

Effect of Substrate and Non Substrate Media on the Production of Hydrolytic Enzymes in Onion Bulb Fungi from Storage

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ABSTRACT: In order to study the production of hydrolytic enzymes like Cellulases and Pectinases , eight fungal species associated with onion bulbs in storage were tested on substrate and non substrate medium. Among these *Aspergillus niger*, *Alternaria porri*, *Fusarium oxysporum*, and *Botrytis alli* were found to be more vigorous in producing these enzymes on substrate containing media...

Keywords: hydrolytic enzymes, cellulases, pectinases

I. INTRODUCTION

Onion (*Allium cepa* L.) is the most important bulb crop extensively cultivated under irrigated conditions in various parts of India. The bulbs of onion are extensively used in food preparations. It is clear from literature that the crop in general and bulbs in particular get infected by various fungi in field and storage (Alves, *et-al*,1982; Dang and Singh, 1982; Garg and Chauhan, 1981). Due to association of these fungi the bulbs get severely damaged due to bulb rot and necrosis. Role of extracellular hydrolytic enzymes produced by these fungi has been considered to be an important ability of the fungi for bulb deterioration (Abd-El-Razik, 1974). The role of pectolytic and cellulolytic enzymes in development of rot has been found an established fact (Sellam, *et-al*, 1977). The relationship of production of extracellular hydrolytic enzymes is correlated with pathogenicity of the onion bulb fungi (Magro *et-al*, 1979). In present studies attempts were made to study the production of cellulolytic and pectolytic enzymes by onion bulb fungi from storage.

II. MATERIALS AND METHODS

The production of pectolytic and cellulolytic enzymes in onion bulb fungi was studied by Viscometric method (Mahadevan and Sridhar, 1996). In order to know production of pectolytic enzymes,the fungi isolated from onion bulbs from storage were grown on glucose nitrate (non- substrate) and pectin nitrate (substrate) broth media. Whereas, to study the cellulolytic enzyme production fungi were grown on Glucose nitrate (non-substrate) and Carboxymethyl cellulose (substrate) broth media. The culture filtrates were used as active enzyme samples after incubation of a week . The maximum viscosity loss at a given time is considered due to activity of units of enzymes.

RESULTS

Table1: Effect of substrate and non-substrate media on Pectolytic enzyme production.

Fungi	Culture filtrates from non-substrate medium. % viscosity loss after min.			Culture filtrates from substrate medium. % viscosity loss after min.		
	20	40	60	20	40	60
<i>Alternaria porri</i>	05.40	14.02	22.08	16.06	41.06	83.03
<i>Aspergillus niger</i>	20.00	30.00	40.00	40.01	66.06	93.03
<i>Fusarium oxysporum</i>	11.03	15.09	22.07	50.00	81.02	87.05
<i>Botrytis alli</i>	0.0	0.0	0.0	19.02	42.03	53.08
<i>Penicillium sp.</i>	09.25	11.01	12.09	48.04	54.05	63.06
<i>Macrophomina phaseolina</i>	09.00	18.01	22.07	33.03	72.02	77.07
<i>Cladosporium alli</i>	21.00	26.03	31.05	0.0	33.03	66.06
<i>Stemphylium botryosum</i>	18.01	27.02	54.05	60.06	67.07	78.08

Fig.1: Effect of non-substrate and substrate media on Pectolytic enzyme production.

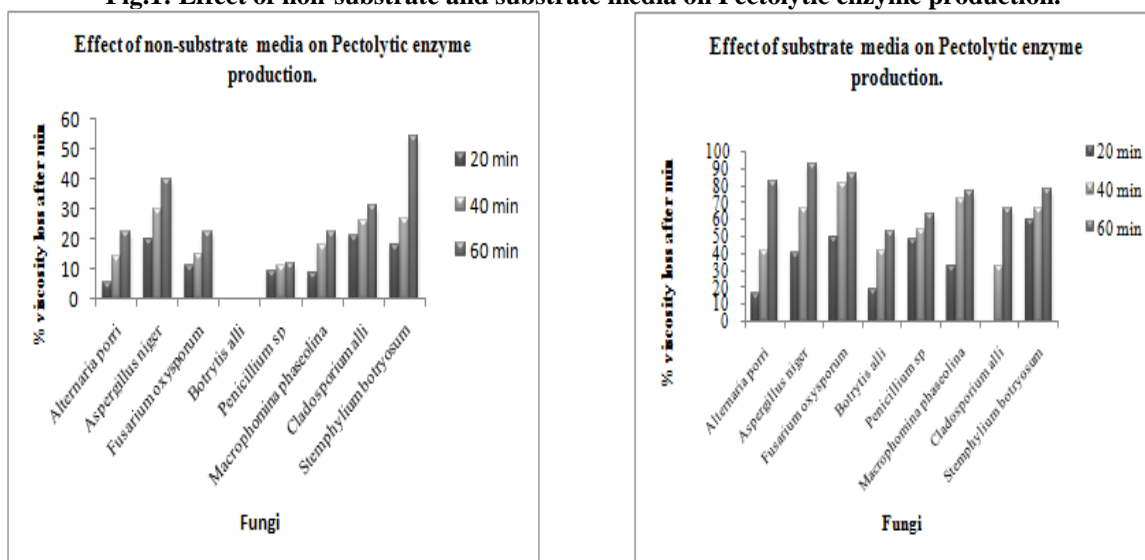
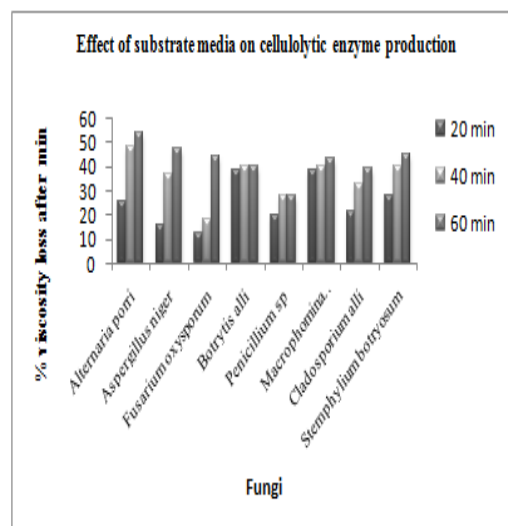
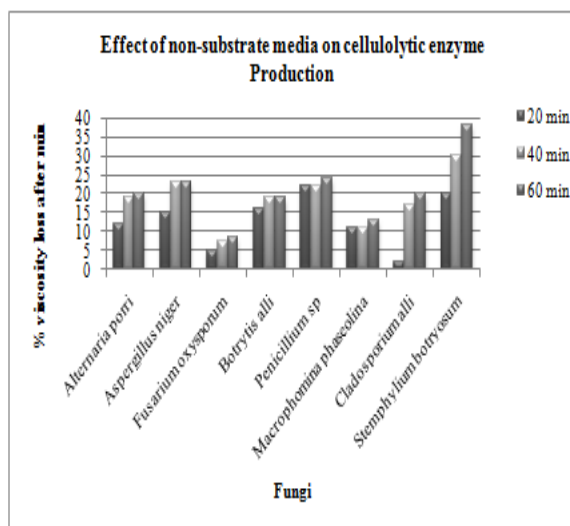


Table 2: Effect of substrate and non-substrate media on cellulolytic enzyme

Production.

Fungi	Culture filtrates from non-substrate medium. % viscosity loss after min.			Culture filtrates from substrate medium. % viscosity loss after min.		
	20	40	60	20	40	60
<i>Alternaria porri</i>	12.04	19.00	20.09	25.08	48.09	54.04
<i>Aspergillus niger</i>	15.02	23.00	23.02	16.09	37.06	47.00
<i>Fusarium oxysporum</i>	05.02	07.37	08.62	12.08	18.03	44.04
<i>Botrytis alli</i>	16.01	19.01	19.02	38.06	40.08	40.08
<i>Penicillium sp.</i>	22.00	22.06	24.04	20.03	28.03	28.07
<i>Macrophomina phaseolina</i>	11.00	11.09	13.02	38.03	40.04	43.02
<i>Cladosporium alli</i>	02.15	17.03	20.02	21.05	33.07	39.04
<i>Stemphylium botryosum</i>	20.08	30.01	38.02	28.02	40.01	45.02

Fig.2: Effect of substrate and non-substrate media on cellulolytic enzyme production.



III. RESULTS AND DISCUSSION

Data presented in the table 1 and 2 indicate that pectolytic and cellulolytic enzyme production was found to be maximum in substrate broth media for all tested fungi in general. *Alternaria porri*, *Fusarium oxysporium*, *Aspergillus niger* and *Stemphylium botryosum* showed high production of both the enzymes in particular. This indicates their high pathogenicity to cause diseases. Same was concluded by Sellam *et-al* (1977) and Tanaka and Nonaka (1981).

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