P: ISSN No. 0976-8602 RNI No.UPENG/2012/42622 VOL.-7, ISSUE-2, April-2018
E: ISSN No. 2349-9443 Asian Resonance

Effect of Antibiotics & Pesticides for the Management of Spoilage of Silk Cocoons

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Abstract

The control of spoilage of plant parts, agricultural, horticultural and sericultural products (Cocoons) by different microorganisms as well as fungi is urgently required to minimize the economic losses caused to the farmers, traders & growers. The different concentrations (0.01, 0.05, 0.1, 0.15 and 0.2 percent) of five antibiotics viz, Tetracycline, Qucin, Ampicillin, Cephalexin and Erthrocin as well as five pesticides like Flash, Atom, Metacid, Triton and Folidol (0.01, 0.05, 0.1, 0.15 and 0.2%) treated against spore germination of three test fungi i.e., Penicillium citrinum, Curvularia lunata and Drechslera. spiciferum. The results exhibited that lower concentrations of both the antibiotics and the pesticides induced poor inhibitory effect on spore germination of all the three fungi, however, higher concentrations of antibiotics and pesticides showed maximum percent inhibition of spore germination of three fungi. But maximum percent inhibition of spore germination of three fungi observed at 0.2% concentration treated with Tetracycline & Qucin. Similar result was observed due to two pesticides i.e. Metacid and Atom at 2% concentration.

Keywords: Effect, Antibiotics & Pesticides, Management, Silk Cocoons.

Introduction

Tasar and Mulberry cocoons are considerably spoiled during storage and transportation. Survey has shown that fluctuating environmental condition makes them prone to the attack of various microorganisms which ultimately deteriorates the thread quality causing severe economic loss to the growers and traders. So control of microbial spoilage of tasar and mulberry cocoons is urgently required to minimize the economic loss caused to the farmers as well as traders.

Keeping this in view the present investigation was under taken to study the spore germination of different test fungi responsible for the spoilage under treatment with various antibiotics & pesticides.

Review of Literature

Jolly et. al (1981) was pioneer workers who worked on silk cocoons regarding spoilage, damaged by microbes (fungi and bacteria) and studied chemical constituents of silk cocoons. Prasad & Singh (1995) also worked on biodegradation of chemical constituent in silk cocoons. Prasad et. al (1995) also detailed worked on microbial spoilage of silk cocoons and to control by the treatment of plant/leaf extracts, fungicides, pesticides and antibotics. In adition Singh and Kumari (2016) had worked on different hosts in concern to efficacy of chemicals on spore germination of fungi.

Aim of the Study

The present aim of the investigation deals the effect of antibiotics and pesticides for the management of spoilage of the cocoons due to different fungi. Due to the faulty method of transportation and storage techniques cocoons are spoiled. So it is urgently required to control the damage of cocoons.

Materials & Methods

Several pesticides like Flash, Atom, Metaid, Triton and Folidol and five antibiotics i.e., Tetracycline, Qucin, Cephalexin, Ampicilline, Erythrocine were also selected. The desire concentrations (.01, 0.05, 0.1 0.15 and 0.2 percent) of antibiotics and pesticides respectively were prepared in sterilized distilled water.

The spore suspension of three test fungi viz, Penicillium, citrinum, Curvularia, lunata and Dreshlera spiciferum was prepared separately in 10

ml of sterilized distilled water using 7-10 days old culture. The suspension was centrifuged and the sediments were washed twice by distilled water. The concentration of spore in each case was maintained (100-150/0.5ml of distilled water) by dilution techniques. 1ml spore suspension was mixed with equal volume of antibiotics and pesticides selected for study. Percentage germination of spores was noted at the intervals of 8 hours following the hanging drop method of Anonymous (1947).Control was maintained in each case and the average of three readings was taken.

The inhibitory effect of antibiotics and pesticides was observed in terms of percent spore germination and was calculated following the formula of Dixit et.al (1978). % inhibition of spore germination

$$= \frac{Gc - Gt}{Gc} \times 100$$

Gc = Average spore germination under control
Gt = Average spore germination under treatment

Results and Discussions

A perusal of Table-1 reveals that different concentrations of antibiotics induced considerable inhibition in the spore germination of all the test fungi. However, the degree of inhibition varied with the concentration as well as with the types of antibiotics. Of all the five Antibiotics, Tetracycline was found to be most effective inhibiting 83.79, 83.93 and 82.04% spore germination of P. citrinum, C. lunata, and D. spiciferum respectively at 0.2 percent concentration. Qucin had almost similar effect as like Tetracycline at 0.2% concentration. Other concentrations of these two Antibiotics exhibited poor effect. However, the higher concentrations of these antibiotics viz, Cephalexin, Erthrocin and Ampicillin showed mode rate effect while their lower concentrations induced/ poor/ inhibition of fungal spore germination Similar observations have been reported by many earlier workers like Dublish (1986), Sharma & Dharam Vir, (1986) and Kumar & Singh (1991) Parsad et.al (1995). While working with different antibiotics to control the diseasse with various hosts. The inhibition in the germination of fungal spores may be due to the toxic effect checking the necessary metabolic activity needed at the time of germination.

Table-2 shows that different concentrations (0.01, 0.05, 0.1, 0.15 and 0.2%) of five pesticides viz, Flash Atom, Metacid, Triton and Folidol dust had variable effect on the spore germination of three test fungi. The percent inhibition in the spore germination increased with the increase in the concentrations of pesticides as well as with the nature of pesticides. Out of five pesticides, Metacid was found to be most effective against spore germination of all three test fungi and exhibited inhibition of D. spiciferum (91.80%) P. citrinum (91.22%) and C. lunata (91.00%) respectively at 0.2% concentration.Similarly treatment with 0.2% concentration Atom showed 88.56% 88.27% 82.83% inhibition of spore of D. spiciferum, C. lunata and P. citrinum respectively. Almost similar trend was observed in case of Flash. Application of Triton and folidol registered poor effect of all the three test fungi at all the concentrations. A perusal of Table-2 also shows that lower concentrations of all the pesticides induced poor inhibitory effect in the spore germination of the above listed fungi which gradually increased with the increase in the concentration of pesticides. Similar findings were also made by earlier workers including Kaushik et.al. (1972), Thakur & Chenulu (1974), Prasad et.al (1995). Crafts (1957) also worked on pest control against plant diseases caused by microorganisms and Dwivedi (1991) studied on different pesticides in control of diseases and found similar results.

Conclusion

Application of different concentration of antibiotics induced inhibition in the spore germination of all the three fungi. The percent inhibition increased with the nature of antibiotics as well as with increase in their concentrations. Out of five Antibiotics, Tetracycline and Qucin showed maximum percent inhibition in spore germination of P. ctrinum, C. lunata and D. spiciferum respectively. Cephalexin and ampicillin had poor effect. While erythrocine was still very poor with respect to the inhibition in spore germination of all the test three fungi. The result supports the studies carried by Sharma & Dharam Vir (1986), Kumar & Singh (1991) and Prasad et.al. (1995).

Various concentration of five pesticides (Metacid, Flash, Atom, Triton and Folidol) showed variable effect on the spore germination.The inhibition in spore germination increased with the increase in the concentration and nature of pesticides. Higher concentrations of Metacid and Atom proved to be most effective against spore germination of all the fungi. Flash showed almost similar effect. Triton & folidol exhibited poor effect. The results confirmed that lower concentrations of pesticides induced poor inhibitory effect on spore germination while higher concentrations caused considerable inhibition of spore germination similar findings have been noted by previous investigators like Martin (1961) Kaushik et.al (1972), Kurundkar and Dhoot (1995) and Singh & Kumari (2016).

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Table-1 Effect of Antibiotics on Spore Germination of Fungi

Antibiotics	Concentration	P. citrinum		C. lunata		D. spicifcrum	
		% Spore Germination	% inhibition over control	% Spore Germination	% Inhibition Over Control	% Spore Germination	% Inhibition Over Control
Control		**58.252**		**60.184**		**52.440**	
Tetracycline	0.01	38.398	33.224	48.955	18.657	36.998	29.446
	0.05	29.399	49.531	30.544	49.248	29.946	42.894
	0.1	16.811	71.140	25.108	58.281	23.156	55.842
	0.15	11.203	80.768	17.860	70.324	17.100	67.391
	0.2	9.437	83.799	93.670	83.932	9.415	82.046
Qucin	0.01	39.234	32.647	49.221	18.215	37.128	29.319
	0.05	29.897	48.676	31.518	47.630	30.102	42.597
	0.1	17.902	69.268	26.195	56.475	23.463	55.257
	0.15	12.542	78.57	8.664	68.988	14.135	73.045
	0.2	10.323	82.278	8.500	85.876	6.840	86.956
Ampicillin	0.01	39.879	31.540	49.413	17.896	37.455	28.575
	0.05	30.980	13.817	32.000	46.829	28.888	44.912
	0.1	18.910	67.537	26.454	56.044	21.466	59.065
	0.15	12.961	77.750	19.446	67.689	14.018	73.268
	0.2	10.890	81.305	11.600	80.725	8.133	84.490
Cephalexin	0.01	40.653	30.211	49.988	16.941	38.444	29.689
	0.05	32.145	44.817	32.558	45.902	29.185	44.345
	0.1	19.931	65.781	27.641	54.072	22.133	57.793
	0.15	13.918	76.107	20.511	65.919	14.838	71.704
	0.2	11.315	80.575	11.953	80.139	9.321	82.225
Erthrocin	0.01	42.013	27.877	50.441	16.188	38.688	26.224
	0.05	33.254	42.913	33.884	43.699	30.105	42.591
	0.1	20.323	65.111	28.981	51.846	22.433	57.221
	0.15	14.420	75.235	21.611	64.091	14.888	71.600
	0.2	12.000	79.399	12.112	79.875	10.330	80.301

Table-2 Effect of Pesticides on Spore Germination of Fungi

Antibiotics	Concentration	P. citrinum		C. lunata		D. spicifcrum	
		% Spore Germination	% Inhibition Over Control	% Spore Germination	% Inhibition Over Control	% Spore Germination	% Inhibition Over Control
Control		**58.252**		**60.184**		**52.440**	
Flash	0.01	39.898	32.366	48.960	18.649	65.986	29.469
	0.05	29.199	49.874	29.543	50.927	29.899	42.984
	0.1	16.500	71.674	24.986	58.483	22.979	56.180
	0.15	11.100	80.944	17.610	70.739	16.866	67.837
	0.2	9.100	84.378	8.055	86.616	8.670	83.466
Atom	0.01	40.133	31.104	49.122	18.380	37.145	29.166
	0.05	29.799	48.844	30.158	49.890	28.432	45.781
	0.1	17.803	69.437	22.988	56.819	21.614	58.783
	0.15	12.343	78.811	18.640	69.028	13.831	73.625
	0.2	10.000	82.833	7.055	88.277	6.000	88.558
Metacid	0.01	39.132	32.822	47.899	20.412	35.144	32.982
	0.05	28.584	50.930	28.145	53.235	27.933	46.733
	0.1	16.422	71.808	25.860	60.354	20.640	60.640
	0.15	10.188	82.510	15.511	74.227	14.389	72.561
	0.2	5.111	91.226	5.415	91.002	4.312	91.778
Triton	0.01	40.833	29.902	49.980	16.945	38.088	27.368
	0.05	31.677	45.620	32.518	45.969	29.156	44.401
	0.1	19.833	65.953	27.411	54.454	22.644	56.819
	0.15	13.781	76.342	20.115	66.577	14.800	71.778
	0.2	11.135	80.884	12.065	79.953	9.357	82.156
Folidol dust	0.01	40.788	29.980	49.633	17.531	37.445	28.594
	0.05	30.897	46.959	31.158	48.228	28.886	44.916
	0.1	18.883	67.583	27.145	56.558	21.464	59.069
	0.15	12.66	77.913	19.644	67.360	13.969	73.361
	0.2	10.101	82.659	10.123	83.179	7.500	85.697