

PRELIMINARY EVALUATION OF CYTOZYME AS A GROWTH REGULATOR UNDER FIELD CONDITIONS

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Cytozyme - a biologically derived nutrient support product is known to increase the crop yields. Five field experiments were conducted to evaluate the potential of this compound as a growth stimulant on the yield of rice (*Oryza Sativa* L.), groundnut (*Arachis hypogaea* L.), and greengram (*Phaseolous aureus* Roxb.). The chemical was applied to the seed prior to planting, directly on the soil alone and as a foliar spray. This study indicated that the cytozyme application has neither favourable nor detrimental effect on the yields of the three field crops studied.

INTRODUCTION

The energy crisis and consequent escalation in cost of chemical fertilizers and the widening gap between the indigenous supply and demand coupled with low purchasing power of the rural farming community, has imposed serious limitations in crop production, in developing countries.

Various practices have been developed for improving the quantity and quality of crop yields. Apart from agronomic practices, growth regulating chemicals are known to improve stand, establishment and increase the response to conventional fertilizers. The impact of growth regulators lies in reduction of the amount of fertilizer required due to more effective use of native soil nutrients. Both these aspects are of considerable importance in view of the current and projected high costs of fertilizers.

Cytozyme - a biologically derived nutrient support product is reported to have increased yields of groundnut (Singh *et al.* 1978). The active components in cytozyme include (a) biologically activated and motivated micronutrients (b) active endo and exo-enzymes (c) hydrolysed protein complexes and (d) plant growth promoters. These components are claimed to improve seed germination and emergence, efficient translocation and utilisation of nutrients in the plant, increased resistance to pests and diseases and finally increased crop yields (Anonymous 1980). Field experiments were conducted to evaluate agronomically its effect on the growth and yield of rice (*Oryza sativa* L.), groundnut (*Arachis hypogaea* L.) and greengram (*Phaseolus aureus* Roxb.).

MATERIALS AND METHODS

Tirupati campus of the Andhra Pradesh Agricultural University [India] is situated at an altitude of 183 m above mean sea level, 13° North latitude and 79° East longitude. Average annual rainfall and temperature range from 950 - 1150 mm and 25 - 42° C respectively.

Agronomic evaluation of cytozyme as a growth regulator involved three separate field experiments in *rabi* 1980-81 under irrigation on rice, groundnut and greengram and two field experiments in *kharif* 1981 on rainfed groundnut and irrigated rice. Formulations of cytozyme used were Seed Plus, Soil Plus and Crop plus applied as seed spray, directly to the soil and as a foliar spray respectively and their combinations. The design was randomized block with nine treatments replicated four times. The soil of the experimental site was sandy loam [13.5% Coarse sand, 58.0% fine sand, 12.0% silt and 16.5% clay] with low moisture retentive capacity, low in available nitrogen [130 - 150 kg N/ha] low to medium in available phosphorus [9 to 13 kg P/ha] and low in available potassium [100-125 kg K/ha]. The soil was moderately alkaline [pH 8.3] in reaction. The test cultivars of rice groundnut and greengram were Rasi, TMV2 and PS 16 respectively. The rice crop received a fertilizer dose of 120 N, 20 P and 50 K (kg/ha) in *rabi* and

100 N, 20 P and 50 K (kg/ha) in *kharif* season and was direct seeded on puddled soil in 15 cm solid rows. The groundnut crop received 40 N, 26 P and 33 K kg/ha in *rabi* and 30 N, 10 P and 25 K kg/ha in *kharif* season and sown with a spacing of 22.5 x 10 cm. The greengram crop received 20 N, 9 P and 24 K kg/ha and sown with a spacing of 22.5 x 10 cm. Urea, single superphosphate and muriate of potash were the sources of supply of nitrogen, phosphorus and potassium respectively in all the treatments. The dose, dilution and method of cytozyme application are as follows:

Soil Plus: Cytozyme was added to the soil at a rate of 7.0 ml of the soil plus in 1400 ml of water sprayed per 100 m² area in open furrows after planting.

Seed Plus: Cytozyme was applied as a seed treatment at a rate of 5.0 ml of seed plus in 20 ml of water for 2.0 kg seed.

Crop Plus: 5 ml of crop plus in 1000 ml of water per 100m² area was sprayed on the growing plants at panicle initiation stage in rice, pod formation stage in groundnut and at 35 days after planting in greengram.

RESULTS AND DISCUSSION

Data reflecting the influence of cytozyme application on grain and

straw yields of rice during both the seasons are presented in Table 1. There was no significant effect of soil, seed or foliar applied cytozyme on the grain and straw yields of rice in both the seasons.

TABLE 1
Influence of Cytozyme on the yield of irrigated rice

Treatments	Grain yield (kg/ha)		Straw yield (kg/ha)	
	Rabi	Kharif	Rabi	Kharif
T ₁ - Untreated control	6500	3865	8120	6337
T ₂ - Water spray	6870	4055	8037	6111
T ₃ - Soil plus	6941	3380	7500	6421
T ₄ - Seed plus	7018	4200	7360	7042
T ₅ - Crop plus	6692	3915	7116	6426
T ₆ - Soil plus + Seed plus	6764	4165	6916	7254
T ₇ - Soil plus + Crop plus	7084	3915	7094	6228
T ₈ - Seed plus + Crop plus	7048	3845	7212	7123
T ₉ - Soil plus + Seed plus + Crop plus	6600	4111	6986	6561
L S D (0.05)	NS	NS	NS	NS

NS: Not significant

The data pertaining to the effect of cytozyme application on groundnut are presented in Table 2.

TABLE 2
Influence of cytozyme on the plant population and yield of groundnut

Treatments	Plant population at maturity per m ²		Filled pods/plant		Pod yield (kg/ha)		Haulm yield (kg/ha)	
	I	R	I	R	I	R	I	R
	T ₁	43.6	41.6	11.6	9.1	3035	721	4320
T ₂	42.2	40.5	11.7	9.6	3210	771	4203	2120
T ₃	41.1	42.1	12.9	8.0	5510	768	4500	2280
T ₄	44.1	44.0	12.2	7.8	3185	690	4600	2448
T ₅	39.0	43.6	11.2	8.3	2770	726	4245	2390
T ₆	41.0	41.5	13.1	9.3	2870	710	4220	2390
T ₇	41.3	41.5	11.2	8.4	3100	751	4601	2496
T ₈	42.5	40.8	12.0	7.5	2950	696	4444	2472
T ₉	42.0	41.5	11.5	7.7	3125	825	4183	2672
L S D (0.05)	NS	NS	NS	NS	NS	NS	NS	NS

NS: Not significant

I--Irrigated R--Rainfed

The results showed that there were no significant differences due to cytozyme treatments in groundnut on any of the characters i. e. plant population, number of filled pods per

plant, yield of unshelled nuts and haulm. Even in greengram, the differences in yield attributes and yield due to cytozyme application were non significant (Table 3).

TABLE 3
Influence of cytozyme on the plant population and yield in greengram

Treatments	Plant population at maturity/m ²	Pods per plant	Grain yield kg/net plot [5.04 m ²]	Yield [kg/ha]	
				Seed	Haulm
T ₁	39.3	9.3	0.598	1188	3675
T ₂	36.0	10.5	0.605	1202	3747
T ₃	39.2	9.4	0.671	1331	3850
T ₄	39.0	10.0	0.687	1364	3525
T ₅	39.4	10.4	0.699	1386	3450
T ₆	39.4	10.0	0.660	1311	3500
T ₇	40.4	10.9	0.651	1293	3725
T ₈	34.4	9.3	0.671	1331	3500
T ₉	39.4	10.2	0.649	1289	4400
L S D (0.05)	NS	NS	NS	NS	NS

NS : Not significant

The results indicated that cytozyme application to soil, seed and crop has neither favourable nor detrimental effect on the yields of rice, groundnut and greengram. Though this study is preliminary in nature, the ineffectiveness of this commercially available enzyme-growth regulator as tested do not offer any substitute for existing fertilisers.

The findings of this study are important in view of the current

expanding and marketing of such growth regulators due to high and spiralling costs of fertilizers in India and other developing countries.

REFERENCES

- Anonymous, 1980. Cytozyme News Letter. Published by Cytozyme A. P. Ltd., Hyderabad, India.
- Singh, G., Sekhar, N. and Kumar, M. 1978. Effect of Cytozyme on the yield and quality characters of groundnut. *PAU J. Res.* 15: 412-15.