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ORIGINAL ARTICLE

STUDY OF FUNGI FROM OIL SEEDS AND THEIR ENZYME ACTIVTY

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Research Guide,

Abstract:

Nine and thirteen fungi were isolated from blotter and agar plate method respectively from test oil seeds like Groundnut, Mustard, Safflower, Sesame and Sunflower. The association of Aspergillus niger and Fusarium dimerum is found maximum in ground nut and mustard respectively from blotter plate method and the maximum incidence of Aspergillus niger is observed in mustard, ground nut and sunflower from agar plate method.

The effect of different carbohydrate sources on production of protease and lipase was studied. The four carbohydrate sources were tested with five fungi which were isolated from different oil seeds. The activity of protease enzyme is observed maximum in presence of sucrose by Aspergillus niger and Fusarium dimerum. Curvularia lunata and Fusarium dimerum had the maximum activity in presence of xylose. The maximum lipase production was found in Curvularia lunata and Fusarium oxysporum in presence of maltose and Aspergillus niger, Aspergillus ustus in presence of sucrose.

KEYWORDS:

Fungi, oil seeds, protease, lipase.

INTRODUCTION:

Seed - borne diseases of oilseeds are important aspects which need our attention. There are several phytopathogenic fungi, bacteria and viruses may infect oil seeds causing various diseases.

Malnutrition causes serious problems in developing countries of the world. Among food from plant origin oilseeds are a source of energy. These contain higher proportion of unsaturated fatty acids and meet the dietary requirement of fatty acids. In recent years the production of oil seeds has been significantly increased because of demand and supply. The excess production of oilseeds leads to drop in the market value. The processing and storage technologies play decisive role in the increasing value and quality of oilseeds. But in developing countries like India, lack of such advanced technologies leads to abundant loss of oil seeds during storage and processing. The fungi like Aspergillus sps, Alternaria sps, Fusarium sps, Rhizopus sps, Penicillium sps. etc. were isolated and reported from oil seeds (Chavan and Danai 1993, Nahar et.al., 2005, Hemantraj et.al.,2007, Hatte and Chavan 2008, Afzal et.al., 2010). The reports on deterioration of seeds by production of enzymes were given by (Umatale, 1995, Waghmare et.al., 2006, Kakde and Chavan 2011). By observing these facts, the study was undertaken to know the impact of fungi on oil seeds from study region and the role of fungi in production of protease and lipase was observed for the analysis of degradation of oil seeds.

MATERIALS AND METHODS:

Collection of seed samples and detection of seed mycoflora:

Oil seed samples were collected as per the method described by Neergaard (1977) for isolation of seed mycoflora.
The seed mycoflora was isolated by using standard Blotter plate method (BPM) and Agar plate method (APM) as described by International Seed Testing Association, ISTA (1966), Neergaard (1977) and Agarwal (1981).

Production of hydrolytic enzymes and its assay:

Protease: Production of protease and its activity were done according to Hislop et.al.,(1982) and Rajamani (1990).
Lipase: Production of protease and its activity were done according to Kesare (2008).

RESULTS AND DISCUSSION:

As per table 1. the results of percent incidence of seed mycoflora of test oil seeds from blotter test method are very interesting. Nine different fungi were isolated and among the test oil seeds the ground nut is found to be contaminated by maximum number of fungi and where as sesame is found as least contaminated. The association of Aspergillus niger and Fusarium dimerum is found maximum in ground nut and mustard respectively. The least association of Alternaria alternata, Aspergillus niger, Aspergillus ustus, Curvularia tetramera and Helmenthosporium tetramera was observed on test seeds and the results correlates with the results obtained by Bhattacharya and Raha (2002), Waghmare et.al., (2009) and Afzal et.al., (2010).

The incidence of seed mycoflora of oil seeds was studied and the results of agar plate method i.e PDA are tabulated in table 2. According to the results 13 pathogenic fungi were isolated and the maximum contamination of fungi is observed in mustard and sunflower. the maximum incidence of Aspergillus niger is observed in mustard, ground nut and sunflower and least incidence is observed in safflower. The maximum incidence of Fusarium oxysporum is observed in mustard and safflower and the results correlates with the findings of Gorgile (2011). There is no incidence of Curvularia tetramera, Penicillium notatum in safflower and sesame, where as Fusarium moniliforme in ground nut.

The effect of different carbohydrate sources on production of protease and lipase was studied. four carbohydrate sources were tested with five fungi which were isolated from different oil seeds and the results are given in table 3. The activity of protease enzyme is observed maximum in presence of sucrose by Aspergillus niger and Fusarium dimerum. Curvularia lunata and Fusarium dimerum had the maximum activity in presence of xylose. The results of the production of protease and lipase with respect to Fusarium species were correlates with the findings of Gorgile (2011). The results of Aspergillus niger, Curvularia lunata correlates with the findings of Sumanth (2010). The maximum lipase production was found in Curvularia lunata and Fusarium oxysporum in presence of maltose and Aspergillus niger, Aspergillus ustus in presence of sucrose.

Table 1. Percent incidence of fungi from different oil seeds (Blotter test method).

Fungi	Groundnut	Mustard	Safflower	Sesame	Sunflower
	% incidence				
Alternaria alternata	05	10	10	--	05
Aspergillus flavus	10	10	15	10	10
Aspergillus glaucus	10	--	--	10	--
Aspergillus niger	20	10	15	10	05
Aspergillus ustus	10	10	--	05	--
Curvularia tetramera	10	--	--	--	05
Fusarium dimerum	--	20	10	10	--
Fusarium oxysporum	10	15	10	--	10
Helmenthosporium tetramera	05	10	--	--	05

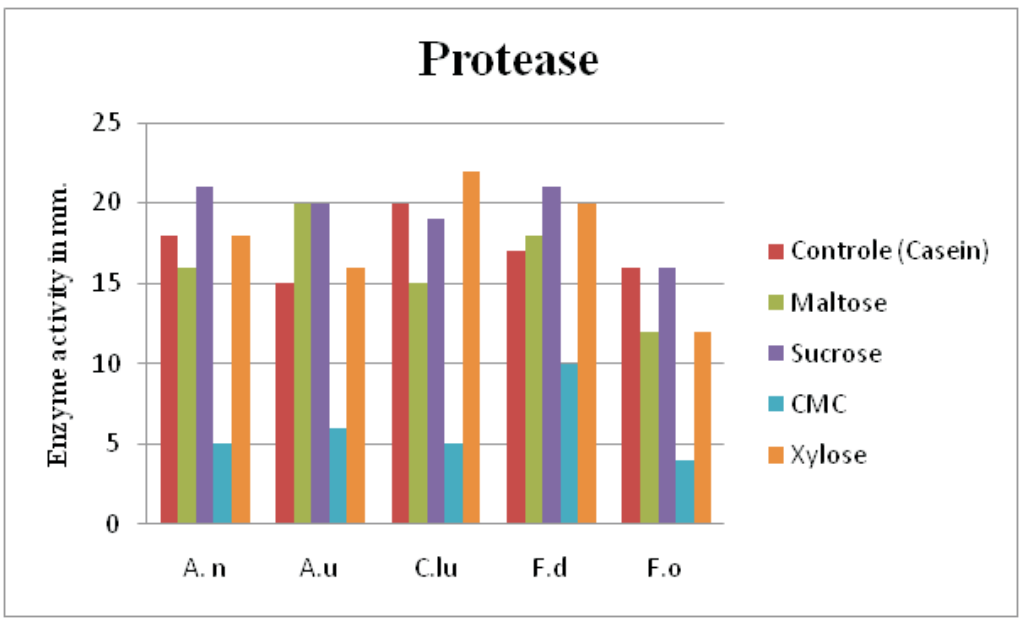
-- = absent

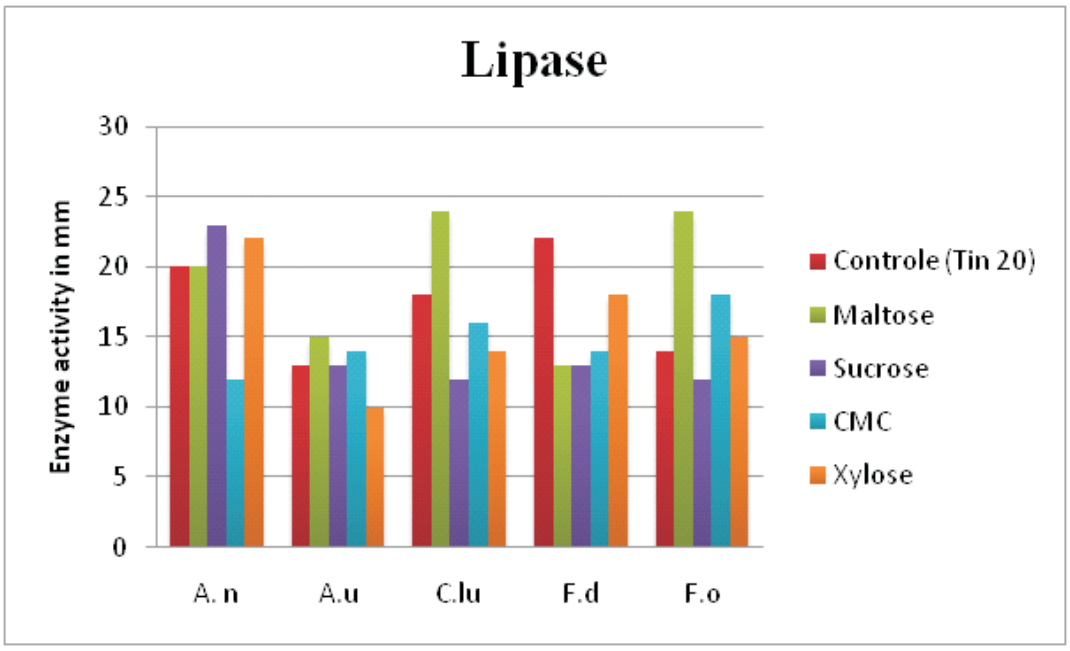
Table 2. Percent incidence of fungi from different oil seeds (Potato dextrose agar).

Fungi	Groundnut	Mustard	Safflower	Sesame	Sunflower
	% incidence				
Alternaria alternata	10	15	10	10	15
Aspergillus flavus	20	15	15	10	10
Aspergillus glaucus	20	10	10	30	20
Aspergillus niger	30	40	20	25	30
Aspergillus ustus	20	15	20	30	20
Cladosporium cladosporidies	10	10	15	10	05
Curvularia lunata	20	30	25	30	10
Curvularia tetramera	10	20	--	--	10
Fusarium dimerum	10	30	20	10	15
Fusarium moniliforme	--	20	10	15	30
Fusarium oxysporum	20	30	30	25	10
Helmenthosporium tetramera	30	10	20	20	15
Penicillium notatum	10	20	--	--	10

-- = absent

Table 3. Effect of carbohydrates on production of Protease and Lipase by fungi.





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