

of leaf extract at a concentration of 100 and 200 mg/kg body weight significantly protect the animal from  $\text{CCl}_4$ -induced increase of glutamate oxaloacetate transferase, glutamate pyruvate transferase, alkaline phosphatase and bilirubin and better maintain protein level in serum. The result suggests use of sea buckthorn leaf extract as nutraceutical or food supplement against liver disease (Geetha et al. 2008).

The possible mechanisms of the adaptogenic activity of sea buckthorn during exposure to cold, hypoxia and restraint (C-H-R) stress induces hypothermia and post-stress recovery in rats has been elucidated. Results suggest that sea buckthorn extract treatment causes a trend for shifting anaerobic metabolism to aerobic during C-H-R exposure and post-stress recovery (Saggu and Kumar 2007). Adaptogenic activity of the extract might be due to its antioxidant activity, maintained body glucose level, better utilization of free fatty acids and improved cell membrane permeability (Saggu and Kumar 2008). Sea buckthorn oil has significant anti-atherogenic and cardioprotective activity. The therapeutic value of sea buckthorn against sub-chronic arsenic toxicity in mice has shown that aqueous extract of sea buckthorn significantly protects against arsenic-induced oxidative stress, but does not chelate arsenic.

In a joint study carried out by different DRDO Life Sciences labs, ethanolic and water extracts of sea buckthorn have shown protective effects against the toxic effect of mustard gas, a chemical warfare agent (Vijayaraghvan et al. 2006). Sea buckthorn extract has also been used against Dengue virus infection in human blood-derived macrophages. Infected cells treated with sea buckthorn extract are able to maintain cell viability of Dengue infected cells at par with some commercially available antiviral drug (Jain et al. 2008). Sea buckthorn seed extract possesses antibacterial activities against *Bacillus cereus*, *B. coagulans*, *B. subtilis*, *Listeria monocytogenes* and *Yersinia enterocolitica*, suggesting the use of sea buckthorn as food preservative (Negi et al. 2005).

Berry oil has shown good potential towards platelet aggregation and the beneficial effects of blood clotting in humans; further studies on the dose–response effect are needed to assess the practical use of berry oil supplements (Stobdan et al. 2011). In arid and semi-arid regions, sea buckthorn has the outstanding capacity to improve the environment and economic development. We can look forward to a continued revelation of sea buckthorn's many gifts through the increasing interest and research into its abundant and valuable properties. Judicious exploitation and utilization of sea buckthorn resources can bring more benefits to humankind throughout the world.

### 12.3 *CAPPARIS SPINOSA* L.

*Capparis spinosa* (Figure 12.2) also called the ‘caper’ and locally known as *Kabra* is one of the oldest of the known medicinal plants of the Amchi system (local doctors) which is occasionally used by local people of Ladakh as a leafy vegetable and forage. It grows wild in the Ladakh region around 10,000 ft above mean sea level. It can be consumed as a cooked vegetable, salad, pickle and condiment. The species is quite hardy and can tolerate temperatures between  $-5^\circ\text{C}$  and  $-10^\circ\text{C}$  (Phillips and Rix 1998; Mishra et al. 2009b). Immature flower buds are pickled in vinegar, sauces or preserved in salt and have a high demand in European countries (Bown 1995).