INVESTIGATIONS OF ANTI-VIRAL PROPERTIES ON EXTRACT OF PLEUROTUS SAJOR CAJU

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ABSTRACT: Pleurotus sajor caju spawns prepared, yield fruiting bodies. Aqueous extract of these was used to test for inhibitory against Tobacco Mosaic Virus. Infectivity assay (local-lesion) method was employed for the anti-viral activity. Treatments, on host plants, were distributed using half-leaf method. The results indicated that extract of the edible mushroom showed anti-viral property.

INTRODUCTION

The fast growing mushrooms have received remarkable interest with realization that they are a good source of nutrition and some have medicinal value as well. During rainy season the forest region in Chotanagpur Plateau are blessed with mushroom growth. The edible fungal flora include the fleshy and palatable gray Oyster Mushroom or Pleurotus sajor caju and named by Singer in1951¹. The Pleurotus mushrooms are delicious food with high nutritional attributes and minerals². A part from being rich in protein content and containing all nine amino acids essential to man, these are good source of several vitamins including Vitamin B¹, Vitamin B², Niacin, Biotin and Vitamin C. Pleurotus sajor caju Sing is a species with very high nucleic acid content (4.06%). Effects of various substrances on apocarpus and medicinal values of these mushrooms are of late being enthusiastically explored³⁴⁵.

P Sajor caju are cultivated without an elaborate compositing on a variety of materials such as polythene bags, baskets or trays without casing. These are characterized by rapid mycelium growth. A wide range of temperature (22⁰-28⁰C) may be allowed and the first crop can be allowed and the first crop can be harvested in about two weeks. It was considered worthy of indoor cultivation, due to its broad adaptability, for the purpose of extraction. Antiviral study of the extract was tested for its inhibitory property against Tobacco Mosaic Virus.

MATERIAL AND METHODS

PLANT MATERIAL AND PREPARATION OF EXTRACT

P. Sajor caju mushrooms were grown indoors based on methods described by Kapoor⁶. Spawn prepared on wheat grains yielded the fruiting bodies. Successive crops were harvested. The aqueous extract was obtained by boiling the fructifications for 10 min in an equal weight of distilled water. Juice form the pulp was squeezed through muslin cloth. The obtained material was centrifuges for 10min at 3000 rpm. The supernatant was used as test or inhibitor throughout the experiment⁷.
PREPARATION OF TMV CULTURE AND TEST HOSTS

Common strain of Tobacco Mosaic Virus in dried infected leaves was supplied by the Director, Central Tobacco Research Institute, ICAR Rajahmundry, Andhra Pradesh. The culture was multiplied by mechanical sap inoculation to healthy tomato (Lycopersicum esculentum Mill), for the ready source of virus inoculum for the present studies, in insect proof glass house. Two local-lesion test hosts viz. nicotinana glutinosa L. and Chenopodium amaranthicolour Cost and Reyn. were grown and used. These seeds were procured from Central Tobacco Research Institute, Rajahmundary and Indian Agricultural Institute, New Delhi, respectively.

PREPARATION OF INOCULUM

TMV infected leaves of tomato showing mosaic symptoms were washed, kept in folds of blotting paper and then ground in pestle and mortar, the pulp was pressed through sterilized cotton and juice used to prepared dilutions with distilled water to limit the number of lesions and thereby; facilitate counting.

In another experiment inhibitor was used in place of distilled water as diluent and dilutions were similarly prepared.

ANTIVIRAL ACTIVITY7-10

Aqueous extract of P. Sajor caju fruit bodies were tested against TMV. Inoculations were made on the upper surface of leaf lamina of the test plants, N. glutinosa and C. amaranthicolor. Carbonbundum powder was used as abrasive to provide entry points for the virus. Excess inoculum was washed. Infectivity assay (local-lesion) method was employed for assay of active virus. Treatments were distributed on individual leaves of the same plant following half-leaf method TMV mixed extract of inhibitor was inoculated. Preinoculation treatment of inhibitor was also applied separately wherein after inoculation with TMV Control was also kept without inhibitor, keeping other factors common. Inoculated test plants were kept in insect-proof glass house for symptom development.

The local lesions produced were counted after three days. From the local lesion count, percentage inhibition was calculated as the difference between; the number of lesion from the test sample (T) and that of control (C) expressed as percentage of number of lesions of the control (C-T/C) x 100.

RESULTS AND DISCUSSION

The result indicated that extract of P. sajor caju possessed inhibitory properties against TMV. It was observed that the number of local lesions produced were more in C. amaranthicolor that in N. glutinosa. Also, the extract of P. sajor caju when mixed with TMV was found to be more effective in reducing local-lesions produced by TMV as compared to the same applied as preinoculation treatments. The results are depicted in Table 1 and 2.

In this experiment also a progressive, corresponding higher percentage decrease in local lesions in both the test hosts were recorded at higher dilutions (Table 2). However, the virus concentration values are relative, not absolute.

The usefulness of this investigation lies in the recommendation of this antiviral mushroom for further investigations of medicinal properties. In nutraceuticals it may serve as an economical resources.
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Table 1. Effect of Pleurotus sajor –caju extract applied as pre-inoculation treatment on TMV local-lesion production

| Local – lesion host                  | TMV dilution | Number of local lesions| Percent decrease in Pretreated | Control |
|-------------------------------------|--------------|------------------------|--------------------------------|---------|
| Nicotiana glutionsa L.               | 10-1         | 30                     | 41                             | 26.8    |
|                                     | 10-2         | 14                     | 22                             | 36.4    |
|                                     | 10-3         | 5                      | 9                              | 44.4    |
| Chenopodium Amaranticolor Cost & Reyn. | 10-1         | 88                     | 141                            | 37.6    |
|                                     | 10-2         | 48                     | 84                             | 42.8    |
|                                     | 10-3         | 21                     | 43                             | 51.2    |

* Average number of local lesions on 12 half-leaves for each dilation (Two plants with six leaves each)
Table 2. Effect of Pleurotus sajor –caju extract mixed with TMV-inoculum on TMV local-lesion production

| Local – lesions host | TMV dilution | Number of local lesions* Pretreated** | Percent decrease in Control *** | Local - lesion |
|---------------------|--------------|--------------------------------------|---------------------------------|---------------|
| Nicotiana glutiousa L. | $10^{-1}$ | 26 | 39 | 33.3 |
| Chenopodium Amaranticolor Cost & Reyn. | $10^{-2}$ | 12 | 20 | 40.0 |
| | $10^{-3}$ | 6 | 11 | 45.5 |
| | $10^{-1}$ | 73 | 135 | 45.9 |
| | $10^{-2}$ | 41 | 79 | 48.1 |
| | $10^{-3}$ | 18 | 41 | 56.1 |

* Average number of local lesions on 12 half-leaves of each dilution (Two plants with six leaves each)
** Pleurotus sajor-caju extract used for preparing dilutions of TMV inoculum
*** Sterilized distilled water used as diluent for preparing dilutions of TMV inoculum