

summarized, so that out of 20 trials conducted, 12 trials became the bases of analyses (Ripsin et al. 1992). This report provided the strongest substantiation to the FDA, so that about 3 g per day of soluble fibre from oat products can achieve a clinically relevant lowering effect of cholesterol in serum, and that the reduction was also greater in individuals with higher initial blood cholesterol levels.

To explain the cholesterol-lowering effect of β -glucan from oats, four mechanisms have been proposed by Bell et al. (1999). First, it has been hypothesized that the soluble fibre binds to bile acids in the intestinal lumen, resulting in a reduced bile acid pool flowing back to the liver. This binding activity stimulates the production of more bile acids from cholesterol, thus reducing the serum cholesterol concentration (Lia et al. 1997). A second mechanism centres on the short-chain fatty acids (like acetic, butyric and propionic acids) that are formed from the fermentation of soluble fibre in the large bowel by native intestinal microflora (Glore et al. 1994). These fatty acids are absorbed through the portal vein, inhibiting the HMG-CoA reductase activity or increasing the catabolism of LDL cholesterol. A third mechanism involves the delay of gastric emptying by oat soluble fibre – this minimizes post-prandial serum insulin concentrations (Inks and Mathews 1997), which in turn diminishes hepatic cholesterol production through mediation of HMG-CoA reductase. Lastly, the increase in intestinal viscosity was induced by oat soluble fibre that may interfere with the absorption of dietary fat, including cholesterol (Inks and Mathews 1997).

2.3.3 FLAXSEED (LINSEED)

Flaxseed or linseed is known as an abundant source of omega 3-fatty acid, α -linoleic acid (ALA), mammalian lignan precursors and viscous fibre components (Oomah and Mazza 1999). The high concentrations of ALA, dietary fibre (polysaccharide gum or mucilage) and lignans have been related with the many potential health benefits of flaxseed.

The first meta-analysis investigated the relationship between intake of flaxseed or its components and risk reduction of disease in humans was exploited by Oomah (2001). Out of the 24 clinical studies identified, only 12 (6 with flaxseed and 6 with flaxseed oil), comprising a total of 208 subjects, were observed to meet all the criteria of well-designed clinical trials. Four of these studies substantiated the protective effect of ALA of flaxseed oil against cardiovascular disease. Three studies reported that utilization of raw or defatted flaxseed reduced total and LDL cholesterol. Five studies showed the role of flaxseed in promoting bone health and its phytoestrogenic and therapeutic effect in reducing the risk of hormone-associated cancers in women.

2.3.4 TOMATOES

Tomatoes and tomato products have been the focus of intense investigation in recent years, particularly for their relation to prostate cancer (Giovannucci et al. 2002; Hadley et al. 2002; Campbell et al. 2004; Stacewicz-Sapuntzakis and Bowen 2005). Giovannucci (1999) studied the epidemiological literature on the relationship between intake of tomatoes and tomato-based products, the plasma levels of