EFFECTS OF CERTAIN HOMOEOPATHIC DRUGS ON THE MYCELIAL GROWTH OF *BOTRYODIPLODIA THEOBROMAE* PAT

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ABSTRACT: Effects of fourteen homoeopathic drugs in 1, 4, 7, 13, 31, and 201 potencies were studied on the mycelial growth of *Botryodiplodia theobromae*. They were found to induce inhibitory responses to varying extents. None of the drugs were found to cause cent per cent inhibition. However, Apis mellifica (potencies 7, 13 and 31), Sulphur (potencies 4, 7 and 13) and Chenopodium anthelminticum (potency 7) appeared remarkable in reducing fungal growth to more than fifty per cent. These drugs may, therefore, be tried *in vivo*.

INTRODUCTION

Botryodiplodia theobromae Pat. is a deadly fungal pathogen of a large number of post-harvest diseases of fruits and vegetables. Chemicals like fungicides, antibiotics and phenols are currently in use to control this pathogen *in vitro* and *in vivo* (Nene, 1972; Atri, 1980) but they cannot be used safely as majority of them are reported to leave phytotoxic effects on the host and to pose danger of environmental pollution. Recently, attempts are being made to explore the possibilities of homoeopathic drugs as anti-fungal agents (Khanna and Chandra, 1977, 1978; Dua and Atri, 1983) as these drugs are known to act harmlessly. In view of this, effects of some homoeo. drugs on *B. theobromae*, the apple isolate, were investigated.

MATERIALS AND METHODS

B. theobromae, the pathogen used in the studies, was isolated from infected apples and stored in potato dextrose agar slants. 25 ml of freshly prepared Czapek's dox broth (basal medium) was taken into 150 ml flasks and sterilized at 15 lbs. for 15 minutes. After that, 5 ml of fourteen homoeo. drugs, viz. Aconite napellus, Arnica montana, Calendula officinalis, Pulsatilla, Chimaphilla umbellata, Sanguinaria canadensis, Spigelia, Sulphur, Apis mellifica, Euphrasia officinalis, Chenopodium anthelminticum, Carbo vegetabilis, Nux vomica and Ipecacuanha, each with 1, 4, 7, 13, 31 and 201 potencies, were mixed with basal medium. The potencies of the drugs were prepared in distilled water on a centesimal scale. For this, drugs of 1, 3, 6, 12, 30 and 200 potencies were taken and each was raised to next higher potency by adding 99 ml of distilled water to 1 ml of drug and giving ten powerful strokes to it as described in M. Bhattacharya & Co's *Homoeopathic Pharmacopoeia* (1980). Before use, the drugs were passed through Jena sintered glass

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TABLE

ANTIFUNGAL ACTIVITY OF HOMOEOPATHIC DRUGS AGAINST *Botryodiplodia theobromae*

Drugs	Potency											
	1		4		7		13		31		201	
	MW	PI	MW	PI	MW	PI	MW	PI	MW	PI	MW	PI
Aconite napellus	0.143	8.0	0.142	9.0	0.153	1.0	0.150	2.0	0.148	4.0	0.153	1.0
Arnica montana	0.190	23.0[S]	0.080	48.0	0.079	49.0	0.084	46.0	0.095	38.0	0.117	24.0
Calendula officinalis	0.117	24.0	0.102	34.0	0.102	34.0	0.119	23.0	0.120	23.0	0.132	15.0
Pulsatilla	0.176	13.0[S]	0.167	8.0[S]	0.143	8.0	0.147	5.0	0.152	2.0	0.152	2.0
Chimaphilla umbellata	0.132	15.0	0.129	17.0	0.127	18.0	0.119	23.0	0.127	18.0	0.121	22.0
Sanguinaria canadensis	0.137	12.0	0.130	16.0	0.132	15.0	0.147	5.0	0.152	2.0	0.132	15.0
Spigelia	0.127	18.0	0.120	23.0	0.109	30.0	0.105	32.0	0.111	28.0	0.120	23.0
Sulphur	0.103	33.0	0.066	57.0	0.057	63.0	0.079	51.0	0.092	41.0	0.140	44.0
Apis mellifica	0.089	43.0	0.107	31.0	0.076	51.0	0.057	63.0	0.066	57.0	0.119	23.0
Euphrasia officinalis	0.129	17.0	0.132	15.0	0.143	8.0	0.137	12.0	0.102	34.0	0.117	24.0
Chenopodium anthelminticum	0.095	38.0	0.084	46.0	0.066	57.0	0.121	22.0	0.119	23.0	0.127	18.0
Carbo vegetabilis	0.150	2.0	0.147	5.0	0.143	8.0	0.132	15.0	0.140	10.0	0.145	6.0
Nux vomica	0.117	24.0	0.127	18.0	0.130	16.0	0.130	16.0	0.127	18.0	0.148	4.0
Ipecacuanha	0.109	30.0	0.130	16.0	0.132	15.0	0.102	34.0	0.117	24.0	0.119	23.0
Control	0.155											

MW = Dry mycelial weight (g); PI = Per cent inhibition over control; S = Per cent stimulation over control.

filter G5m. Such flasks were then inoculated with the test pathogen and incubated for seven days at 28°C. Three flasks were used for each treatment. Flasks containing the basal medium plus 5 ml distilled water served as controls.

Mycelial mats after several washings in distilled water were taken on already weighed circular filter papers and dried in oven adjusted at 60°C. Dry mycelial weights were then determined and from these, percentage of inhibition over control was calculated.

RESULTS AND DISCUSSION

The table given herein represents the comparative account of the growth of *B. theobromae* on basal medium and that on the medium amended with homoeo. drugs. These drugs were found to be antifungal against *B. theobromae* to varying extents. None of the drugs demonstrated cent per cent inhibition. However, Apis mellifica (potencies 7, 13 and 31), Sulphur (potencies 4, 7 and 13) and Chenopodium anthelminticum (potency 7) caused maximum inhibition bringing more than fifty per cent inhibition over control. Arnica montana (potencies 4, 7, 13 and 31), Calendula officinalis (poteneies 4 and 7), Spigelia (potencies 7 and 31), Ipecacuanha (potencies 1 and 13) and Euphrasia (potency 31) were next in order of their effectivity inducing between thirty to fifty per cent inhibition over control. While the rest of the drugs, i.e. Aconite napellus, Pulsatilla, Chimaphilla umbellata, Sanguinaria canadensis, Carvo vegetabilis and Nux vomica exhibited mild to poor inhibitory responses (25% inhibition and below) against the test pathogen. Arnica montana (potency 1) and Pulsatilla (potencies 1 and 4), on the contrary, stimulated growth. Characteristically, there appeared, in general, no positive correlation between the drug potency and antifungal activity as one would have expected with the conventional therapeutic substances. This finding is in conformity with that of Khanna and Chandra (1977) and Dua and Atri (1983). However, the observation that lower potencies have proved more effective than the higher ones (200), is inescapable in the present case. Verma *et al.* (1969) have also reported lower potencies of the drugs more effective against tobacco mosaic virus.

From the foregoing, it can be inferred that Apis mellifica, Sulphur and Chenopodium anthelminticum could be the prospective drugs and hence their application in appropriate potencies may control *in vivo* disease.

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Editorial comment: (1) Reasons for selection of particular drugs should have been explained, (2) the effects of the drugs in potencies after regular treatment for a definite period should have been also given and (3) the *Homoeopathic Pharmacopoeia of India* published by Government of India is now the standard for homoeopathic medicines.