Among synthetic antioxidants, those most frequently used in food industries are butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), propyl gallate (PG) and tert-butyl hydroquinone (TBHQ). Reports revealed that BHA and BHT could be toxic, and the higher manufacturing costs and lower efficiency of natural antioxidants, such as tocopherols, together with the increasing consciousness of consumers with regard to food additive safety, created a need for identifying alternative natural and probably safer sources of food antioxidants (Sherwin 1990; Wanasundara and Shahidi 1998). Moreover, antioxidant activity also depends on the type and polarity of the extracting solvent, the isolation procedures, the purity of active compounds, as well as the test system and substrate to be protected by the antioxidant (Meyer et al. 1998).

The genus *Castanospermum* belongs to the family Fabaceae and has only one species, *Castanospermum australe*, commonly referred to as the black bean or the Moreton Bay chestnut. It is a medicinal as well as toxic plant which is indigenous to Australia, but cultivated in Pakistan. The seeds are toxic, but become edible when carefully prepared by pounding into flour, leaching with water and roasting. Its seeds have been utilized following extensive preparation as a food by Aborigines and contain alkaloids which have been shown to have anti-HIV and anticancer properties. *Castanospermum australe* has proved to be a fruitful source of alkaloids of the polyhydroxy indolizidine and pyrrolizidine classes, having antineoplastic and antiretroviral properties. It is evident from the fact that the various constituents of *Castanospermum australe* e.g. alkaloid, saponin and flavonoids may exhibit biological activity to a various extent, and could be considered as promising compounds for clinical utilization. The present study focused on a method to quantify the total amount of phenolics, tannins, flavonoids and *in vitro* antioxidant activities of leaf, bark and seed extracts of *C. australe.*

18.2 MATERIALS AND METHODS

18.2.1 Collection and Identification of Plant Material

Fresh leaves and bark were collected during the month of January 2014 and the seeds during the month of June 2014 from the Thiruvananthapuram district of Kerala, India. The taxonomic identity of the plant was confirmed from the Botanical survey of India, Southern Circle, Coimbatore, Tamil Nadu. The fresh plant materials were washed under running tap water to remove the surface pollutants and were air-dried under shade. Then they were separately homogenized into a fine powder using a mixer and were used for further studies.

18.2.2 Chemicals

2,2-diphenyl-1-picryl-hydrazyl (DPPH$^{\bullet}$), potassium persulfate, 2,2'-azinobis (3-ethylbenzothiozoline)-6-sulfonic acid disodium salt, 6-hydroxy-2,5,7,8-tetramethylchroman-2-carboxylic acid (Trolox), butylated hydroxy toluene (BHT), rutin, gallic acid, ferrous chloride, ferric chloride, hydrogen peroxide, ferrous ammonium sulfate, ethylene diamine tetra-acetic acid (EDTA) disodium salt, N- (1-naphthyl) ethylene