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STUDY ON DIFFERENT GROWTH PARAMETERS OF CAULIFLOWER CROP BY USING TRICHODERMA VIRIDE WITH FARM YARD MANURE

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Abstract-

An attempt was made to study the biocontrol efficacy of Trichoderma viride on different growth parameter of cauliflower crop. Three type of treatments– Soil, Seed and Foliar in combination with farm yard manure were given. The result was recorded at fifty days, after sowing and sixty days after sowing and at the time of harvest (70 days). The best result was recorded in seed treatment followed by foliar and soil treatment in comparison with control (without treatment). Therefore from present investigation it is concluded that an eco-friendly biopesticide (T.viride) is very easy to use and having no adverse effect on crop, animals or people. They can be applied to prevent and control several pathogenic fungi and grow healthy crop. T. viride can be used as a biocontrol agent as it is low cost and profitable dependent system to all people and animals and it also helps in conserving the natural resource as well as different biodiversity.

Keyword – Cauliflower, Trichoderma viride, FYM, Soil- treatment seed treatment, Foliar treatment, Effect on different growth parameter.

Introduction-

India is fortunate enough to have vast diversity of land, soil and agro-climatic condition to grow various vegetable. India shares 13.38% of vegetable production, important vegetables cabbage, cauliflower, peas etc. (anonymous ,2013) cabbage and Cauliflower are the few vital vegetables to the world food supply cole crops. It's high nutritional value contains vitamin-B, vitamin-C, beta- carotene, antioxidant, calcium, potassium etc. It's nutritive value leads to increase high demand (Haque, 2006). Cauliflower contains vitamins, minerals, anti-cancer compounds – glucosinolates, sulforaphane.etc. (Kirsh et al. 2007). Cauliflower (Brassica oleracea var. botrytis) is one of the most important vegetable crops in the mustard family (Brassicaceae) . In India, cauliflower is a major vegetable crop grown mainly in states like Bihar, Uttar Pradesh, Orissa, West Bengal, Assam, Maharashtra and Himachal Pradesh. Today farmer are searching for resource efficient low cost and profitable dependent system. Chemical pesticides when especially used indiscrimnately have contaminated the environment, A number of plant diseases especially the soil and seed born could not be significantly controlled by chemical means and gain the resistance from the chemicals. So the substitute is only to apply cultural and biological protection. Biological control methods are alternative means of disease control and grow healthy crop. An eco-friendly biopesticide – Trichoderma viride is very easy to use and having no adverse effects on environment. Trichoderma species has a direct as well as indirect impact on crop growth, yield parameters and quality in the field. FYM is an important, and most valuable organic fertilizer for crop production. FYM is a bulky organic manure for crop production which releases the soil compaction and improves the aeration in addition to supply of plant nutrients (Kale and Bano,1986) . Trichodermaviride and FYM can be applied to prevent and control several pathogenic fungi like Fusarium , Alternaria, Erysiphe , Peronospora, etc . and grow healthy crop.

Material and Methods–

The experiment was conducted in the research field of St. Andrew's college, Gorakhpur. During the Rabi season 2021. The experimental field was ploughed with the help of hoe. The seed beds were prepared for respective treatment as per the layout planned plot for each treatment 7.50m2. The seed variety selected for the study was shatabdi (F1 hybrid) . FYM was given @250g /7.50m2 in selected plot and and mixed well with soil and spread uniformly in the soil and 9 plants are planting in each plot.

Types of Application –

1. **Seed Treatment** – The seeds of cauliflower treated with T. viride and then spread in plot for seedbed preparation.
2. **Soil Treatment** – Little amount of soil was taken and treated. Treated soil was broadcasted uniformly with hand.
3. **Foliar Spray** – Foliar spray was given by hand sprayer till the leaves become thoroughly wet. This treatment was given 31 days after plantation. This spray was repeated after 10 days of interval till February.

Detail of Treatments–

1. T0 – control (without treatment)
2. T1 – soil application @5kg/ha + FYM (250q/ha)
3. T2 – seed application @600-700g/ha + FYM (250q/ha)
4. T3 – foliar application @1.5kg/ha + FYM (250q/ha)

Observation on plant growth parameter–

1. **Shoot Length (cm)** – Shoot length was measured from the soil to the upper part of the plant at 50,60 and 70 DAS with the help of measuring scale.
2. **Root Length (cm)** –Root length was measured at 50, 60 and 70 DAS with the help of measuring scale.
3. **Fresh shoot and fresh root weight (gm)** – Plants were randomly uproot and detached from shoot and root were weight at 50, 60 and 70 DAS.
4. **Dry shoot and dry root weight (gm)** – The uproot plant and their detached shoot and root were dried at 50°C for 4 hours daily for till one week.

Result– Effect of different treatments of Trichoderma viride with FYM on growth parameters of cauliflower. FYM - Farm Yard Manure, DAS – Days After Sowing **,**T.V.- Trichoderma viride

Treatment	**Shoot length (CM)**			**Root length (CM)**			**Fresh shoot weight (gm)**			**Fresh root weight (gm)**			**Dry shoot weight (gm)**			**Dry root weight (gm)**		
Duration (days)	50	60	70	50	60	70	50	60	70	50	60	70	50	60	70	50	60	70
T0 (control)	12.43	15.93	16.66	4.83	5.36	5.66	58.69	73.74	180.81	4.23	7.57	20.59	7.86	17.38	47.38	1.33	1.79	4.69
T_1 (soil) T.V+ FYM	16.93	18.33	18.5	5.7	6	6.77	60.18	126.28	187.93	5.43	12.90	21.61	11.74	36.86	57.36	2.38	4.19	5.84

T_2 (Seed) T.V+ FYM	13.83	16.5	17.73	5.2	6.1	6.83	63.52	86.71	220.05	5.96	7.85	25.7	8.96	33.33	51.91	1.55	2.12	7.27
T_3 (Foliar) T.V+ FYM	14.33	18.03	18.66	5.63	6.16	7.87	80.60	88.07	2016.8	6.07	8.88	21.72	11.07	23.29	48.35	1.59	2.33	5.40

Discussion –

Effect of T. viride with FYM on growth parameters of cauliflower.

The data recorded on growth parameters of cauliflower treated plot indicated that shoot length , root length , fresh shoot weight , dry shoot weight , fresh root weight , dry root weight . The shoot length and root length were increased in treatment T3(Foliar,T.V+FYM) . Where as Fresh shoot weight, fresh root weight and dry root weight increase in treatment T2 (Seed , T.V + FYM) and dry Shoot weight increase in T1 treatment (Soil , T.V + FYM).

Conclusion –

From all the above we can conclude that biocontrol agent when applied in combination with FYM had beneficial effect on cauliflower growth. Overall, the paper demonstrates and the discussion here shows that application of Trichoderma viride increases growth characters of crops in compared to the control (T0) . T. viride is one of the beneficial micro-organisms in the agro- ecosystem which influences soil health and crop growth. However, its use is not limited to anti- pathogenic activity but also acts as bio-fertilizer,
plant growth promoter, bioremediation and increase in crop yield both biological and economic yield. Thus,the use of Trichoderma for sustainability of agricultural systems.

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