

Effect of Carbohydrates on production of hydrolytic enzymes in different species of *Fusarium*

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SUMMARY

Amylase production was found to be stimulated due to fructose, lactose and maltose in all five species of *Fusarium* while, CMC showed inhibitory effect in all tested species of *Fusarium* and Mannitol and Sucrose inhibited *F. oxysporum*. Lactose proved to be best source for production of amylase in all tested fungi, maltose in case of *F. roseum* and mannitol in case of *F. semitectum*. Protease production was found to be poor in sucrose, CMC and mannitol in all five species of *Fusarium* while lactose was found to be best source for production of protease. Lactose inhibited growth of *F. dimerum*, *F. semitectum* and *F. roseum*. Fructose stimulated growth of *F. dimerum*, *F. moniliforme* and *F. semitectum*. Lipase production was favoured due to fructose, maltose in case of *F. oxysporum*, *F. moniliforme* and *F. semitectum*

Key words :

Different species of *Fusarium* are known to infect variety of seeds in field as well as storage. Hence, *Fusarium* is responsible for seed biodeterioration as prominent fungus responsible for production of different hydrolytic enzymes. The production of amylase by *Fusarium* and its significant role in seed damage has been reported by Dingle *et al.* (1953) and Brown (1965). Earlier workers reported that the loss in the seed weight, as well as oil content may have relation with lipolytic nature of seed mycoflora. Goodman and Christensen (1952) found degradation of seed protein and their successive utilization by the associated seed mycoflora due to proteolytic nature of seed mould. Production of these hydrolytic enzymes is influenced by various sources of nutrients. The carbohydrates are one of the prominent source of nutrients which are responsible for production of hydrolytic enzymes. During present study the production of amylase, protease and lipase was studied by growing *fusarium* on liquid medium.

MATERIALS AND METHODS

Twenty five ml. of the medium was poured in one hundred ml. conical flask, autoclaved at 15 lbs and incubated separately with 1 ml. spore suspensions of five *Fusarium* species which were maintained on PDA plants

for seven days. The flasks were incubated for six days at $25\pm 2^{\circ}\text{C}$. On seventh day the contents were filtered through Whatman No.1 filter paper. The filtrates were collected in presterilised bottles and termed as crude enzyme preparation.

Amylase preparation was done by growing *Fusaria* on liquid medium containing starch 1%, KNO_3 0.25%, KH_2PO_4 1%, and $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ 0.05%, at pH 5.5 and activity was determined by cup plate method as described by Danai (1994). The production of protease by the *Fusarium* was studied by growing them on liquid medium containing casein hydrolysate 5%, glucose 1%, KH_2PO_4 0.1%, $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ 0.05%, and pH 5.6. The assay of protease was done by using the method described by Rao and Mukharjee (1990) and Lipase preparation was studied by using liquid medium containing 1% groundnut oil, KNO_3 0.25%, KH_2PO_4 0.1%, and $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ 0.05%, pH 5.0. The activity was assayed as described by Danai (1994).

RESULTS AND DISCUSSION

Surface sterilized seed samples of *Cajanus cajan*, *Cicer arietinum*, *Phaseolus mungo*, *Phaseolus radiatus* and *Glycine max* were used for isolating the fungi and utilized for the production of different hydrolytic enzymes.

The six carbohydrate sources viz., fructose, lactose, maltose, sucrose, CMC and mannitol were used to study their effect on the production of hydrolytic enzymes by five species of *Fusarium*. The results are given in Table 1. Amylase production was found to be stimulated due to fructose, lactose and maltose in all five species of *Fusarium* while, CMC showed inhibitory effect in all tested species of *Fusarium* and mannitol and sucrose inhibited

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