and cancer risk was observed. This epidemiological evidence is supported by a host of experimental studies, which have indicated that glucosinolate breakdown products exerted anticarcinogenic activity in both experimental and animal models (Verhoeven et al. 1997).

Stoewsand (1995) reported that the cancer chemopreventive effects of *Brassica* vegetables were attributed by the two types of phytochemicals such as certain glucosinolates and *S*-methyl cysteine sulfoxide present in it.

The indolyl glucosinolate glucobracissin, found in higher levels in Brussels sprouts, was hydrolyzed by myrosinase to give indole-3-carbinol (I3C). This indole was suspected to be responsible for its chemopreventive property and this relation has been under investigation, especially toward the mammary gland. It may reduce the risk of cancer by increasing 2-hydroxylation over 16-hydroxylation of oestrogen – this shift in hydroxylation represents a reduction in the activity of oestrogens and may protect against oestrogen-related cancers (Hasler 1998).

In a human clinical trial, women were given a dose of 500 mg I3C (roughly 50 times the estimated average daily intake in the United States) daily for a week, which resulted in a significant increase in 2-hydroxylation of estradiol (Michnovicz and Bradlow 1991). The result recommended that I3C may be a new approach for minimizing the risk of breast cancer. However, animal studies have shown that I3C and other indoles induced the production of both phase I and II enzymes. Induction of phase I enzymes could activate or deactivate the carcinogens, whereas the induction of phase II enzymes leads to detoxification. Thus, caution was urged before going on with an extensive clinical trial (Dashwood 1998); although similar phase I clinical trials to the one described above are being carried out (Wong et al. 1998).

Three-day-old sprouts of cultivars of certain crucifers, including broccoli and cauliflower, contain 10 to 100 times higher amounts of the aliphatic glucosinolate glucoraphanin than the corresponding mature plants (Fahey et al. 1997). Myrosinase hydrolyzes glucoraphanin to yield sulforaphane, an isothiocyanate, which induces a phase II enzyme (Zhang et al. 1992). Hence, broccoli sprouts have more desirable anticancer properties than matured vegetables (Fahey et al. 1997; Nestle 1998).

2.3.2 Oats

Among the food grains, oats are the most concentrated source of β-glucan, a soluble non-starch polysaccharide recognized to reduce the risk of coronary heart disease (Bell et al. 1999). Compounds such as phytates, phenolics, vitamins and minerals, which confer other physiological benefits, are also present.

Oats were the first food to be permitted to have a health claim under the U.S. Nutrition Labeling and Education Act (Hasler 1998). The FDA approved the claim 'soluble fiber from oatmeal, as part of a low saturated fat, low cholesterol diet and may possibly reduce the risk of heart disease'. The FDA has acknowledged that β-glucan is the main active ingredient accountable for this health claim (Oomah and Mazza 1999).

Several clinical studies were conducted to find the impact of oats on serum lipids (de Groot et al. 1963). The most conclusive study was a meta-analysis for the effect of oat products, wherein a clinical trial on free-living subjects was performed and