Chapter-VI

SUMMARY

_Cassia tora_ L. syn. _Cassia obtusifolia_ commonly known as Foetid Cassia, The Sickle Senna and Wild Senna., _Puwad, Charota, Chakvd, Chakavat, Aelu_ belongs to family Leguminosae. It is an annual herb, 30–90 cm high occurring as wasteland rainy season wild plant in India. _Cassia tora_ is a wild crop that grows in most parts of India as a weed. The main useful parts of _Cassia tora_ are leaves, roots and seeds. _Cassia tora_ seeds are rich in proteins and dietary fiber. Much work has not been done in India on the nutritional and biological evaluation of _Cassia tora_ seeds, so the present study was planned with the objectives of carrying out the physico-chemical analysis, biological evaluation and to develop some value-added food products by supplementing _Cassia tora_ seeds. The study was conducted in the Department of Food Science and Nutrition, College of Home Science, CSK HPKV, Palampur.

As far as physical characteristics were concerned, the colour of raw and roasted _Cassia tora_ seeds was dark brown with a glossy surface. Shape of the seeds was irregular and rectangular resembling fenugreek seeds in appearance. 1000 kernel weight of the raw seeds was higher than that of roasted seeds. Length, width and density of raw seeds was more as compared to the roasted seeds. Roasting resulted in a decrease in the physical characteristics of the seeds.

Moisture content of roasted seeds was less than that of the raw _Cassia tora_ seeds. Ash content was higher in raw seeds as compared to the roasted seeds. Roasting resulted in a decrease in crude fat and crude protein content of _Cassia tora_ seeds. Roasted
*Cassia tora* seeds had higher crude fiber content as compared to raw seeds because of concentration of nutrients due to moisture loss in roasting. The NPN content was also higher in the roasted seeds due to degradation of enzymes during roasting. Raw seeds contained higher amount of true protein as compared to the roasted seeds. Roasting resulted in an increase in total carbohydrates and decrease in energy content of *Cassia tora* seeds. An increase was observed in total sugars, reducing sugars and non-reducing sugars in roasted seeds.

Roasting resulted in an increase in the dietary fiber constituents *viz.* lignin and cellulose while the hemicellulose content decreased in roasted seeds, whereas the antinutritional factors such as, phytic acid, trypsin inhibitors and tannins decreased.

Biological trial for evaluating the protein quality of *Cassia tora* seeds was conducted on rats by feeding them diet containing 10, 20 and 30 per cent levels of raw and roasted *Cassia tora* seeds. Results of the trial showed that feed and protein consumption was more in control group. Addition of raw and roasted *Cassia tora* led to a decrease in feed consumption by the rats. PER and FER of the control group was maximum and that of the groups fed raw and roasted *Cassia tora* at 30 per cent levels was minimum. Mortality was also observed in the groups fed *Cassia tora* diet at all the levels, however, 100 per cent mortality was observed in the groups fed raw and roasted *Cassia tora* at 30 per cent levels. The animals fed raw *Cassia tora* at 30 per cent level died within 12 days of the trial and the animals fed roasted *Cassia tora* at the same level died within 26 days of the trial. The postmortems of the dead animals revealed that the animals died due to hemorrhages of the lungs and gastro-intestinal tract.
As far as nitrogen balance is concerned, nitrogen intake, nitrogen excretion and nitrogen retention were higher in rats fed roasted *Cassia tora* at 10 per cent level as compared to other groups fed *Cassia tora* diet. But nitrogen intake, excretion and retention were maximum and significantly higher in the control group. APD, TPD, BV, NPU, NPR, PRE were also maximum in the control group followed by the group fed roasted *Cassia tora* at 10 per cent level.

Incorporation of *Cassia tora* seeds in the diets of rats resulted in a slight decrease in blood glucose. However, this decrease could have also been due to less feed intake by the animals fed *Cassia tora* diets.

Addition of *Cassia tora* seeds in the diets of rats significantly lowered their blood cholesterol levels. Roasting had a higher hypocholesterolemic effect as compared to raw seeds. However, this significant decrease could have also been due to less feed intake by the animals fed *Cassia tora* diets.

Some of the food products were prepared by supplementing *Cassia tora* seeds at different levels and their organoleptic evaluation based on a 9-point hedonic scale was carried out. Coffee was prepared by supplementing raw and roasted *Cassia tora* seeds at 5 per cent levels. The overall acceptability of control coffee was found to be highest, however the coffee supplemented with *Cassia tora* powder was liked slightly by the panel of judges. *Chutney* was prepared by supplementation of *Cassia tora* seeds at 2.5 and 5 per cent levels. The scores for overall acceptability of *chutney* at 2.5 and 5 per cent levels were 8.07 and 8.09, respectively. *Missi roti* and rice flour pancake supplemented with *Cassia tora* powder were found to be ‘moderately liked’ by the judges. The overall acceptability of bread *pakora* supplemented with *Cassia tora* powder at 2.5 per cent level
was higher than that of control. The scores for overall acceptability of parantha supplemented with *Cassia tora* powder at 2.5 and 5 per cent levels were 7.74 and 7.79, respectively.

*Cassia tora* seeds are rich in proteins, fiber and carbohydrates. However, they also contain certain antinutritional factors, which decreased on roasting. The seeds have a hypocholesterolemic effect which increased on roasting. The seeds have also been found to be toxic as is evident from the findings of Biological trials resulting in hemorrhages of lungs and gastro-intestinal tract. However, further research needs to be done to detoxify and for recommending a safe level of consumption of *Cassia tora* seeds for humans, so as to make use of this underutilized crop.