CHAPTER II

AIM AND SCOPE
On a world wide basis, legumes make an important contribution to human nutrition. Legumes are important sources of protein in Indian diets. Legumes are subjected to a variety of preliminary processing methods like decortication, pounding and milling before they are consumed. Among the traditional methods of legume food preparations, germination is the generally adopted method for enhancing the palatability which incidentally may result in enhancing the digestibility and nutritive value. Germination is a complex process. Imbibition of seeds triggers the cellular machinery to convert the complex stored food materials to simpler forms, facilitating their utilization. Pronounced metabolic changes take place during seed germination with the development of the enzyme systems needed for the mobilization of food reserves and for the utilization of products resulting from degradation. The metabolic events occurring during germination are not the same in seeds of different species and even in different cultivars of the same species.

For human consumption, the legumes are processed by various methods like parching, puffing including soaking, sprouting, boiling, roasting and fermentation, depending upon tradition and taste preferences. Domestic processing and cooking have been known to improve the nutritional quality of the legumes by increasing the protein digestibility as well as by reducing the level of antinutritional factors, like trypsin inhibitors, phytic acid, polyphenols and others.

Extensive epidemiological, animal and clinical studies have established raised serum cholesterol levels as a strong risk factor for ischaemic heart disease (IHD). Efforts to decrease serum cholesterol levels in an attempt to alleviate IHD
have long been the preoccupation of nutritionists and medical scientists. Diets based on leguminous seeds appear to possess the desirable qualities of a cholesterol lowering diet. During the last few years considerable work has been carried out on the role of dietary fibre from different sources in reducing the serum cholesterol in hypercholesterolemic conditions.

Among the commonly grown and consumed legumes, Indian bean (Dolichos lablab) is a lesser known legume which has not received due attention by biochemists and nutritionists. It is prain with short pods. Varietal variation in size and colour - white, red, brown, black, hilum white - are noted in Indian bean, grown in different parts of South India. Indian beans (Dolichos lablab var lignosus L.) are grown widely and consumed in this region (Anantapur district, Andhra Pradesh, India). Seeds of this variety are brown in colour with average weight of hundred seeds being 24.0 ± 1.2 g. Germination is epigeal. It is cultivated as an inter-crop with ragi (finger millet) and as border crop with many other crops under rainfed conditions. Irrigation is rarely required if plants are sown at the end of wet season, but irrigation is necessary for crops grown in semi-arid areas with an annual rainfall of less than 400 mm (Tindall, 1986).

Dry seeds of Indian bean (Dolichos lablab var lignosus L.) are widely used in the diets of people residing in the district of Anantapur, Andhra Pradesh. The dry legume is generally soaked and consumed sprouted or unsprouted, cooked or uncooked (Shakuntla Manay and Shadakshara Swamy, 1995).

Hence the present study was carried out to perform a systematic study of the manner in which chemical and biochemical components, protein quality, digestibility
and cholesterol lowering effect of Indian bean (Dolichos lab lab var lignosus) are altered during germination. Studies also have been extended on changes in selected antinutritional factors of Indian bean by different cooking processes.

Raw, dry Indian bean seeds soaked for 12 h were set to germinate in dark at room temperature and samples of germinated seeds were removed at 8 hourly intervals of time over a period of 32 h and processed for analysis.

In the present study, major thrust has been focussed on the following aspects of Indian bean during germination.

1. Changes in starch, total soluble carbohydrates (TSC), oligosaccharides - raffinose and stachyose, and reducing sugars (RS) as well as the enzymes (amylolytic and phosphorolytic) involved in the degradation of starch have been studied.

2. The characteristic changes in total nitrogen, protein nitrogen, non-protein nitrogen, and free amino acids and development of proteases involved in the degradation of proteins have been investigated.

3. In vitro and in vivo protein digestibility.


5. Biological evaluation of seed protein-in vitro, and in vivo protein digestibility, apparent and true digestibility, and protein efficiency ratio.

6. Cholesterol lowering effect of diet supplemented with Indian bean seeds, was also studied.

Further, the effect of different cooking processes like roasting, boiling and pressure cooking on antinutritional factors was also determined.

The data of this study has been analysed and discussed in relation to the work carried out on other legumes.