



Issue 1: May, 2019: This e-bulletin is aimed at health professionals, consumers, growers, farmers, packers, processors, distributors, retailers, and others in the plant foods area.

Fibre in the diet – increase your intake!

This is the first issue of **PlantFoods_{ucd}** and is in response to increased consumer and food industry momentum to raising consumption of foods of plant origin as a route to maintaining good health. The surge in vegetarianism, veganism and flexitarian eating is manifested in existing/new food companies producing foods of plant origin and the availability of these foods in supermarkets. Small companies such as The Vegetarian Butcher are being taken over by multinationals to give the latter an entrée in the rapidly expanding plant foods market. The current and future issues of **PlantFoods_{ucd}** will highlight developments in the plant foods area with emphasis on health properties.

Dietary fibre intakes in Ireland

Promoting fibre in the diet is nothing new dating back to the 1960s and 1970s (Burkitt et al., 1972; Scala, 1974; Gormley, 1977). Yet despite continued emphasis on increased dietary fibre intake over the decades Irish consumers were still fibre deficient at about 19g/person/day in 2011 (Flynn et al., 2011) and there is no reason to assume that daily intakes have increased since then. The European Food Safety Authority recommends about 25g/day with upwards to 30-35g/day recommended by dietary experts in a number of countries.

Types and sources of dietary fibre (DF)

In the 1970s distinction had to be made between fibre (crude fibre) and DF. The former was the dry residue remaining after a food/fibre source was digested with sulphuric acid under specific conditions (Ershoff, 1975) while the latter is food/plant material which passes undigested through the small intestine and is fermented by bacteria in the large intestine. DF is measured by an enzymatic procedure (McCleary, 2003) and is usually much higher than crude fibre content e.g. the DF content of wholemeal is about 11% compared to a crude fibre content of circa 2%. The term crude fibre has been largely abandoned and nowadays fibre, e.g. on a food label, means DF. Pectin, cellulose, hemicelluloses (gums and mucilages) and

lignin (woody tissue, e.g. in over-mature green beans or asparagus) are the main constituents of DF and plant foods and foods of plant origin are the principal sources. Enzyme resistant starch (RS) is also recognised as DF and three forms have been identified i.e. RS1: physically inaccessible starch (in partly milled grains and seeds); RS2: resistant starch granules (raw potato and banana); RS3: retrograded starch (in cooked and cooled starchy foods) (Englyst et al., 1992). For example, heating and cooling boiled potatoes three times results in RS contents of 13, 18 and 23% (dry matter basis) i.e. a large increase in DF content (Gormley & Walshe, 1999). Heating and cooling porridge would have a similar effect. The DF content of foods is readily available from Google so there is no need for an exhaustive list here. However, some examples (% as eaten) in descending order are wheat bran (43), chia seeds (34), linseed (27), oat bran (15), porridge oats (8.6), wholemeal bread (7), raspberries (7), pulses (5), carrots (2.8), white bread (2.7), broccoli (2.6) and strawberries (2). In the last 15 years there has been a plethora of plant derived fibre concentrates which can be added to formulated foods to increase DF content. Examples include resistant starch (90% DF), Herbacel AQ Plus Citrus (90% DF), SunFiber (86% DF) and green banana flour (12% DF). Other DF concentrates include hydroxypropyl methylcellulose and xanthan gum.

Health benefits of dietary fibre

There are many studies on the positive effects of DF in the diet. Foremost among these is the provision of bulk in the gut and resulting decreased gut transit time which reduces the residence time of potentially harmful substances in the gut. DF is associated with alleviation of constipation, reducing cancer risk, lowering blood pressure & total cholesterol, raising good cholesterol (HDL), helping control type-2 diabetes, appetite regulation, weight control and recently a study linking minimally processed high DF diets, especially wholegrains, with reduced mortality (Reynolds et al., 2019).

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