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Effect of homoeopathic drugs to control growth & aflatoxin G_1 production by Aspergillus parasiticus

[1] Dr.Shabnam Bee
[1]Assistant Professor,Gyanodaya College, Jaisinagar, Sagar (MP)

***Abstract*— Effect of three homoeopathic drugs each in six potencies were tested against mycelia growth and aflatoxin G1 production of Aspergillus parasitics preventives treatment such a Coffea cruda 6,12,1M, Thuja occidentalis 3,6,12,200,and 1M appeared as most effective on aflatoxin G1 production ,mycelium growth and aflatoxin G1 production could be dealth with quite successfully by the homoeodrugs**

Index terms: Aflatoxin, Aspergillus parasiticus, homoeopathic drugs.

INTRODUCTION

Aflatoxin secondary metabolites produced by Aspergillus flavus and A. parasiticus are extremely toxic immunosuppressive and A. parasiticus are extremely toxic immunosuppressive and carcinogenic compounds (Bhatnagar –Mathur et al .2015). Aspergillus section nigri produces mycotoxins ochrataaxinss fumonisins in peanut maize and grape (Astoreca et al 2007 , ab; Frisvad et al 2007, Mogensen et al 2009). Aftatoxin is the major one in food that ultimate human and animal health (Boutrif 1998).

MATERIAL AND METHODS

Fungal strain and Growth condition

Aspergillus parasiticus, strain MTCC No. 411, the test pathogen in the present investigation was obtained from IMTECH, Chandigarh. A. parasiticus was grown on the malt salt agar medium at 28oC for seven days and stored at 4oC. For experimental purposes, three homoeopathic drugs (Table) belonging to centesimal potencies marked as 3, 6, 12, 30, 200, 1M and 10M were used (customarily suffix c representing centesimal potency is dropped). They belonged to Medisynth Chemicals Private Limited Navi Mumbai. In homoeopathy, concentration of drugs is inversely proportional to their potencies. Hence, drug concentration in 3, 6, 12, 30, 200, 1M and 10M potencies used in the present investigation were of the order of 10-6, 10-12, 10-24, 10-60, 10-400, 10-2000 and 10-20000 dilutions respectively. From any standard these are ultra microdilutions. Drugs were randomly picked up from materia medica devoted for human sufferings. In fact, a parallel materia medica should be developed for the treatment of plant sufferings. Homoeopathic law of similars needs be extended to plant world as well using many plant-pathogen-drug systems. And depending upon the requirement, additional drugs should be incorporated from the products of the living world including even secondary metabolites.

2.1 IN VITRO STUDIES

Fungitoxicity of the drugs was examined in relation to their inhibitory effects on mycelia growth as well as aflatoxin production. For this purpose, 150 ml flasks were dispensed with 25 ml sterilized yeast extract sucrose broth containing 20g yeast extract, 200g sucrose and 1000 ml distilled water [Davis and Diener (1966)] and were provided with 0.1ml each of 3, 6, 12, 30, 200, 1M and 10M drug potencies. In control 0.1 ml 90% ethyl alcohol (drug medium) was used instead of the drug. Flasks were inoculated with the test pathogen A. parasiticus and incubated at 28 ± 1oC for 10 days. Thereafter, mycelial mats were removed and % inhibition of the mycelia growth over control was calculated. Effects of homoeodrugs on aflatoxin G1 production were determined by estimating the mycelial weights in different culture filtrates following the standard methods of Nebney and Nesbitt, (1965) and Eppley.

RESULT AND DISCUSSION

Effect of homoeopathic substances on the mycelium growth of A. parasiticus Effect of three homoeopathic drugs on the mycelium growth of the fungus judged on the basic of dry mycelium weight over control have been presented in table.

POTANCY

	3		6		12		30		200		1M		10M	
Drugs	MG	AP	MG	AP	MG	AP	MG	AP	MG	AP	MG	AP	MG	AP
Bryonia	63.82	100.00	24.10	98.03	27.28	89.75	-3.74	100.00	48.24	100.00	28.95	100.00	32.00	100.00
Coffea Cruda	87.61	63.85	30.63	95.70	34.21	96.60	20.70	73.68	33.72	88.75	37.42	98.80	30.53	93.56
Thuja occidentalis	-6.11	100.00	13.28	100.00	-3.35	100.00	68.75	85.68	10.07	90.88	6.02	95.24	64.35	68.61
Control	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00

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Table: Effect of Homoeophathic Druges to Control Growth and Aflatoxin G1 Production by Aspergillus parasiticus

A perusal of data revealed that homoeopathic drugs have produced a wide range of a inhibitory and stimulatory effects on the mycelia growth, thought complete inhibition of fungal growth could not scored. For example Bryonnia 30 (-3.74%), Thuja Occidentalis 3 (-6.11%) and 12(-3.35%). Only one drug, Coffea cruda 3 which was strong fungitoxicants but poor aflatoxin G1 production.

Effect of homoeopathic substances of aflatoxin G1 production by A. parasiticus A perusal of the data presented in table revealed that majority of homoeo substances are inhibitory to aflatoxin G1 production to varying extents. Byonia 3, 30, 200, 1M, 10M, Thuja occidentalis 3,6,12 were remarkable as they caused almost cent percent inhibition of aflatoxin G1 production. A significant reduction to the extent of 80-98% could also be recorded with Bryonia 6,12, Coffea cruda 6,12,200,1M,10M, Thuja occidentalis 30, 200 and 1M. A study of data (Table) would also exhibit certain unconventional features of homoeopathic drug action. Three homoeopathic drugs each in seven potencies were used, and though some of them emerged as strong fungicide, yet none could suppress mycelia growth totally. Such workers using homoeopathy Sinha and Singh (1983), Shrivastava and Atri (1998), Bee and Atri (2012a), (2012b) and (2013). Reasons for such happening are not clear. Homoeopathy, unlike allopathy, considers host as the main site action where basic contractions of health and disease operate, wherefrom the drugs amass their powers to fight against the pathogen, the latter being considered as playing the second fiddle in producing the disease Goswami and Das (1980),Dua and Atri (1986-87).Another characteristic striking in majority of cases was that several drug response were not proportional to the concentration of the drug . This is the unlike conventional substance where drug responses are usually concentration dependent . the mode of drug preparation which uniquely involves potentization might account for this feature Gibson (1968), Pelican and Unger (1971), Rowson (1976). The process of potentization presumably produces different physical forms of the drug molecules, each from endowed with a distinct medicinal property , suggestive of multipal sitexin of homoeopathic drugs Gibson (1968), Pelican and Unger (1971), Rowson (1976); hence sinusoidal responses over a range of drug potencies. Earlier worker khare and Atri (1995) have observed the same. If such is the case then it would not possible for the pathogen to devolve resistance against homoeopathic drugs through alternative pathways conventional substances are site specific selective fungicides and do not demonstrate this property. This could possible be the reason why pathogens evolve resistance against conventional substances Dekker (1976), Georgopulos and Owens (1969).

CONCLUSIONS

Effect of three homoeopathic drugs each in six potencies were tested against mycelia growth and aflatoxin G1 production of Aspergillus parasitics preventives treatment such a coffea cruda 6,12,1M, Thuja occidentalis 3,6,12,200,and 1M appeared as most effective on aflatoxin G1 production ,mycelium growth and aflatoxin G1 production could be dealth with quite successfully by the homoeodrugs. Thus, we can infer that homoeodrugs may fulfill all the prerequisites of a promising fungicide. Being cheap, posing no health hazard or pollution problem, they may be used without risk as protectant or therapeutant in controlling aflatoxin G1 contamination.

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