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BIOMASS PRODUCTION OF *PENICILLIUM NOTATUM* USING DEPROTEINIZED LEAF JUICE (DPJ) AS A SUBSTRATE

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ABSTRACT

Deproteinized leaf juice is one of the byproduct of mechanical process is known as Green Crop Fractionation. It contains all primary metabolite required for the growth of fungi. In present investigation, *Penicillium notatum* was cultured on the various concentration of deproteinized leaf juice of *Brassica oleraceae*, *Raphanus sativus* and *Trigonella foenum* Species. Among these deproteinized leaf juices of *Raphanus sativus* give better results for the biomass production of *Penicillium notatum.*

KEYWORDS: Green crop fractionation, deproteinized leaf juice, *Penicillium notatum*, biomass production.

INTRODUCTION

Green Crop Fractionation (Pirie, 1942) is a simple mechanical process specially designed for obtaining the leaf protein and other byproducts. The byproducts such as fiber and DPJ enhance the efficiency of GCF process. Kohler and Bickoff (1970) found that DPJ is rich in water soluble nutrients like vitamins, minerals, carbohydrates and unidentified growth regulators which are useful for the growth and development of fungi. Gogle (2000) also successfully cultivated *Aspergillus niger*, *Penicillum chrysogenum* on deproteinized leaf juice of Lucerne. Chowdhary *et al*., (2002) investigate that deproteinized leaf juice of mulberry as a new media for the growth of various types of microorganisms such as *Trichoderma*, *Rhizobium*, *Pseudomonas* and *Bacillus*. They also strongly support that deproteinized leaf juice of mulberry replaces the synthetic media which having costly ingredients. Shende and Gogle (2016) studied the effect of various concentration of deproteinized leaf juice of some plants on the growth and biomass production of *Aspergillus niger*. Manwatkar (2010) also reported the cultivation of *Aspergillus niger* and *Fusarium* on deproteinized leaf juice. The

production of citric acid by *A. niger* cultivated on deproteinized leaf juice of Lucerne (Doiphode *et al*., 2011). Chanda *et. al.*, (1987); Chanda (1982a.) reported that deproteinized leaf juice of various plants have been used as a cultivation media for the many useful bacteria, fungi and actinomycetes. Sreenivasan et.al. (1995) reported that deproteinized leaf juice can be a novel medium for rhizogenesis.

In this present study, use of deproteinized leaf juice was employed as a substrate for the fungal growth and biomass production of *Penicillium notatum* on various concentration of deproteinized leaf juice.

MATERIAL AND METHOD

Fresh leaves of *Brassica oleraceae, Raphanus sativus* and *Trigonella foenum* were used for the preparation of deproteinized leaf juice. These leaves were washed with distilled water. Then leaves were ground in the mixture which became pulp. This pulp was neatly pressed in a cotton cloth with hands. Fibers and expressed juice was obtained after the pressing. Expressed juice then heated on 95^0C., curd like product obtained after heating the juice. Afterwards, this filtered though a cotton cloth. Deproteinized leaf juice and leaf protein concentrate were obtained. This deproteinized leaf juice is employed for the growth of fungi. Make dry at 65^0C in oven for further use. In this present investigation, different concentration of deproteinized leaf juice of *Brassica oleraceae*, *Raphanus sativus* and *Trigonella foenum* was used for the cultivation of the fungus *Penicillium notatum.*

Preparation of DPJ substrate medium

For the preparation of various concentrations (in percent) of DPJ substrate medium, weighed accurately 1g to 10 g dry powder of deproteinized leaf juice and mixed well in 100 ml of distilled water respectively and poured 25ml DPJ into the each 100ml conical flask in triplet. Prepare the PDY as a control and made ready for the autoclave with plugged tightly by cotton plug.

Sterilization or autoclaving

The flasks were autoclaved in autoclave for 20 minutes on 121^0 or 15 lbs. This all autoclaved flask made ready for the inoculation of fungus *Penicillium notatum*. in laminar air flow aseptically.

Inoculation and incubation time

Inoculation of fungi *Penicillium notatum* done in air laminar flow with aseptic condition. A mycelia or spore inoculation the all flasks in front of spirit lamp. All flasks must be shake well after the inoculation for the uniformly distribution of the inoculated mycelium or spores. After the inoculation and shaking, all flasks were put for the incubation for 7-8 days.

Harvesting of fungal biomass production of *Penicillium notatum*

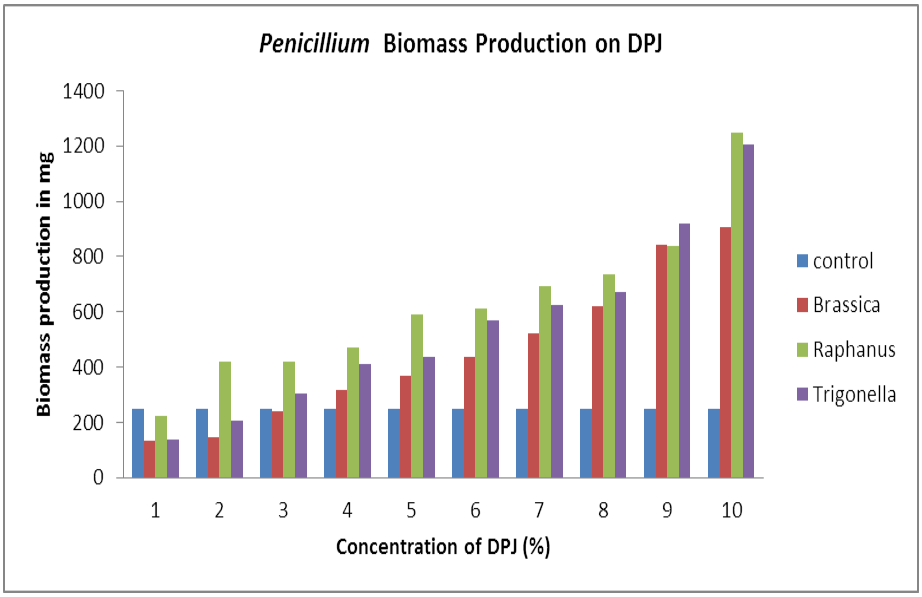
After 7-8 days of incubation period, all the flasks were filtered through a pre-weighted Whatman filter paper. This filtered Whatman paper along with mycelia dried in oven at 65^0 C for night. All filtered paper was weighted and subtraction was done for obtaining the fungal actual weight or Mycelial Dry Weight.

RESULT AND DISCUSSION

In present investigation, the cultivation of fungi Penicillium notatum on various concentrations of deproteinized leaf juice of *Brassica oleraceae*, *Raphanus sativus* and *Trigonella foenum* has been carried out. In the results has got, it clearly observed that if concentration of deproteinized leaf juice increase then fungal biomass production also increases (Table 1). But in *Raphanus* there is a significant biomass production observed as compare to *Brassica* and *Trigonella* (Graph 1). All biostatastical analysis done from book Biostatastical Analysis by Mungikar, (2003).

Table 1: Various concentrations of deproteinized leaf juice.

Medium	Biomass of *Penicillium notatum* on DPJ (mg)		
	Brassica	***Raphanus***	***Trigonella***
Control PDY	247	247	247
Conc. of DPJ in % 1	133	224	139
2	145	418	206
3	239	420	304
4	317	471	413
5	369	591	438
6	436	610	568
7	522	691	623
8	621	736	671
9	843	837	921
10	906	1247	1205
Mean	453	624	548
Range	733	1023	1066
S. D.	264.16	291.34	323.85
C. V.	59.00	45.00	59.00



Graph 1: Various concentrations of deproteinized leaf juice.

CONCLUSION

From the above results, it can be concluded that, the deproteinized leaf juice of *Brassica oleraceae, Raphanus sativum* and *Trigonella foenum* are the suitable for the cultivation of fungi *Penicillium notatum*, its growth and its biomass production. As increasing in the concentration of deproteinized leaf juice, biomass also increases. Hence, it can be say that deproteinized leaf juices have potential to cultivate fungi as they have nutrients, minerals and other soluble nutrients which are required for the cultivation of fungi. Among the three deproteinized leaf juice, *Raphanus* deproteinized leaf juice has more potential to produced more biomass than other two deproteinized leaf juice.

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