

## 2.6 Antioxidant

Antioxidants are found abundant in several types of plant materials such as vegetables, fruits, cereal crops, spices and herbs (Table 2.5). Most of these substances are polyphenol components, types of secondary metabolites of plants (Walton *et al.* 1999). Therefore, consumption of diet high in fruits and vegetables can significantly increase the antioxidant capacity in human plasma and have strong protective effects against major disease risks.

Polyphenol components play important roles as reducing agent, hydrogen donor, metal chelators and singlet oxygen quenchers, which are attributed by their scavenging properties (Rice-Evans *et al.*, 1995). Thus, antioxidants can neutralize the free radicals and oxygen radicals produced in biological systems. According to Moskovitz *et al.*, (2002), free radicals have been associated with etiology and progression of diseases and ageing.

On the other hand, in food industries, antioxidants are usually used in inhibition of lipid oxidation in red meat, poultry, fish (Tang *et al.*, 2001a; McCarthy *et al.*, 2001) and also bakery products. Antioxidants help to inhibit rancidity and prolong the shelf life of food products. However, compared to natural antioxidants, synthetic antioxidants such as butylated hydroxytoluene (BHT) and butylated hydroxyanisole (BHA) and propyl gallate (PG) are widely used in food industries. Due to carcinogenic and toxic components which will be released during degradation (Ito *et al.*, 1985), natural antioxidants including catechins, epicatechin, gallic acid, and  $\alpha$ -tocopherol can be used as alternative in food.

Recently, many epidemiological studies have found that there is a significant positive effect of antioxidant intake towards human health. These included improve