INTRODUCTION
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Millets are small seeded cereals used for food, feed and forage. They are widely cultivated in the tropics and consumed by all age groups in several recipes after cooking. They are highly valued by rural and tribal populations in dryland regions of India. Sorghum, pearl millet and finger millet have received the attention of agricultural scientists and nutritionists for a long time. But some of the minor millets such as Italian millet/ Foxtail millet (Setaria italica Beauv.), Proso millet (Panicum miliaceum Linn.), Barnyard millet (Echinochloa frumentacea (Roxb.) Link., Kodo millet (Paspalum scrobiculatum Linn.) and Little millet (Panicum miliare Lam.) have not been much investigated for nutrient composition and protein quality (Geervani and Eggum, 1989).

Millets were consumed as cereals and brewed from prehistoric times in Asia, Africa and Europe. They may have been among the first cultivated crops being grown in the `Hoe Age' preceding the `Plow Age'. The millets were widely grown in Europe during the `Middle Ages' being one of the principal foods of the poorer people of Rome and of Europe. During 19th century, however, the millets were gradually superseded by wheat, rye, rice, maize and potatoes in Europe. However, the production and consumption of millets have persisted to a greater extent in Eastern Europe and Russia, where they are still used in certain parts for cooking, baking, brewing or for other purposes. They form staple food for millions of people in Africa, Asia including India (Rachie,1975).

They are frequently short-term, warm season crops. Sometimes used in emergencies following crop failure due to some unfavourable weather
conditions or other calamities. Individual millet species or varieties frequently possess some unusual characters for adaption or use like tolerance or resistance to drought, high temperature, low soil fertility and diseases or pests or for making special foods or beverages (Rachie, 1975).

In India the production of minor millets is 9.52 lakh tonnes and in Tamil Nadu alone it is 0.88 lakh tonnes (Anon., 1993). The nutritive values of minor millets are high and comparable to that of wheat, rice and barley. The protein contents of foxtail, little, barnyard, kodo and proso millets are 12.3, 7.7, 7.2, 8.3 and 12.5% respectively as reported in ‘Nutritive values of Indian foods’ (Gopalan et al., 1971). The amino acid composition of minor millets is also comparable with other cereals. The high values for energy and protein digestibility show that starch as well as protein are highly digestible (Geervani and Eggum, 1989). In spite of all these desirable qualities, they remain as under-exploited. Like other cereals, millet proteins are also deficient in lysine. Recently attempts are being made by the breeders in India to produce minor millet varieties with increased yield, protein and disease resistant traits.

Osborne and Mendel classified plant protein into four groups on the basis of their solubility differences as albumins-extracted in water, globulins-extracted in salt solutions, prolamins- extracted in aqueous alcohol and glutelins- extracted in alkaline or acidic solvents (Osborne and Mendel, 1914). The composition of these fractions is different to each crop. In cereals, prolams form the major storage protein except in oats and rice where globulin and glutelin are the major storage proteins. In millets, both prolamins and glutelins are considered as storage proteins but the ratio of prolamin to glutelin varies with the millets. The quality of the protein depends on the relative
proportion of the essential amino acid contents. But prolamins contain less quantity of lysine and it limits the quality of the cereal and millet proteins.

Breeding for higher protein content in cereals has the disadvantage since increase in protein content in seeds decreases the overall nutritional quality. The alternative strategy is to breed for protein quality. The most successful approach so far has been to change the proportion of different proteins in the seed either by conventional crossing involving a rare line which has unusual proportions of protein types or by mutation. The protein groups richest in lysine (albumin and globulin) would be increased at the expense of lysine poor groups (prolamin and glutelin). The ideal way of improving quality would be to radically alter the nucleotide sequence of the structural genes which code for storage protein by mutation programme so that a storage protein with an improved balance of amino acids is obtained.

Another possible approach to protein improvement is to change the morphology of seed. The aleurone layer in cereals is rich in basic amino acids and is consequently of superior nutritional quality but is usually only one cell thick. The embryo also is rich in protein and lysine than starchy endosperm and there may be scope for increasing its size, relative to endosperm. Hence the final aim of research must be to improve the quality of protein in any one of the ways described above. Mertz et al. (1964) produced a maize mutant, Opaque-2, which had nearly twice as much lysine as other varieties of maize. From this, scientists realised that cereal grain proteins could be improved in quality by genetic manipulations. Routine methods for gene insertion are available at present only for rice among cereals, although the prospects for manipulating maize, barley and wheat are good.
Very little information is available on minor millet proteins. Prolamin and glutelin form the major storage protein in millets. Foxtail millet contain higher amount of prolamin (Monteiro et al., 1982) whereas in other millets (kodo millet and barnyard millet) glutelins form the major storage protein (Sudharshana et al., 1988; Monteiro et al., 1988). Naren and Virupaksha (1990) isolated α- and β- setarins from foxtail millet which are low in molecular weight and rich in sulfur amino acids. Not much work has been done on the molecular aspects of protein genes in minor millets.

Studies on the homology in amino acid composition, molecular weights from SDS-PAGE, peptide maps and amino acid sequences among these grains will provide evidence for a common evolutionary origin for the protein that have diverged greatly in structure and function (Shewry and Miflin, 1985).

In view of the above and also considering the importance of minor millets as food for the poor, studies were undertaken with the following objectives.

1. Assessment of nutritional qualities and fractionation of protein in different minor millets,
2. Identification, isolation and purification of homologous protein,
3. Determining the antigenic relationship of homologous protein among the minor millets and with other cereals,
4. Peptide mapping and amino acid composition of the homologous protein,
5. Changes in the nutritional qualities, hydrolytic enzymes and storage proteins during germination and
6. Synthesis and accumulation of storage proteins during seed development.