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Suitability of Jack Seeds as a Medium for Mass Multiplicatior of the Entomopathogenic Fungus, *Cephalosporium lecanii* Zimm.

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The white halo fungus, *C. lecanii* infecting coffee green bug, *Coccus viridis* (Green) could be easily cultured on jack seed medium cheaply using the by-product from the plantations. The radial growth and mycelial dry weight of the fungus were greater in this medium compared to sorghum medium. Spore production was enhanced when jack seeds, broken into pieces of 5 mm size, were used. The mortality inflicted by the fungus in the bug did not vary when the pathogen cultured on sorghum and jack seed media was used.

Most of the entomopathogenic fungi can be (easily) cultured on artificial media without loss of much virulence. The white halo fungus, *Cephalosporium lecanii* Zimm., is found to grow well on artificial media and has given encouraging results in the control of of coffee green bug *Coccus viridis* (Green) on the Lower Pulneys in Tamil Nadu (Easwaramoorthy and Jayaraj, 1978). Since loose substrates like bran or grains yield more spores than solid substrates like agar (Muller-Kogler, 1967), attempts were made to mass-multiply the fungus on grains and tubers, and a medium based on sorghum grains was found suitable (Easwaramoorthy and Jayaraj, 1977) With a view to develop a cheaper medium based on by-products available locally in the coffee plantations, the seeds of jack, *Artocarpus heterophyllus*, grown as a shade tree, were tried for culturing the fungus and compared with sorghum grains.

MATERIAL AND METHODS

Jack seeds collected at Lower Pulney hills were dried at 80° C for 72 hours and ground into powder. Jack or sorghum powder was boiled in water for one hour at the rate of 200 g/1 (Evalakhova, 1966) filtered and sterilised. The sugars, glucose and sucrose, were added at the rate of 1 g / 100 g of medium in the respective treatments before sterilization. Agar-agar was added at the rate of 20 g/1 in the preparation of solid medium. For studying the radial growth, 10 mm mycelial discs obtained from the edges of an actively growing colony were inoculated in petridishes of 100 mm diameter containing 20 ml of the medium and incubated at room temperature. Diameter of the 'growth circle' was recorded on 5, 10, and 15 days after inoculation. Mycelial dry weight was determined at 5, 10 and 15 days after inoculation by growing 10 mm discs in 100 ml of broth medium.

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TABLE I Mycelial Growth of *C. lecanii* on Jack and Sorghum Media (a) Radial Growth of the Fungus (mm) (Mean of 3 Observations)

Treatments	Days after inoculation		
	5	10	15
Jack seed extract + 2% agar	2.26	4.60	6.40
Jack seed extract + 2% agar + 1% glucose	2.16	4.36	6.26
Jack seed extract + 2% agar + 1% sucrose	2.06	4.13	6.30
Sorghum extract + 2% agar	1.73	3.40	5.43
Between treatments **	C. D. (P = 0.05)		0.24
Between Periods **	C. D. (P = 0.05)		0.21
Treatment X Period **	C. D. (P = 0.05)		4.18

** Significant at 1% probability level

(b) Mycelial weight of the fungus (mg) (Mean of 4 observations)

Treatments	Days after inoculation		
	5	10	15
Jack seed extract	0.822	0.924	1.066
Jack seed extract + 1% glucose	1.156	1.259	1.425
Jack seed extract + 1% sucrose	1.101	1.270	1.340
Sorghum extract	0.283	0.637	0.717
Between treatments **	C. D. (P = 0.05)		0.071
Between periods **	C. D. (P = 0.05)		0.062
Treatment X Period *	C. D. (P = 0.05)		0.124

** Significant at 1% level; * Significant at 5% level

In another study, the jack seeds were broken, sieved to get the material in two different sizes of 5 and 16 mm diameter and used for studying the spore production in 250ml Ehrlenmeyer flasks. Sorghum grain was used as such and both the media were autoclaved at 15 psi for 30 minutes. Total spores produced per 40 g of material was calculated 20 days after inoculation by serial dilution method using a Neubauer haemocytometer. The virulence of the culture produced in jack and sorghum media was checked using the coffee green bugs colonized on coffee seedlings in a pot culture trial. The fungus was sprayed at 16 x 10^6 spores /m1 along with Triton X—100 0.05 per cent and mortality assessed after a week.

RESULTS AND DISCUSSION

Jack seed powder either alone or along with glucose or sucrose supported greater radial growth of the fungus than sorghum powder (Table I). Addition of glucose or sucrose failed to increase the radial growth of the fungus Mycelial dry weight of the fungus was maximum in the medium containing jack seed powder and glucose. Addition of sucrose was also found to increase the mycelial dry weight. Broken jack seeds of 5 mm size had given a spore production of Ca 7.05 x 10^9 spores/40 g as against 5.81 x 10^9 spores on sorghum grains (Table II). The increase in the size of broken jack seeds significantly reduced the spore production. This may be due to the reduction in the surface area since spores per unit weight of medium is related to the surface area (Roberts and Yendol, 1971). Addition of glucose or sucrose has resulted in lesser spore production probably due to the luxurient mycelial growth and delayed spore production because of higher carbon source. There was no difference in the rate of mortality of green bugs when sprayed with spores produced on jack seeds (76.4%) and sorghum grains (78.1%) at a concentration of 16 x 10^6 spores/m1 along with surfactant Triton X—100 at 0.05 per cent The present studies have clearly indicated that the jack seeds available in the coffee plantations can be effectively utilized for the mass multiplication of the fungus.

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TABLE II. Spore production of *C. lecanii* on broken jack seeds and whole sorghum grains (Mean of 3 observations)

Treatments	Mean No. of spores produced (X 109 spores/40 g)
Broken jack seeds (5 mm dia)	7.05
Broken jack seeds + 1% glucose	3.06
Broken jack seeds + 1% sucrose	2.64
Broken jack seeds (16 mm dia)	4.52
Broken jack seeds + 1% glucose	3.37
Broken jack seeds + 1% sucrose	1.16
Sorghum whole grains	5.81
S. E.	0.66**
C. D. (P = 0.05)	2.03

** Significant at 1% probability level

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