Introduction
INTRODUCTION

One of the most challenging tasks facing mankind today is to provide sufficient food for the teeming millions. Plant Genetic Resources for Food and Agriculture (PGRFA) is the biological basis of world food security and directly or indirectly supports the livelihood of every person on Earth (FAO, 1996). It is a proved fact that, the carbohydrate play a key role in human nutrition providing the largest single component in man’s diet and it is the main source of energy apart from cereals, root crops form the most important stable food in the tropics (Oyenuga, 1959). In general, plants provide 65% of the global requirement of edible protein (Young and Pellett, 1994) and in particular, about 80% of the protein consumed by the humans in developing countries accrues from plants (Singh and Singh, 1992).

The study on the diversity and distribution of plant wealth vis-à-vis its utilization in this context is of great concern to mankind. Among the various kinds of plants, food plants received the earliest attention of mankind (Burkill, 1952) and reflect man’s search for knowing more and more about the nutrient qualities of food plants. Against this back drop, studies on the diversity and distribution of such edible plants, both of the wild and the cultivated types are relevant to codify exploitation of bioresources.

Before the advent of systematic agricultural practices, man used to gather basic needs from nature food plants and their edible parts. They constituted nearly sixty percent of his intake. The focus of the present study is to throw light on the prevalence of such food consumption patterns among primitive tribes who have not yet been exposed to systematic agricultural production manoeuvres. Such communities still depend on wild food plants (Arora, 1985).

The wild relatives of cultivated crops are actively considered for genetic improvement because they have beneficial genes for tolerance to environmental stress, resistance against pests and insects and higher levels of nutrients, while cultivated species
often have a very narrow genetic base and genes for resistance to certain diseases. Wild species of several cultivated plants act as reservoirs for crop improvement including developing resistance to pests and pathogens (Ignacimuthu and Babu, 1987; Babu et al., 1988).

The tribals in particular have their own culture, religious rites, food habits and a rich knowledge of plant genetic resources in their surroundings. Unfortunately this indigenous knowledge on the properties, utilization and conservation aspects of plant resources available with them is on the verge of depletion due to various development activities which are adversely affecting their cultural and traditional life. It is essential that the knowledge available with these people must be properly documented and integrated with modern scientific values before it gets entombed with culture that gave its birth.

Conservation and use of biodiversity must be concerned not only with genes, genotypes, species and ecosystems, but also with the traditional knowledge that has helped to produce and maintain this diversity. The tribals derive very basic needs for survival from the biodiversity. In turn, they protect the forest, conserve its biodiversity and also enrich its fertility through their various cultural activities, beliefs and practices.

The ethnic people use a wide variety of wild plants and plant products as their food. Studies of nutritional value of wild plant foods are of considerable significance since they may help to identify long forgotten food resources. Irvine (1952) stated that, nutritive value of wild plants will also help to throw some light on the origin of man’s food habits and his agriculture.

India, being one of the biodiversity centres, has contributed to world agriculture atleast 167 plant species (Khoshoo, 1991; Zeven and de Wet, 1982). India ranks tenth among the species rich countries of the world and sixth among the centres of diversity (Gadgil, 1996). Presources and directly or indirectly support the livelihoods of every person on the
Earth (Anon, 1996). The plant genetic diversity is now under threat because of several factors and much of the world's food supply is based on genetically uniform crops.

Agricultural production in the country has substantially decreased due to erratic monsoons and frequent occurrence of drought in certain areas. Tubers can face adverse climatic conditions. The knowledge about the tubers grown in different areas of the country is very poor and hence ethnobotanical studies on tubers are necessary. Along with the crop plant, the ethnic societies of India still depend upon several wild species for their food. The wild fruits, seeds, pods, leaves, tubers, corms and rhizomes are used by the tribals (Ravishankar, 1996). Tamil Nadu is rich in tropical tuberous species though temperate root crops are also cultivated at higher elevations in the Nilgris and Anamalais. The semi evergreen and wet evergreen forests are abundant in plants with tuberous roots and corms. The ethnic communities generally prefer to eat wild varieties of food plants.

During stress conditions, when there is scarcity of food, inhabitants of forests exploit their environment to assuage their hunger and wild food helps them to survive (Vartak, 1982; Gunjakar and Vartak, 1982). The survey of ethnobotanical nature has shown a large number of edible species being exploited by the tribal communities and the consumption of tubers were maximum as compared to leaves, seeds and flowers (Nilegaonkar et al., 1985).

Tuber crops play a vital role in the dietary pattern of many developed countries where per capita consumption ranges from 117 g to 383 g per day (Amla and Shankar, 1975). Dietary surveys carried out in places where Pacific Islanders follow traditional eating show that roots, tubers and fruits usually provide 75-85 per cent of the total energy. In these situations the staple food also provides people with a high proportion of all the other necessary nutrients and it is important that the chosen food should contain high amounts of
proteins, vitamins and minerals. These surveys were carried out amongst the Chimbu people of Papua, New Guinea (Lambert, 1975).

Dye (1976) showed that 60 per cent of the energy came from roots and tubers. In Western Samoa, Wilkins (1963) found that the percentage of total energy derived from roots and tubers varied greatly between rural and urban areas. People living near the town obtained 37-50 per cent of their energy from these foods; those living in more remote villages depended on roots and tubers for 50-64 per cent of their total energy.

Information regarding the chemical and nutritional content of Indian wild edible tubers, corms and rhizomes is meager (Coursey, 1967; Gopalan et al., 1976; Anon, 1976; Cock, 1985; Bradbury and Holloway, 1988; Babu et al., 1990; Mitra et al., 1990; Nair and Nair, 1992; Rajyalaksmai and Geervani, 1994; Balagopalan, 2000; Shanthakumari et al., 2008; Arinathan et al 2009.). Therefore, in the present study, an attempt is being made to estimate the proximate and mineral profiles, starch, vitamins (niacin and ascorbic acid), amino acid profiles, fatty acid profiles, in vitro protein digestibility and in vitro starch digestibility of the collected wild edible tubers, corms and rhizomes consumed by the tribals Kanikkar / Palliyar of South eastern slopes of Western Ghats, Tamil Nadu.

Apart from nutrients, plants contain secondary chemicals / antinutrients such as protease inhibitors, haemagglutins, allergens, alkaloids, hormones and vitamin antagonists (Leopard and Ardrey, 1972). Some of these constituents have been found to be harmful if plants are consumed in raw form or processed incompletely. Over the years, tribals have evolved methods of food processing and food preparation to render the plant free from toxic substances and bitter ingredients. Hence, certain antinutritional substances like total free phenolics, tannins, hydrogen cyanide, total oxalate, amylase inhibitor and trypsin inhibitor activity are also quantified in the present investigation.
It is hoped that, this study will provide ample information for the researchers dealing with nutritional studies on the indigenous wild edible plants particularly tubers, corms and rhizomes which are a cheap sources of carbohydrates, fats and minerals.

As far as the tubers, corms and rhizomes of the present study are concerned, they are considered to be the potential nutraceutical agents (any substance that is a food or part of food and it provides medical or health benefits, including the prevention or treatment of disease). So a considerable emphasis was focused in this investigation on the identification of valuable pharmacological activities from them with effective usefulness as phytopharmaceuticals / nutraceuticals. A similar study on usage of wild edible plants in general was made to identify their therapeutic and dietary potential (Ogle et al., 2003) besides identifying biofunctional tubers, corms and rhizomes in particular (living organism having more than one biological function on or within another organism with distinct effects for health such as phytopharmaceuticals, food or feed) (Morris, 2003).

Keeping these things in mind, an attempt has been made to evaluate their pharmacological activities such as antifertility, antidiabetic and antiinflammatory activities.

PHARMACOLOGICAL STUDIES

Medicinal plants are still a major part of traditional medical system in developing countries. Several herbal remedies are now being intensively used in therapy. The use of medicinal plants as antidiabetic, hepatoprotective and antiinflammatory activities in medicine is a practice common in India, although in most cases the active principles of the plants are unknown. However, evaluation of the pharmacological effects of the herbal crude extracts can still be used as a logical research strategy for searching of new drugs.

In view of this fact, in the present investigation, the ethanol extract of the tuber of *Dioscorea esculenta* for antifertility, corm of *Xanthosoma sagittifolium* and tuber of
*Nymphaea pubescens* for antidiabetic and tuber of *Amorphophallus paeoniifolius* var. *campanulatus* for antiinflammatory activity were used to study through animal model.

**ANTIFERTILITY**

The options available to men for fertility control are much more limited compared to those for women. The male reproductive system, particularly the process of spermatogenesis, sperm maturation and transport and also the sperm-egg interaction are so complex that it has not so far been possible to find an effective intervention that can be converted into a product. Continued efforts over the past three decades to develop additional methods of male contraception have made some significant contribution in the field. However, there is still no method available in the field of male contraception that satisfies the essential criteria of safety, efficacy, economy and complete reversibility. Inspite of considerable development in contraceptive technology, search for male antifertility agents in plants continues to be a potential area of investigation.

**ANTIDIABETIC**

Diabetes refers to Diabetes Mellitus or less often to Diabetes Insipidus. Diabetes Mellitus and Diabetes Insipidus share the name “Diabetes” because their conditions are characterized by excessive urination (polyuria). The word “diabetes” is borrowed from the Greek word meaning “a siphon”. The 2nd century A.D. Greek physician, Aretus the Cappadocian, named the condition “diabetes”. He explained that patients with it had polyuria and ‘passed water like a siphon’. When ‘diabetes’ is used alone, it refers to Diabetes Mellitus. The two main types of Diabetes Mellitus; insulin requiring type 1 diabetes and adult-onset type 2 diabetes are distinct and different diseases in themselves.

The non insulin-dependent diabetes mellitus is one of the most common disorders worldwide. It is a group of metabolic disorders characterized by hyperglycemia, the metabolic disorders include alterations in the carbohydrate, fat and protein metabolism.
associated with absolute or relative deficiencies in insulin secretion and / or insulin action. Along with hyperglycemia and abnormalities in serum lipids, diabetes is associated with microvascular complications, which constitute the main cause of morbidity and mortality of diabetic patients.

The prevention of diabetes is an urgent worldwide public health concern. Obesity and insulin resistance induced by overeating and physical inactivity typically characterize the period preceding onset of type 2 diabetes. The caloric restriction and physical exercise have obvious importance. They stress that actively promoting healthy eating and sleeping habits should be considered for the preventive of obesity and insulin resistance.

ANTIINFLAMMATORY

Antiinflammatory refers to the property of a substance or treatment that reduces inflammation. Inflammatory diseases including different type of rheumatic diseases are very common throughout the world. Although rheumatism is one of the oldest known diseases of mankind and affects a large population of the world, no substantial progress has been made in achieving a permanent cure. The search involving screening and development of drugs for antiinflammatory activity is an unending problem. There is much hope of finding active antirheumatic compounds from indigenous plants, as these are still used in therapeutics despite the progress made in conventional chemistry and pharmacology for producing effective drugs (Handa et al., 1992).