section 5: Dietary fibre and cardiovascular protection***

Dietary fibre on the prevention of cardiovascular diseases has been concluded by Prof. Yunqing Cai. Some research studies demonstrated that a higher intake of dietary fibre, particularly water-soluble fibre from whole-grain, fruit and vegetables, reduced the risk of CHD. Prof. Jianbin Jia provided a large number of literatures to compare the blood cholesterol lowering ability and the delay of ischemic heart disease of different dietary fibres, according to sources and solubility. Prof. Meiqin Cai summarised 5 mechanisms of dietary fibre on blood lipid-lowering effect. The beneficial effect on blood lipid has been shown by

dietary fibre complex (soluble fibre/insoluble fibre) in ratio 2. Some participants suggest more research work is needed to evaluate the dietary fibre on other biomarkers of coronary diseases, not only on blood lipid.

### ***Section 6: Health claim of functional food and nutraceuticals***

The functional food/nutraceuticals claim system and health food reporting procedures in China were introduced by Prof. Yuexin Yang and Guiyuan Lv, respectively. Prof. Ibrahim Elmadfa, President of International Union of Nutritional Science provided an abundance of information about dietary fibre intake status and functional claim systems in the European Union. Prof. Andrew J Sinclair, President of Nutrition Society Australia, introduced functional foods regulatory issues in Australia. In Australia, functional food claims include nutrition claim and health claims. The Code prohibits health claims including 1) a statement that the food is a slimming food or has intrinsic weight-reducing properties; 2) a claim for therapeutic or prophylactic action 3) any word, statement or claim that could be interpreted as advice of a medical nature and 4) any reference to a disease or physiological condition. The only permitted health claim under the Code is for folate consumption reducing the risk of fetal neural tube. European Commission Concerted Action has defined three types of claims on food, nutrition claims, function claims and disease risk reduction claims. Both Australian and European food claim systems require convincing human clinical trials to support the functional food claims. In China, there are 27 health claims for functional food. More than 3 animal studies and/or human trials are required to support health claims in China. Chinese scientists communicated with international experts and learned the disparity of health claim systems for functional food in China and other developed nations.

### ***Summary of roundtable discussion by Dr. Junshi Chen, Academician of Chinese Academy of Engineering***

The roundtable discussion ended with a speech by Dr. Chen. He summarised the roundtable discussion from definition, methods for determination to the health effects of dietary fibre. He mentioned that some issues arising from this roundtable discussion should be highlighted in ongoing researches: 1) analytic method development of total, insoluble and soluble fibre; 2) whether there is clear difference between soluble and insoluble fibre on human health, which needs to be clarified by more clinical intervention trials; 3) comparison of dietary fibres from different sources should be conducted in future research as currently most studies are carried out to investigate the single component of fibre on human health. Finally, Dr. Chen provided recommendation for the best strategies of dietary fibre intake on health in China: 1) based on the balanced diet, dietary fibre intake should be increased by consumption of variety of foods, including vegetables, fruits and whole grains; 2) consumers should be provided with more education to establish healthy eating behaviour accompanied by the development of a variety of new products with high dietary fibre in the food industry.

Overall it was a very successful roundtable discussion. All participants attended from opening to closing. Some young scientists had the opportunity to be actively involved in this unique discussion with leading experts of nutrition. The unsolved issues about dietary fibre arising from this roundtable discussion will be the focus of future nutrition research.