Scientific Substantiation of the Claimed Effects

Truelife Heart Up +

Barley Beta-glucan

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I. Health claims

- Based from Commission Regulation (EU) No 1048/2012 of 8 November 2012:

  Barley beta-glucans has been shown to lower/reduce blood cholesterol. High cholesterol is a risk factor in the development of coronary heart disease.

  Conditions:
  Information shall be given to the consumer that the beneficial effect is obtained with daily intake of 3 g of barley beta-glucan. The claim can be used for foods which provide at least 1 g of barley beta-glucan per quantified portion.

- Based from Commission Regulation (EU) No 432/2012 of 16 May 2012

  Consumption of beta-glucans from oats or barley as part of a meal contributes to the reduction of the blood glucose rise after that meal

  Conditions:
  The claim may be used only for food which contains at least 4 g of beta-glucans from oats or barley for each 30 g of available carbohydrates in a quantified portion as part of the meal. In order to bear the claim information shall be given to the consumer that the beneficial effect is obtained by consuming the beta-glucans from oats or barley as part of the meal.

II. Beta-glucan

Beta-glucans are soluble fibre made up of non-starch polysaccharides. They have linear glucose molecules linked by β (1-4) bonds and separated by a single glucose molecule with a β (1-3) link. The mixed linkages are responsible for the unique properties of beta-glucans such as solubility and viscosity (EFSA Journal 2011;9(12):2471).

Beta-glucans occur naturally in brans of cereal grasses like barley, oats, rye and wheat. Methods for measuring the concentration of beta-glucans in food are already established (EFSA Journal 2011;9(6):2207).

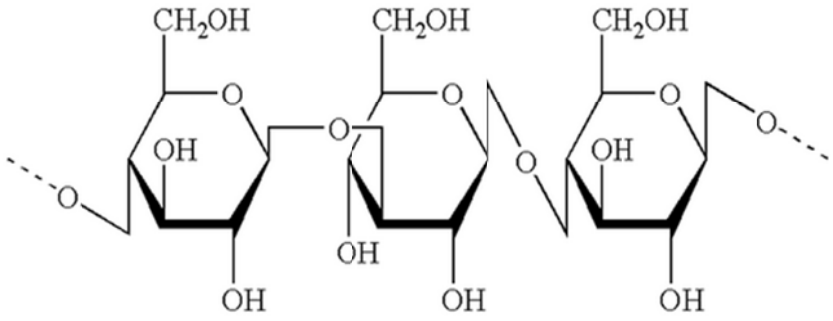

Fig.1. Beta-glucan linkages.

III. Blood cholesterol lowering/reducing effect of beta-glucan

The cholesterol lowering effect of beta-glucan are brought about by the following mechanisms:

1. Reduction of the intestinal absorption of cholesterol and bile acids by binding to the glucans;
2. Shifting the liver from cholesterol synthesis to bile acid production;
3. Fermentation by intestinal bacteria to short chain fatty-acids, which are absorbed and inhibit hepatic cholesterol syntheses.

   (Rondanelli, M., Opizzi,A. and Monteferrarion, F., The biological activity of beta-glucans. From:http://www.ncbi.nlm.nih.gov/pubmed/19571787)

The cholesterol lowering effect of beta-glucans depends on the property of the fibre to increase in viscosity while in the small intestine. The viscosity in the small intestine is determined by the concentration, molecular weight and solubility of the beta-glucans (EFSA Journal 2011;9(12):2471).

Several studies were presented in EFSA Journal 2011;9(12):2471 to prove the cholesterol lowering effect of beta-glucan. First study was a meta-analysis comprised of 11 studies which included a total of 591 subjects, ages from 20 to 63 years old.

Study populations were both normo- and hypercholesterolaemic with an average blood cholesterol ranges from 3.6 to 8.6 mmol/L. The duration of the intervention lasted from 4 to 12 weeks. Products made with barley flour, flakes, bran and pearls were given to the study group with beta-glucans level from 3 to 12 g/day (average 5g/day). Control group were given comparable products made with wheat and rice. Results showed that overall, barley beta-glucans lowered total cholesterol by 0.30 mmol/L and specifically, LDL-cholesterol by 0.27mmol/L. Results also showed that HDL-cholesterol concentrations were not affected.

The second meta-analysis comprised of 8 studies, seven of which were already included in the first meta-analysis. The additional study included a randomised, parallel, 30-days intervention trial in 79 hypercholesterolaemic subjects. Results showed barley beta-glucans lowered total cholesterol by 0.35 mmol/L and specifically, LDL-cholesterol by 0.26mmol/L. Other blood lipid parameters were not affected.

A randomised controlled crossover trial including 24 mildly hypercholesterolaemic men was conducted. The subjects consumed a barley beta-glucan enriched diet (6g beta-glucans per day) or a rice bran-enriched control diet for 4 weeks each. The barely beta-glucan diet induce a significant decrease in total and LDL-cholesterol concentrations of 0.34mmol/L and 0.21 mmol/L respectively. No effects were observed on other blood lipid parameters.

IV. Reduction in blood sugar rise after meal

Beta-glucans' reduce post-prandial glycaemic response or the reduction in blood sugar rise after meal effect is related to the increased viscosity of the meal bolus when beta-glucans are added. Due to the high viscosity of the meal bolus, the rate of absorption of nutrients, including glucose, in the small intestine were delayed (EFSA Journal 2011;9(6):2207) (Battilana et al., 2001; Wood et al., 2000; Wursch and Pi-Sunyer, 1997).

Several human intervention studies were presented on the EFSA Journal 2011;9(6):2207 to substantiate the reduce post-prandial glycaemic response effect of beta-glucan.
Studies conducted by Liljeberg et al. (1996), Östman et al. (2006) and Juntunen et al. (2002) involved comparisons between standardised meal protocol using whole-meal bread products (from oats, barley and rye) and standardised meal protocol using white wheat bread. Liljeberg and Östman's results showed statistically significant reduction in post-prandial glycaemic and insulinaemic responses following the consumptions of beta-glucan-riched meals (4.6 to 14g of beta-glucans per 30g of available carbohydrates) compared to the test meal. Juntunene's study observed significant reduction in post-prandial insulinaemic response from the test meal.

Studies of Holm, et al. (1992) and Yokoyama, et al (1997) showed consumption of pasta with 12g of beta-glucans in 100g available carbohydrate portion (about 3.6g/30g available carbohydrates) resulted in significant reduction and delayed peak glucose responses.