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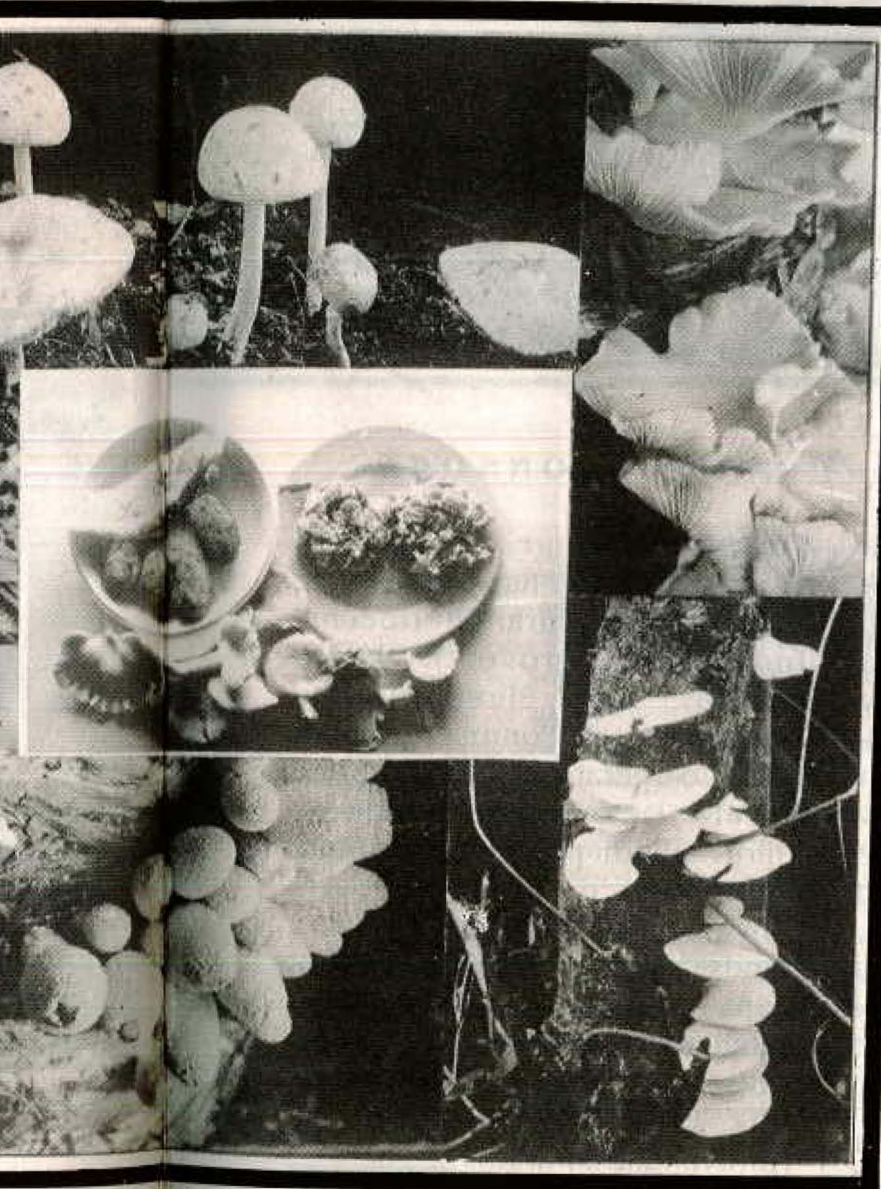
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Inaugural Address

Dr.E.G. SILAS,

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Fungi, the organisms of concern of the Mycologists are an unique group, and are traditionally viewed upon as enemies of crops which reduce their economic value. Therefore, the Scientists have concentrated their efforts to evolve suitable control measures to minimise the crop losses caused by the pathogenic fungi while not much concentrated effort has been made universally to develop the culture of edible fungi - The Mushrooms.

Mushrooms have attracted the attention of man from very ancient times and the use of mushroom as food is as old as human civilization. In ancient religious writings like the Vedas and the Bible there are references on the occurrence of mushrooms and their utilization as food as well as in medicine. The various sizes, colours and shapes of mushrooms have attracted the attention of both naturalists and artists who have depicted them in their drawings, paintings, sculptures etc.

Mushrooms form very delicious and choicest food stuffs, but at the same time many people are afraid of mushrooms since some are deadly poisonous. This is because there is no fool proof method to separate the edible from the poisonous mushrooms. Many cases of mushroom poisoning may not be essentially due to mushroom toxins but may be due to mushrooms which are infected by microorganisms or may be due to the fact that some individuals may be allergic to certain mushrooms.

In nature, mushrooms grow wild in almost all types of soils on decaying organic matter, wooden stumps etc. They appear in all seasons, but mainly during the rainy season wherever organic matter or its decomposition products are available. There are more than 1000 species of edible mushrooms reported in literature from different parts of the world.

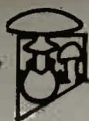
The very high nutritive values of edible mushrooms rank them above all the vegetables and most of the legumes and they are second only to meat.

The cultivation of mushrooms in its primitive forms must have been a very ancient art. Cultivation of the Jew's Ear Mushroom has been recorded in ancient Chinese literature dating back to around 300 B.C. Authentic records are available only for *Agaricus bisporus* (white button mushroom), the cultivation of which was started in Paris around 1650 by melon growers. The standard mushroom houses were built in U.S.A. in 1910. In the later years many improvements were made in the cultivation techniques of mushrooms. The important contribution of scientists is the preparation of pure culture spawn which has opened new avenues for the systematic cultivation of mushrooms.

In India the work on cultivation of mushrooms was first started with the paddy straw mushroom at the College of Agriculture, Coimbatore in the erstwhile Madras Presidency during early 1940s. In 1961 a scheme on cultivation of the European button mushroom was initiated at Himachal Pradesh by the Himachal Pradesh state Government in collaboration with the ICAR and later on this effort blossomed out leading to the creation of the National Centre for Mushroom Research and Training at Solan, H.P. The scientists of our country working at different centres have made significant contributions in the cultivation of Mushrooms.

The economy of Kerala state is mainly based on Agriculture. This state is world famous for its scenic beauty provided by the lush green tropical rain forests and the vast expanses of paddy fields interspersed with long stretches of backwaters. The farming community of Kerala is also well known for the innovations introduced in the different farming systems. The typical homestead in Kerala is really an unique unit of mixed farming consisting of different crops, cattle, poultry etc.

In Kerala, we are now at a stage in which further expansion of area under cultivation of crops is almost impossible because all the arable areas have already been brought under cultivation. This is all the more



evident from the fact that a major area on which our environmentalists have raised their serious objection is the deforestation by people, for cultivation of crops. Therefore, our efforts have to be concentrated on more and more intensive methods of cultivations to increase the yield from different types of crops on an area and for providing enough employment opportunities for the agricultural labourers all the year round.

The introduction of mushroom cultivation in our farming system is gaining importance in this context. The agricultural wastes which are very much plenty in Kerala, can be efficiently utilized for the production of mushrooms which are highly nutritious food materials.

The diet of an average Indian comprises of calorie rich food stuffs but often highly deficient in proteins and ill effects of malnutrition are quite common in our country. According to an estimation made in the late 1960' there was a short fall of around 3.65 m tonnes of protein per year in our country which must have shooted up over these years. To meet the growing food demands of the country, changes in the present day cropping patterns are required. The microbial foods often referred to as single cell protein like the edible mushrooms yeasts and algae are the possible non-conventional food stuffs which need promotion and acceptance from the general public. The mushrooms are a good source of protein, vitamins and minerals apart from having a pleasant flavour and taste.

The cultivation of mushrooms can be considered as the most economic method to convert lignocellulosic agricultural wastes to consumable, protein rich biomass. Utilization of edible fungi forms an important step in the process of microbial biotechnology in which a useful edible product is obtained from agricultural or industrial wastes which may otherwise pose environmental problems. Other redeeming features of mushroom growing are that it requires limited space, needs no sunlight or fertile soil and its high biological efficiency for conversion of lignocellulosic wastes into consumable biomass.

Mushrooms have been regarded as a tasty food material by the people of Kerala from time immemorial. The mushroom, *Termitomyces* has been collected and consumed by villagers and it is known by different names like 'Perumkala', 'Nilampulappan', 'Arikkoon', 'Uppukoon' etc., in different localities in Kerala. This shows that mushrooms have been popular in different parts of Kerala even before the scientists became interested in them.

Now that we have gathered a lot of information on the different aspects of cultivation of many edible species of mushrooms, we have to make mushroom cultivation more popular among the rural as well as urban population.

The cultivation of edible mushrooms can become a very profitable business for our unemployed youth, housewives and many private and public organizations.

In Kerala, systematic cultivation of edible mushrooms and research work on various aspects of their cultivation started during early 1970s. The first type of mushroom to be cultivated was the paddy straw mushroom at the College of Agriculture, Vellayani. The cultivation of this mushroom is not successful in a commercial scale because of its low biological efficiency for conversion of agricultural wastes into consumable biomass and its short shelf life.

During the recent years, the technology for the cultivation of Oyster mushrooms has been revolutionised by the introduction of the polybag method by a group of scientists of CFTRI, Mysore. The technology has been adopted and standardised for Kerala conditions by the scientists of the Department of Plant Pathology, College of Agriculture, Vellayani.

In Kerala, knowledge on the technique or rather art of cultivation of mushrooms has already been imparted by the Scientists of Kerala Agricultural University to small cross sections of different sets of people like unemployed youth, housewives, personnel of the different Government Departments etc. Hence, I think the idea of mushroom cultivation has already started permeating into the different types of people in the rural and urban areas. But we have to put in a lot more effort to popularise it in a very systematic manner through the various Krishi Bhavans and other organizations like service co-operative societies which are established in every Panchayat in Kerala. The Agricultural Officers are already working in good rapport with the



Agriculture and Rural development bank and other commercial banks. Charitable and co-operative organizations can do a lot in promoting the popularity of this nutritious as well as delicious food stuff. Apart from this the different media, social workers, scientists and general public have to work hand in hand for the popularisation of this prized delicacy which can be cultivated in any homestead or on a commercial scale.

When we consider mushroom production on a global scale the contribution of India is far from satisfactory. Many of the developing countries started cultivation of mushrooms after 1960 and realised that it is a promising crop which can be exported to other countries in a very much profitable manner. Taiwan started mushroom cultivation in 1950's and after 1960 started exporting mushrooms. By 1970 mushroom production in Taiwan reached about 44,700 tonnes. South Korea also started mushroom cultivation in 1960's and by 1971 its earnings from export of mushrooms reached \$2 million. This has crossed \$ 60 million by the end of 1980's. China's production of various cultivated mushrooms was over 600,000 tonnes by the end of 1980's even though they started organized cultivation of mushrooms only during 1960's.

Mushroom growers and scientists engaged in research work on various aspects of mushroom cultivation may agree that there is dearth of appropriate technology for the cultivation of mushrooms. The available technology does not solve many problems in the mushroom cultivation. Consistently profitable mushroom production is not possible in many instances and therefore many farmers may shift to safer means of livelihood. Effective low cost technology is essential to bring up good mushroom farmers capable of producing consistently good crops of mushrooms. Mushrooms are a highly perishable item of food stuff and at present there is no efficient technology available for preservation of mushrooms in a fresh condition. This is necessary because people are more interested in getting fresh mushrooms than the dried or canned materials.

We have to find out cheaper substrates for mushroom cultivation especially in the case of paddy straw mushrooms. Paddy straw is a costly material in places like Kerala and so we have to suggest some other substitute. Another lacuna which limits mushroom cultivation is the non-availability of quality spawn for the growers and the Governmental organisation should be set up for supply of pure and quality spawn to growers with some check on the supply of spawn by the private laboratories.

Indian Council of Agricultural Research, the major agricultural funding agency in the country has great interest in mushroom production as evidenced by the amount of funds being invested in mushroom research. A National mushroom research institute and different sub centres have started functioning for the conduct of coordinated projects on mushrooms. The adaptive research of existing species where the cultivation technology has been perfected is needed at many parts of the country and the same needs more funds. Unless this is done at grass root level many people in this vast country may remain ignorant of the possibility of using mushrooms as a food stuff except in those living in large cities.

The future of mushroom production in India holds much promise in view of the fact that many private growers have started cultivation of the European button mushroom in North India and in some of the hill stations in South India. I hope that this symposium will help the Scientists and growers in sharing their ideas and experiences necessary for improvements and innovations in the endeavour of mushroom cultivation. I declare this symposium opened.