



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; 8(3): 158-161
Received: 13-03-2019
Accepted: 15-04-2019

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Perception of effectiveness of SAWAJ *Trichoderma* in controlling the disease among farmers

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Abstract

Trichoderma is a very effective biological mean for plant disease management especially the soil born. It is a free-living fungus which is common in soil and root ecosystems. It is highly interactive in root, soil and foliar environments. It reduces growth, survival or infections caused by pathogens by different mechanisms like competition, antibiosis, mycoparasitism, hyphal interactions, and enzyme secretion. For the management of soil borne diseases especially stem and pod rot of groundnut, *Trichoderma harzianum* is very effective. Junagadh Agricultural University (JAU) has started the commercial production and selling of bio-agent *Trichoderma harzianum* culture under the brand name of SAWAJ *Trichoderma*. The study revealed that *Trichoderma* can be used with mixing with FYM ranked first, Application of *Trichoderma* is beneficial where fungal disease every years appears in soil ranked second, *Trichoderma* can used with sand mixing ranked third, Soil moisture must at the time of application of *Trichoderma* mixing ranked fourth, *Trichoderma* is cheaper than other chemical fungicides ranked fifth, Fungal disease not appears when *Trichoderma* is used for continuous 2 to 3 years ranked sixth.

Keywords: Constraint, *Trichoderma*, adoption, technology

Introduction

Agriculture is an important sector in India. Among the entire crop production technology insects and diseases control practices, are very complex in nature due to they are highly technical in nature which required precision in use. Excessive uses of chemicals in agriculture are hazardous to human being. There are plenty of insecticides and fungicides are used in agriculture which is adversely effects on human being. To solve this problem, there is urgent need for increasing usage of safe insecticides and fungicides for the control of pest and diseases. The genus *Trichoderma* comprises a great number of fungal strains that colonize plants roots as a symbiont and have properties to stimulate plant growth and development (Harman *et al.*, 2004) [3]. In rain fed agriculture, these inputs gain added importance in view of their low cost, as most of the farmers are small and marginal and cannot afford to buy expensive insecticides and fungicides. *Trichoderma* are also ideal input for reducing the cost of cultivation and for practicing organic farming. For the management of soil borne diseases especially stem and pod rot of groundnut, *Trichoderma harzianum* is very effective. Junagadh Agricultural University (JAU) has started the commercial production and selling of bio-agent *Trichoderma harzianum* culture under the brand name of SAWAJ *Trichoderma*. During this year JAU has produced and distributed 1, 04, 800 kg of SAWAJ *Trichoderma* to the farmers for the control of stem and pod rot of groundnut. JAU provide facility to buy SAWAJ *Trichoderma* at university campus and KVKs (Krishi Vigyan Kendra). It is also available at various NGOs (Non-Government Organizations) and co-operative societies of Saurashtra to the farmers. Department of Agriculture, Co-Operation & Farmers Welfare (DAC&FW) emphasizes Integrated Pest Management (IPM) which promotes biological, cultural and mechanical methods of pest and advocates need based, judicious use of pesticides. "Grow Safe food" Campaign has been initiated to create awareness about the safe and judicious use of pesticides among the various stakeholders. In addition to the above, DAC&FW has revised 68 Integrated Pest Management (IPM) Packages of Practices for major crops giving impetus to ecological and cultural techniques of pest management. Government also implemented various schemes for creating awareness and adoption of organic farming and due to increasing interest in the biocontrol, awareness about pesticide hazards, commercial production and use of biocontrol agents has now come into a reality and there are several reports of successful use of formulations of *Trichoderma* in the green house as well as in the field for control of various diseases, particularly for the soil borne pathogens. For mass introduction of *Trichoderma* in the fields, *Trichoderma* spp. are to be multiplied on some suitable and cheap media which

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can provide a food base for the initiation of the growth. *T. harzianum* and *T. viride* are the two most commonly used species and have been found effective when applied on about 87 different crops in India (Sharma *et al.*, 2014) [8]. Available literature reveals that researchers have attempted for use of varied substrates and techniques for multiplication and introduction of *Trichoderma* into the soil (Sabalpara, 2014) [7]. But it is very important as per extension and research view point what's farmer's perception about effectiveness of SAWAJ *Trichoderma*. Looking to above facts a study entitled "Perception of effectiveness of SAWAJ *Trichoderma* in controlling the disease among farmers" was undertaken with following objectives:

1. To Study the profile of respondents.
2. Perception of effectiveness of SAWAJ *Trichoderma* in controlling the disease among farmers

Materials and Methods

Amreli district of Gujarat state was selected for the study. Amreli district consists of 11 taluka likes Amreli, Babra, Dhari, Vadia, Lathi, Lilia, Savar Kundla, Khambha, Rajula, Jafrabad, Bagasara. Among 11 talukas 5 talukas Bagsra, Amreli, Dhari, Rajula and Savarkundla were selected purposively where more number of farmers were cultivated groundnut and used SAWAJ *Trichoderma*. From selected talukas, 20 farmers from each talukas were selected for the study. Thus, total 100 respondents were selected from Amreli district that who have used SAWAJ *Trichoderma* in 2017-18. Data collected through personal interview with the developed questionnaire. Ex-post-facto research design was used in the present investigation. The collected data were tabulated and analyzed in the light of objectives. To determine perception of effectiveness of "SAWAJ" *Trichoderma*, twenty-two item statements were made and assessment based on a five quntinum strongly agree, coded 5, agree coded 4, undecided coded 3, disagree coded 2 and strongly disagree coded 1, mean scores was calculated.

Result and Discussion

Profile of the farmers use the SAWAJ" *Trichoderma*

The data presented in Table 1 revealed that majority 76.00 per cent respondents were middle age to old age group. Whereas, only 24.00 per cent of respondent were young age group. Youth is very less due to low earning in rural area. It is also found that 46.00 per cent respondents had primary level education followed by 16.00 per cent secondary school level and literate level. 15.00 per cent respondents were illiterate. Only 5.00 and 2.00 percent respondents were educated higher secondary and graduate & above respectively. Table 1 clearly indicated that majority respondents were medium size land holding. 18.00 per cent respondents were both small and big size of land holding. Majority 83.00 per cent respondents fall in medium cropping intensity whereas only 17.00 per cent respondents had high cropping intensity. Table 1 show that, majority 64.00 per cent respondents had medium social participation. 20.00 per cent belonged to high social participation. Only 16 per cent respondents had found low social participation.

In case of income of respondents, table 1 revealed that majority 75.00 per cent respondents had upper middle income to high income followed by 13.00 per cent respondents had higher income, 9.00 per cent respondents had lower middle income and only 3.00 per cent had low income respectively. The data from the Table 3 clearly indicated that 47.00 per cent of the respondents had medium extension participation. Whereas 30.00 and 23.00 per cent of the respondents had low and high extension participation respectively. Data presented in Table 3 revealed that 42.00 per cent respondents had medium innovativeness followed by 35.00 per cent and 23.00 percent had high and low innovativeness respectively. It is also found from the Table 1 that majority 64.00 per cent respondents had medium risk orientation. 20.00 per cent respondent had low risk orientation and 16.00 per cent respondents had high risk orientation.

The findings of the study are in accordance with the findings of Matto *et al.* (2018), R. C. Prajapati *et al.* (2018) [5, 6].

Table 1: Distribution of respondents according to their personal socio - economic characteristics N = 100

S. No.	Categories	Frequency (f)	Percentage (%)	Mean	S.D.	
1	2	3	4	5	6	
1	Age	Young Age (up to 35 years)	24	24	47.44	21.89
		Middle Age (36 to 50 years)	43	43		
		Old Age (above 50 years)	33	33		
2	Education	Illiterate	15	15	4.84	3.66
		Literate	16	16		
		Primary education (1 st to 8 th std.)	46	46		
		Secondary school education ((9 th to 10 th std.)	16	16		
		Higher Secondary education (11 th to 12 th std.)	5	5		
	Graduate and above	2	2			
3	Size of Land Holdings	Small (0-2 hectares)	18	18	3.36	1.87
		Medium(2-4 hectares)	64	64		
		Large(Above 4 hectares)	18	18		
4	Cropping intensity	Low cropping intensity (below 111.24)	0	0	2.17	0.38
		Medium cropping intensity (111.25 to 178.35)	83	83		
		High cropping intensity (Above 178.36)	17	17		
5	Social Participation	Low Social Participation (below 1.01)	16	16	6.12	1.81
		Medium Social Participation (1.01 to 3.28)	64	64		
		High Social Participation (above 3.28)	20	20		
6	Income of respondents	Low income (Rs. 25000 to 50000)	3	3	1.50	0.46
		Lower middle income (Rs. 51000 to 100000)	9	9		
		Upper middle income Rs. 100001 to 150000	36	36		
		High income (Rs. 150001 to 200000)	39	39		
		Higher income (Rs. 200001 to above)	13	13		
7	Extension Participation	Low extension participation (below 12.68)	30	30	3.21	1.21

		Medium extension participation (12.68 to 36.54)	47	47		
		High extension participation (above 36.54)	23	23		
8	Innovativeness	Low innovativeness (Below 1.39)	23	23	2.09	0.84
		Medium innovativeness (1.39 to 2.90)	42	42		
		High innovativeness (Above 2.91)	35	35		
9	Risk Orientation	Low Risk Orientation (below 10)	20	20	20.20	10.49
		Medium Risk Orientation (10 to 30)	64	64		
		High Risk Orientation (30 to 50)	16	16		

Perception of effectiveness of SAWAJ *Trichoderma* in controlling the disease among farmers

Table 2: Perception of effectiveness of SAWAJ *Trichoderma* in controlling the disease among respondents. n = 100

S. No.	Statements	SA	A	UD	DA	SDA	WMS	RANK
1	There is no benefit of application of <i>Trichoderma</i>	1	5	10	24	60	1.63	XX
2	Good germination observed when seed treatment done with <i>Trichoderma</i>	22	54	18	2	4	3.88	IX
3	To avoid groundnut seed rotting in godown, apply seed treatment with <i>Trichoderma</i>	10	14	66	5	5	3.19	XVI
4	Application of <i>Trichoderma</i> is beneficial where fungal disease every years appears in soil	60	29	7	2	2	4.43	II
5	Fungal disease not appears when <i>Trichoderma</i> is used for continuous 2 to 3 years	32	56	7	3	2	4.13	VI
6	<i>Trichoderma</i> can applied in furrow/lines	17	68	13	1	1	3.99	VII
7	<i>Trichoderma</i> can used in standing crop and easy to apply with other career agent	24	50	19	6	1	3.9	VIII
8	<i>Trichoderma</i> can used with sand mixing	64	23	6	4	3	4.41	III
9	<i>Trichoderma</i> can be used with mixing with FYM	71	18	9	0	2	4.56	I
10	<i>Trichoderma</i> is effective in wilt disease in cumin crop	16	32	46	4	2	3.56	XIII
11	<i>Trichoderma</i> is cheaper than other chemical fungicides	61	18	10	5	6	4.23	V
12	SAWAJ <i>Trichoderma</i> can be used with mixing with other chemical pesticides/chemical fertilizers	5	11	15	35	34	2.18	XIV
13	<i>Trichoderma</i> get available as per needs and any time at any stage of crop	10	63	8	14	5	3.59	XII
14	Application of <i>Trichoderma</i> is environmental friendly	12	22	56	5	5	3.31	XV
15	Soil moisture must at the time of application of <i>Trichoderma</i>	62	20	8	7	3	4.31	IV
16	It damage the crop when it applied higher dose than recommendation	13	9	14	52	12	2.59	XVIII
17	For storage of SAWAJ <i>Trichoderma</i> , cold and shaded space required	24	52	12	7	5	3.83	X
18	Good plant growth due to use of <i>Trichoderma</i>	11	19	48	21	1	3.18	XVII
19	<i>Trichoderma</i> can be used in any kind of soil	17	25	48	7	3	3.46	XIV
20	Production increased due to use of <i>Trichoderma</i>	11	11	25	46	7	2.73	XVII
21	Use of <i>Trichoderma</i> is cheaper and safe	26	44	19	9	2	3.83	X
22	Due to establishment of <i>Trichoderma</i> in soil, decomposition of crop residue/bio mass become very fast	17	56	21	4	2	3.82	XI

It is revealed from Table 2 that general perception of effectiveness of SAWAJ *Trichoderma* in controlling the disease among respondents. Twenty-two item statements presented and means score work out according to means score ranked given. General perception of respondents' were: *Trichoderma* can be used with mixing with FYM(WMS= 4.56) ranked first, Application of *Trichoderma* is beneficial where fungal disease every years appears in soil (WMS= 4.43) ranked second, *Trichoderma* can used with sand mixing (WMS= 4.41) ranked third, Soil moisture must at the time of application of *Trichoderma* mixing (WMS= 4.31)ranked fourth, *Trichoderma* is cheaper than other chemical fungicides (WMS= 4.23) ranked fifth, Fungal disease not appears when *Trichoderma* is used for continuous 2 to 3 years (WMS= 4.13) ranked sixth, *Trichoderma* can applied in furrow/lines (WMS= 3.99)ranked seventh, *Trichoderma* can used in standing crop and easy to apply with other career agent (WMS= 3.9) ranked eighth, Good germination observed when seed treatment done with *Trichoderma* (WMS= 3.88)ranked ninth, For storage of SAWAJ *Trichoderma* , cold and shaded space required and Use of *Trichoderma* is cheaper and safe (WMS= 3.83) ranked tenth. Due to establishment of *Trichoderma* in soil, decomposition of crop residue/bio mass become very fast (WMS= 3.82) ranked eleventh, *Trichoderma* get available as per needs and any time at any stage of crop (WMS= 3.59) ranked twelfth, *Trichoderma* is effective in wilt disease in cumin crop (WMS= 3.56) ranked thirteenth, *Trichoderma* can be used in any kind of soil (WMS= 3.46) ranked fourteenth, Application of *Trichoderma* is environmental friendly (WMS= 3.31) ranked fifteenth, To avoid groundnut seed rotting in go down, apply seed treatment with *Trichoderma* (WMS= 3.19) ranked sixteenth,

Good plant growth due to use of *Trichoderma* (WMS= 3.18) ranked seventeenth, Production increased due to use of *Trichoderma* (WMS= 2.73) ranked eighteenth, It damage the crop when it applied higher dose than recommendation (WMS= 2.59) ranked nineteenth, SAWAJ *Trichoderma* can be used with mixing with other chemical pesticides/chemical fertilizers(WMS= 2.18) ranked Twentieth and There is no benefit of application of *Trichoderma* (WMS= 1.62) ranked Twenty-one.

The above findings are in consonance with the observation made by Herath and Wijekoon, (2013); Camelia *et al.*, (2017); Sharma *et al.*, (2012) ^[4, 2, 9]

Conclusion

Adoption of SAWAJ *Trichoderma* good practice to control soil borne diseases in groundnut and cotton in Saurashtra region of Gujarat. It is cheap price product also eco-friendly and safe for our food chain. Keeping these potentials in mind, farmers starts practicing SAWAJ *Trichoderma*. From the study about perception of effectiveness of SAWAJ *Trichoderma* it can be concluded that *Trichoderma* can be used with mixing with FYM ranked first, Application of *Trichoderma* is beneficial where fungal disease every years appears in soil ranked second, *Trichoderma* can used with sand mixing ranked third, Soil moisture must at the time of application of *Trichoderma* mixing ranked fourth, *Trichoderma* is cheaper than other chemical fungicides ranked fifth, Fungal disease not appears when *Trichoderma* is used for continuous 2 to 3 years ranked sixth. Study also defined the subjective reality of the SAWAJ *Trichoderma* and it is hoped that SAWAJ *Trichoderma* will emerge as an important component of IPM.

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