

Original Research Article

Inhibitory Activity of Dopamine HCl and Codeine Phosphate on *Aspergillus* Species

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ABSTRACT

Keywords

Dopamine HCL,
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Inhibitory activity of two drugs i.e. Dopamine HCL & Codeine Phosphate against two plants pathogenic fungi namely *Aspergillus niger* van Tieghem and *A. flavus* Link was studied. Effect of these drugs on morphological characters like colour, shape and thickness, radial or diametric growth, and conidial germination in drugs as well as in water of all these fungi was investigated. The result showed that 0.5% concentrations of these two drugs were inhibitory for *A. niger* van Tieghem and *A. flavus*.

Introduction

Aspergillus is a saprophytic fungus occurring sometimes as a parasites, Many species of *Aspergillus* are pathogenic and cause several diseases in plants as well as in animals (Martinelli and Kinghorn, 1994). Among plants, it causes diseases mainly on cereals which happens to be the largest source of cause of these fungi. Dopamine HCL and Codeine phosphate is alkaloid and are use in medicines (Bagul and Patel, 2001; Bhowmik and Chowdhary, 1982; Shivpuri *et al.*, 1988).

The present study reports the antifungal activity of Dopamine HCL and Codeine phosphate against two plant pathogenic fungi (*Aspergillus niger* van Tieghem and *A. flavus* Link). *Aspergillus niger* and *A. flavus* is ubiquitous and its air borne spores can cause respiratory diseases known as Aspergillosis.

Materials and Methods

The culture of *Aspergillus niger* van Tieghem and *A. flavus* Link were isolated from the soil and cultured in the laboratory. Pure cultures were developed by serial dilution and by spore culture method, fungal mycelium and fungal cells. Then they were stained with cotton blue viewed and mounted in lactophenol. Microscopic observation of spore and mycelium were done by using standard method of micrometry at 400x (Irobi and Darmola, 1993).

In vitro, inhibitory activity of Dopamine HCL and Codeine Phosphate was determined with different parameters viz. Germination percentage, radial or diametric growth of the colony, colour of colony and conidia. The solution of Dopamine HCL and Codeine Phosphate was redissolved in

distilled water to prepare various concentrations like 0.01%, 0.1%, 0.5%. The above mention solution (conc.) was employed for individual culture tubes containing sterile nutrient media. Potato dextrose agar (PDA) media was used for *Aspergillus niger* and Czapek-dox agar (CzA) media for *Aspergillus flavus*. These tubes were inoculated with assay disc of 2mm diameter (taken out with the help of cork borer) of pure culture of each test fungi and incubated at 37°C.

Growth of fungus was observed on 3rd, 6th and 9th days. Tubes containing drugs free medium were used as control and simultaneously a Dopamine HCL and Codeine Phosphate medium was also maintained. Three replicates of each concentration were maintained and experiment was repeated thrice.

It was observed that higher concentration of these drugs that did not permit any growth of fungus and were recorded as MIC

(Maximum Inhibitory Concentration). MFC (Maximum Fungicidal Concentration) was determined by inoculating treated fungi on Codeine Phosphate and Dopamine HCL and incubating at 37°C. From the results, it was concluded that the MFC were the maximum concentration, which prevented the growth of any fungal colony on Dopamine HCL and Codeine Phosphate medium.

Result and Discussion

Tables 1 & 2 elucidate the MIC as well as effect of Dopamine HCL and Codeine Phosphate (drugs) on growth and germination percentage of *Aspergillus niger* and *A. flavus*. Luxuriant growth was observed in control. At 0.5% concentration of Codeine Phosphate and Dopamine HCL inoculum remain unchanged i.e. growth was completely inhibited. Therefore this concentration was taken as MIC (Max. Inhibitory Concentration) (Histogram I & II).

Table.1 Effect of various concentration of Dopamine HCL and codeine phosphate on morphology of *Aspergillus niger*

Name of Drugs	Concentration	Diameter in mm			Thickness	Colour of the colony
		Petri Plate A	Petri Plate B	Average		
Codeine Phosphate	Control	70	70.7	70.8	+++++	Carbon black
	0.01	34.8	34.3	34.5	++++	Blackish
	0.1	18.5	18.2	18.3	++	Carbon black with white shade
	0.5	2.4	2.3	2.3	+	Faint black
Dopamine HCL	Control	70	70.3	70.15	+++++	Carbon black
	0.01	30.5	30.3	30.8	+++	Carbon black with white shade
	0.1	12.6	12.7	12.6	++	faint black
	0.5	2.5	2.4	2.4	+	Light brownish

Table.2 Effect of various concentration of Dopamine HCL and Codeine Phosphate on morphology of *Aspergillus flavus*

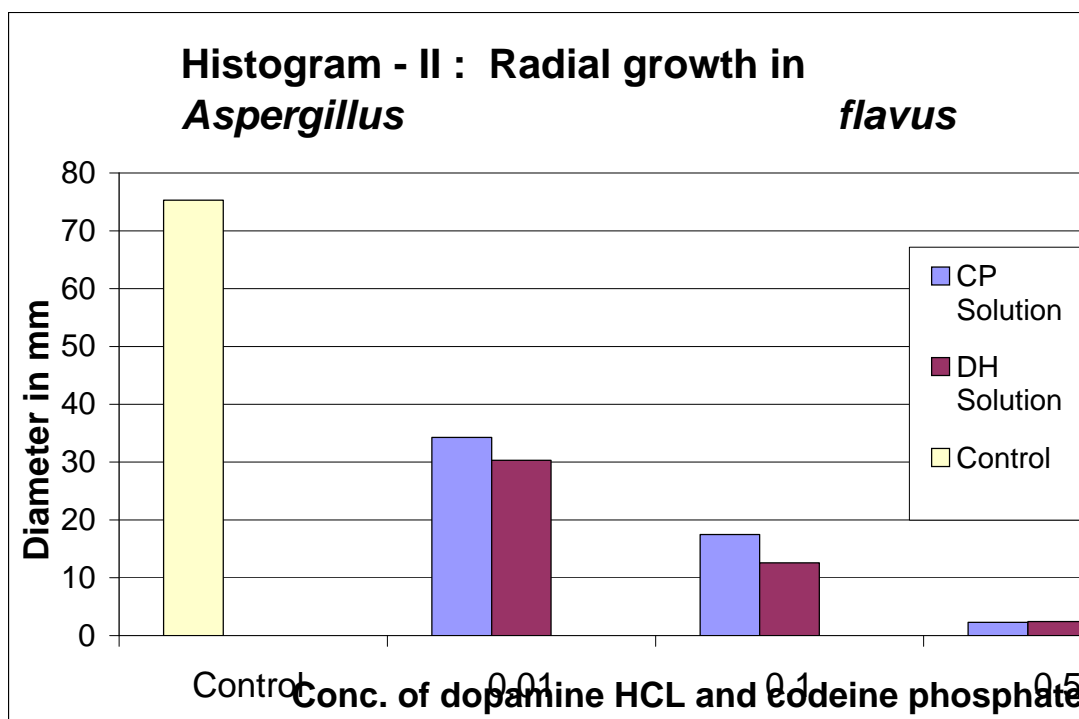
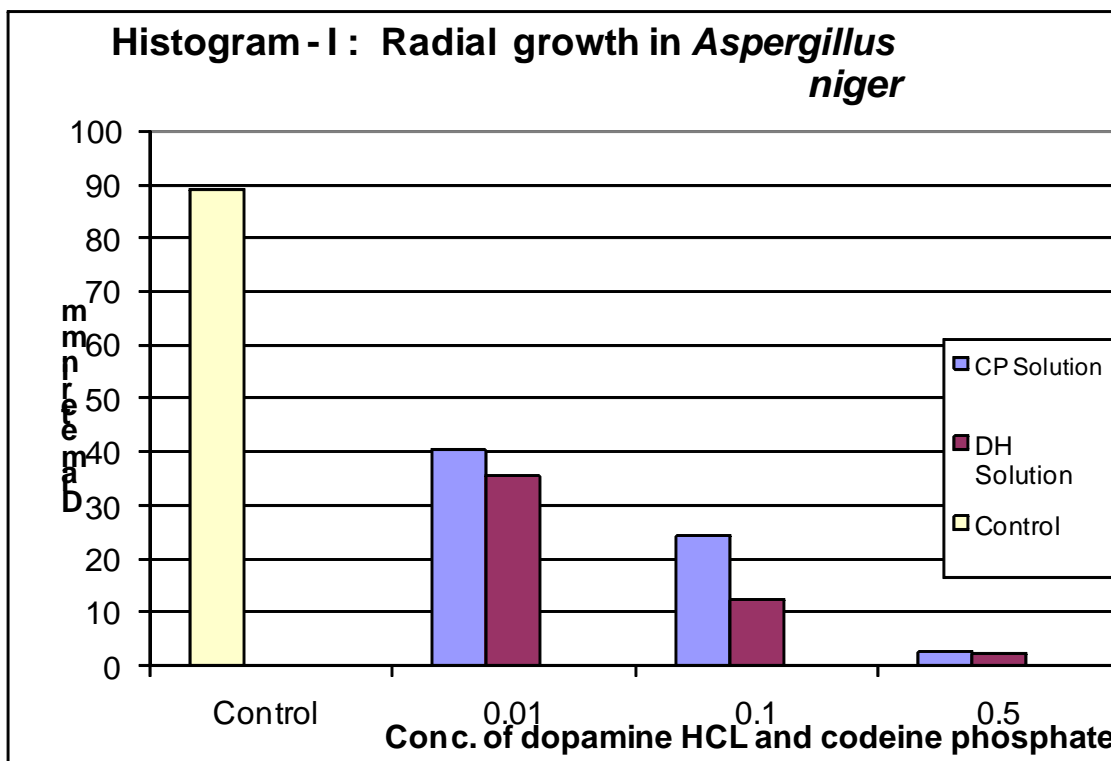
Name of Drugs	Concentration	Diameter in mm			Thickness	Colour of the colony
		Petri Plate A	Petri Plate B	Average		
Codeine Phosphate	Control	88.5	88	88.2	+++++	Dark green
	0.01	40.3	40.5	40.4	++++	Light green
	0.1	25.1	25.5	25.3	++	Greenish with yellow spot
	0.5	2.6	2.5	2.5	+	Patches of yellow colour
Dopamine HCL	Control	87	88	87.5	+++++	Dark green
	0.01	35.6	35.6	35.6	++++	Light green with white spot
	0.1	11.6	11.5	11.5	++	Greenish with white patches
	0.5	2.7	2.5	2.4	+	whitish green

Table.3 Effect of the duration of the treatment with Dopamine HCL on conidial germination of *Aspergillus niger* & *Aspergillus flavus*

Sr. No.	Concentration	<i>Aspergillus niger</i>			<i>Aspergillus flavus</i>		
		Conidial germination			Conidial germination		
		2 Hrs. Germination %	4 Hrs. Germination %	8 Hrs. Germination %	2 Hrs. Germination %	4 Hrs. Germination %	8 Hrs. Germination %
1	Control	90	90	90	90.5	90.5	90.5
2	0.01	85	75	65	80	70	60
3	0.1	50	45	40	50	43	38
4	0.5	50	05	--	13	7	--

Table.4 Effect of the duration of the treatment with codeine phosphate on conidial germination of *Aspergillus niger* & *Aspergillus flavus*

Sr. No.	Concentration	<i>Aspergillus niger</i>			<i>Aspergillus flavus</i>		
		Conidial germination			Conidial germination		
		2 Hrs. Germination %	4 Hrs. Germination %	8 Hrs. Germination %	2 Hrs. Germination %	4 Hrs. Germination %	8 Hrs. Germination %
1	Control	90	90	90	90.5	90.5	90.5
2	0.01	80	70	63	85	80	70
3	0.1	50	42	40	65	50	40
4	0.5	14	10	--	12	7	--



Microscopic examination of the mycelium viz., width, cytoplasmic content of *Aspergillus niger* and *A. flavus* appeared shrunken at MIC as compared to control. As evident in tables 3 & 4, reduction in germination percentage and reduction in spore size were observed at 0.5%. Present investigation revealed a significant decrease in growth and germination percentage of *Aspergillus niger* and *A. flavus* following treatment with drugs i.e. Codeine Phosphate and Dopamine HCL. The drugs showed fungicidal activity against *Aspergillus niger* and *A. flavus*. The results are in conformity with the results of Sharma *et al.* (2007), Jain and Sharma (2007), Galagan (2005), Bagul and Patel (2001), Soni *et al.* (1992), Naseem and Lanjewar (1989) and Bhowmik and Chowdhary (1982).

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