

Oats: Prospects and Challenges in India

Samir Anil Singru* and Shankar Babu Bhosale

Department of Community Medicine, Smt Kashibai Navale Medical College and General Hospital, S.No. 49/1, Westerly Bypass Road, Narhe (Ambegaon), Pune-411041, Maharashtra, India

Avena sativa is the scientific name of grass commonly known as oats and ‘Jai’, ‘Javi’ or jau in Hindi. Oats recently has gained attention because of its various health benefits which are very important especially for a country in a transitional state like India who is faced by the double edged sword of under nutrition and over nutrition. In India, Hypertension, Obesity, Diabetes and Coronary Artery Disease (CAD) are the fast emerging public health problems. Stress, sedentary life style, mechanization and long working hours all contribute to it. Since all the above mentioned diseases are of multifactorial origin and linked with each other, the common interventions targeting all of them will be the most successful strategy in preventing or at least slowing the pathogenesis of the same. Role of fibre in diet is important in reducing cholesterol, sugar and inducing a sense of satiety. Various studies have shown the benefit of dietary fibre. Among cereals, the highest content (g per 100 g dry weight) of β -glucan has been reported for barley: 2–20g (65% is water-soluble fraction) and for oats: 3–8g (82% is water-soluble fraction). Other cereals also contain β -glucan but in much lower amounts [1].

Molecular weight, solubility, and viscosity are important physicochemical properties of β -glucan responsible for the cholesterol lowering effects. Oat β -glucans have a higher molecular weight than barley β -glucans [2-4]. Only 15–20% of barley β -glucans are water soluble while almost 70% of the oat β -glucans are soluble in water [5]. As viscosity is highly influenced by the molecular weight and solubility of β -glucan, a lower molecular weight and/or solubility of β -glucan are expected to reduce its resultant viscosity and consequently its cholesterol-lowering effects. Highly water-soluble β -glucan,

with moderate to high molecular weight, reduced serum LDL cholesterol better than β -glucan with low water-solubility and low molecular weight [6]. This explains the lower reported effects of barley β -glucan on lipid parameters as compared to oat β -glucan.

No human adverse effects have been reported following the consumption of a diet rich in β -glucan from oat or barley flour or their extracts [7]. There are multiple health benefits of Oats. Oats Help Control Blood Pressure both systolic and diastolic [8-9]. Oats if introduced earlier to children may reduce the risk of persistent asthma in children as seen by Finnish researchers [10]. Oats Increase Appetite-Control Hormones, Peptide Y-Y as seen by the study conducted by Australian researchers [11]. Oat Beta Glucans Improve Immune System Defences [12]. Oats Help Cut the Use of Laxatives due to the presence of dietary fibre and thus preventing the adverse effects of laxatives [13]. Oats May Help Reduce the Risk of Type 2 Diabetes by improving insulin sensitivity and decreases the insulin dosage substantially [14-15].

Oats Lower VLDL and LDL Cholesterol [16]. Thus because of all the above mentioned health effects oats establish itself as a food item which ultimately reduces the risk of Coronary heart disease. The United States Food and Drug Administration in 1997 approved the heart-health benefit claim on food labels of food containing soluble fibre from oats [17]. Oats in addition also contain more than 20 unique polyphenols, avenanthramides, which have shown strong antioxidant activity in vitro and in vivo. The polyphenols of oats have also recently been

shown to exhibit anti-inflammatory, antiproliferative, and anti-itching activity, which may provide additional protection against coronary heart disease, colon cancer, and skin irritation [18]. However oats are not that popular in India. Probable reasons could be due to the palatability issue or simply that Indian population has not developed the taste for oats. India was new to spicy, salty noodles before the year 1982 when “Maggi” was introduced. However because of effective marketing, multiple options and strategic pricing it has now become very popular. Oats needs to be fitted in the Indian evergreen food items such as idlis, dosas, dhoklas, milk, upma etc. Celebrity chefs should experiment with

oats and make it popular. However in the past we also have the experience of soya bean, barley which although very healthy are not that popular in India. Thus there is a need for effective marketing and propaganda regarding the health benefits of oats. Public health experts, nutritionist, agriculturist and celebrity chefs should all unite for cause of the society. Tax relaxation, subsidies and other direct or indirect benefits should be given to oats cultivators and oats processing and packaging industries. Oats cultivation presently is only in Jammu Kashmir and Himachal Pradesh. Sturdy oat crops needs to be developed to suite other areas for cultivation.

References

1. Bacic A, Fincher GB and Stone BA. Chemistry, Biochemistry, and Biology of (1-3)-[beta]-Glucans and Related Polysaccharides. *Academic Press, Amsterdam, The Netherlands*, 1st edition, 2009; 287-94
2. Autio K. 'Functional aspects of cell wall polysaccharides' in Carbohydrates in Food, A.-C. Eliasson, Ed., *Marcel Dekker, New York, NY, USA*, 1996; 227-64
3. Wood PJ, Weisz J and Mahn W. Molecular characterization of cereal β -glucans. II. Size-exclusion chromatography for comparison of molecular weight. *Cereal Chemistry*, 1991; 68: 530-536.
4. Åman P, Rimsten L and Andersson R. Molecular weight distribution of β -glucan in oat-based foods. *Cereal Chemistry*, 2004; 81(3):356-360.
5. Lambo AM, Öste R and Nyman MEGL. Dietary fibre in fermented oat and barley β -glucan rich concentrates. *Food Chemistry*, 2005; 89(2):283-293.
6. Theuwissen E and Mensink RP. Water-soluble dietary fibers and cardiovascular disease. *Physiology and Behavior*, 2008; 94(2):285-292.
7. Hallfrisch J and Behall KM. Physiological responses of men and women to barley and oat extracts (nu-trimX). I. Breath hydrogen, methane, and gastrointestinal symptoms. *Cereal Chemistry*, 2003; 80(1):76-79.
8. He J, Streiffer RH, Muntner P, Krousel-Wood MA and Whelton PK. Effect of dietary fiber intake on blood pressure: a randomized, double-blind, placebo-controlled trial. *Journal of Hypertension*, 2004; 22(1):73-80.
9. Keenan JM, Pins JJ, Frazel C, Moran A, Turnquist L. Oat ingestion reduces systolic and diastolic blood pressure among moderate hypertensives: a pilot trial. *J Family Practice*, 2002; 51(4):369.
10. Virtanen SM, Kaila M, Pekkanen J, Kenward MG, Uusitalo U, Pietinen P et al. Early introduction of oats associated with decreased risk of persistent asthma and early introduction of fish with decreased risk of allergic rhinitis. *Br J Nutr*. 2010; 103:266-273.
11. Beck EJ, Tapsell LC, Batterham MJ, Tosh SM, Huang XF. Increases in peptide Y-Y levels following oat beta-glucan ingestion are dose-dependent in overweight adults. *Nutrition Res* 2009; 29:705-709.
12. Rondanelli M, Opizzi A, Monteferrario F. The biological activity of beta-glucans. *Minerva Med*. 2009 100(3):237-245
13. Sturtzel B, Mikulits C, Gisinger C, Elmadfa I. Use of fiber instead of laxative treatment in a geriatric hospital to improve the wellbeing of seniors. *J Nutr Health Aging*. 2009; 13:136-9.
14. Lammert A, Kratzsch J, Selhorst J et al. Clinical benefit of a short term dietary oatmeal intervention in patients with type 2 diabetes and severe insulin resistance: a pilot study. *Exp Clin Endocrinol Diabetes* 2008; 116:132-4.
15. Maki KC, Galant R, Samuel P et al. Effects of consuming foods containing oat beta-glucan on blood pressure, carbohydrate metabolism and biomarkers of oxidative stress in men and women with elevated blood pressure. *Eur J Clin Nutr*. 2007; 61:786-95.
16. Davy BM, Davy KP, Ho RC, Beske SD, Davrath LR, Melby CL: High-fiber oat cereal compared with wheat cereal consumption favorably alters LDL-cholesterol subclass and particle numbers in middle-aged and older men. *Am J Clin Nutr* 2002; 76:351-358.
17. FDA allows whole oat foods to make health claim on reducing the risk of heart disease. *FDA Talk Paper*, T97-5, January 21, 1997.
18. Meydani M. Potential health benefits of avenanthramides of oats. *Nutr. Rev*. 2009; 67:731-735.

About the author: Dr. Samir Anil Singru is a noted expert in Community Medicine at Smt Kashibai Navale Medical College and General Hospital, Narhe (Ambegaon), Pune-411041, Maharashtra, India. He can be accessible by pmsamir@gmail.com