

## **SUMMARY OF THE FINDINGS**

### **UGC-MINOR RESEARCH PROJECT**

Project title: **Cytotoxic Studies of Soluble Proteins from Edible Mushrooms of Kerala on *Allium cepa* L.**

UGC Approval No. and Date: **MRP(S)-914/10-11/KLKE009/UGC-SWRO**

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Tenure of the Project: **18 Months**

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Mushrooms are better source of essential vitamins such as niacin, riboflavin and vitamin-C and biologically active compounds. The continuous use of mushroom developed toxicity after consumption of large amounts and Toxins are responsible for most fatalities in mushroom poisonings. Hence, search for new active substances from mushrooms has been a matter of great importance. The present study thus focused to meet the following objectives

Objectives of the study include screening and grading of edible mushrooms in Kerala with respect to cytotoxic activity, isolation of soluble protein with potential cytotoxic properties and identification of active principle.

Extraction from fresh fruiting bodies of *Calocybe* and *Pleurotus* were carried out in electric shaker and extract was filtered, dried and stored. Ethyl acetate, hexane, methanol and water are used for extraction. The water soluble protein was also extracted and used for cytotoxic screening. Aqueous dilutions of these fractions were prepared to get 0.5, 1.5, 1, and 2 percent concentrations for toxicity assay. Assay was carried out commercially available onion. The rooting is induced and the

roots were immersed in the test solutions along with control. The observations were made from squash preparations using acetocarmine.

Mitotic index after treatment with different concentrations of various extracts of *Calocybe* on mitotic index in root tip cells of *Allium cepa L* indicated that a gradual increase, except in the case of WSP. Index of various mitotic stages after treatment with ethyl acetate fraction of *Calocybe* observed that prophase index showed a remarkable increase after treatment. Treatment with methanol fraction of *Calocybe* induces a remarkable increase in the number of various stages of cell division and similar results were observed in the case of aqueous fraction also. Except in prophase water soluble protein fraction of *Calocybe* also found to induce rapid cell division when compared with the control. Stickiness of chromosomes at prophase was observed after treatment with methanol fraction at all concentrations and higher concentration of treatment in the case of water and water soluble protein. Aberrations are absent in the case of ethyl acetate fraction of *Calocybe*. Treatment with other fractions induces stickiness, unorientation and bridges.

Mitotic index after treatment with different concentrations of various extracts of *Pleurotus* in root tip cells of *Allium cepa L* indicated that a gradual increase, except in the case of higher concentration of ethyl acetate and WSP. Index of various mitotic stages after treatment with ethyl acetate fraction of *Pleurotus* observed that prophase index showed a remarkable increase after treatment. Methanol fraction of *Pleurotus* is not yielding a definite sequence either in the case of increase or in decrease in the case of index of various stages. The variation observed are irrespective of the concentration of treatment. Aqueous fraction of *Pleurotus* induces

an increase in the case of index of various stages. Water soluble protein fraction of *Pleurotus* induces a definite increase in the case of index of various stages. Stickiness of prophase was observed after treatment with higher concentration of all fractions. In the case of metaphase unoriented chromosomes are of frequent occurrence after 1.5 and 2 percent of all fractions. In the case of metaphase 1, 1.5 and 2 percent concentration induces varying degrees of stickiness. Bridge at anaphase was observed at treatment with higher concentration of all the fractions, while telophase bridge was observed after treatment with water soluble protein fraction at 2 percent concentration.

The study revealed that the *Pleurotus* and *Calocybe* are the two commonly cultivated mushrooms in Kerala at commercial level. The soluble protein part induced marked genotoxicity in *Allium cepa* L. The identification of the active fraction is not possible to its complex nature and supposed impurities in it. .

The *Allium* assay test has been used widely to study genotoxicity of many materials revealing that these compounds can induce chromosomal aberrations in root meristems of *A. cepa*. Both the cultivated type showed almost equal grades of toxicity at similar concentrations. It was concluded from the present study that the use of *Pleurotus* and *Calocybe* for a long run and greater quantity may induce a chance of toxicity at chromosomal level.

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