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Effect of Pre-Sowing Seed Treatment With Micronutrients on Growth Parameters of Raya

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Abstract: A field study was conducted to note the effect of pre-sowing seed treatment with different micronutrient solutions i.e., water, $ZnSO_4$, $MnSO_4$ and $FeSO_4$ on field emergence of Raya cv. , Peela Raya. The concentration of solution used for seed treatments was 0.5M. Seeds were soaked for 12 hours and after that these soaked seeds were dried under the shade for 12 hours before sowing. A basal fertilizer dose of 30 kg N and 30 kg P_2O_5 ha^{-1} was applied at the time of sowing. The results revealed that seedling emergence and early growth, fresh and dry weight of roots and shoots were affected significantly by these seed treatments except $FeSO_4$.

Key words: Seed treatment, micronutrients, fresh and dry weight, raya

Introduction

In arid and semi-arid zones of the world scarcity of water is a primary growth limiting factor. Among the various techniques used to raise successful Raya crop in arid and semi-arid tropics, pre-sowing seed treatments seems to be a promising technique. It has been claimed that pre-sowing seed treatment of the seed stimulates germination and subsequent seedling growth under the normal as well saline soil conditions (Idris and Aslam, 1975).

An important constraint that has performed influence on the field emergence of Peela Raya (*Brassica carianata* L.) under arid and semi-arid conditions is less availability of certain micronutrients. In making up of micronutrients deficiency, the application of their compounds to the soil or plant is very necessary but the methods which here being used are un-economical in certain cases or these disturb nutrient balance or sometimes cause pollution.

Beneficial effects of micronutrients seed treatment on different crops have been reported by many scientists (Roberts and Winifred, 1948; Kedrov and Deeva, 1958; Moiseev and Aleksandrova, 1960; Ignaeva, 1969). Furthermore seed soaking with trace elements was found more effective than soil treatment or foliar spraying (Smalik, 1959; Musakhandov, 1984). However studies on seed treatments in Raya are rare in Pakistan. Keeping this in view, the present study was undertaken to determine the effect of pre-sowing seed treatment on the field emergence and further to explore the inherent potential of Raya cultivars by fulfilling its nutritive requirements in an economical ways.

Materials and Methods

To evaluate the response of Raya cultivar Peela Raya to micronutrients seed treatment, a field experiment was conducted in a non saline (EC_e 0.69 dsm^{-1}) alkaline in reaction (pH 7.95), deficient in total N (0.032 %), low in available P (5.94 mg kg^{-1}), adequate in available K (162 mg kg^{-1}) and have manganese (5.84), Zn (2.74), Boron (0.28) and Iron 4.25 mg kg^{-1} soil. The experiment was laid out in RCBD with three replications keeping in view a net plot size of 2.40 X 7 m^2 Steel and torrie (1980).

The treatments of the experiment were:

T_1 = Control (Un-soaked)
T_2 = Soaking in water
T_3 = Soaking in $FeSO_4$ solution 0.5 M
T_4 = Soaking in $MnSO_4$ solution 0.5 M
T_5 = Soaking in $ZnSO_4$ solution 0.5 M

Seeds were treated by soaking for 12 hours in solution in the ratio of 1gm seed in 2 ml of solution and were dried for 12 hours under shade, then crop was sown at the rate of 5 kg ha^{-1}.

Field Emergence (%) : Emergence was recorded on the 7th and 10th day after sowing and percentage was calculated by using total number of seeds planted in each plot.

Early Growth of Seedlings: Fifteen days after emergence a sample of 10 seedlings from each plot was taken, roots and shoots were carefully cut with the help of a sharp razor blade and separated, washed in distilled water and placed on tissue paper for a few minutes in order to remove excessive amount of moisture. The roots and shoots were wrapped in tissue paper and observations were recorded.

Length of Roots and Shoots (cm): Ten plants were selected from each plot and their roots and shoots lengths were measured in centimeter units.

Fresh Weight of Roots and Shoots (g): Fresh weight of roots and shoots of the same plants were recorded in gram units.

Dry Weight of Roots and Shoots (g): Roots and shoots of each plot were wrapped in the paper bags separately and placed in an oven at 70°C to a constant weight. After drying their dry weight was recorded.

Results and Discussion

The data pertaining to field emergence and other growth characters are in given Table 1. It is obvious from the recorded data that all the treatments except $FeSO_4$ showed significant differences among themselves. The maximum field emergence 75.5 % was noted in $ZnSO_4$ followed by $MnSO_4$ treatment showing 72.80 %. The lowest field emergence was noted in $FeSO_4$ treatment. It was noted that seed treatments with micronutrients gave beneficial effects on emergence except $FeSO_4$ under the condition of this experiment. The results are in agreement with those of Vlasyuk *et al*. (1982), Shanthamallaiah *et al*. (1978), Mohammad *et al*. (1982) and Nagappa (1983). Contradictory results for water treatment has been reported by Leo *et al*. (1976). But the result of $FeSO_4$ is different which may be due to high dose of chemical and different crop.

Regarding early growth of seedlings (Table 1) the effect of seed treatments was highly significant with $ZnSO_4$ treatment giving the maximum values for roots and shoots length and their fresh and dry weights. Treatment with $ZnSO_4$, $MnSO_4$ and water gave a significant increase over control.

In case of root fresh weight of seedlings (Table 1) the maximum fresh weight of root 2.15 was noticed in $ZnSO_4$ and was followed by $MnSO_4$ treatment showing fresh weight of root 1.94. The lowest value of fresh weight of root was recorded in control or unsoaked treatment. These findings are supported by Popov (1970), Shaban and Eid (1982).

Regarding the root and shoot dry weight of seedlings (Table 1), the effect of seed treatments was highly significant with $ZnSO_4$ giving the maximum value. Root and shoot dry weights of seedlings with seed treatments were recorded highly significant over control which

Table 1: Effect of micronutrients seed treatment on emergence and other growth characteristics of Raya cv. Peela Raya

Treatments		Field emergence (%)	Root fresh Weight(g)	Shoot fresh Weight(g)	Root dry Weight(g)	Shoot dry Weight(g)	Root length (cm)	Shoot length (cm)
Control (Unsoaked)	T_1	62.07c	1.37c	24.70c	0.18b	2.33c	7.10bc	14.25b
Soaked in water	T_2	66.43bc	1.84ab	27.27bc	0.28b	2.94b	7.87ab	14.35ab
Soaked in $FeSO_4$	T_3	32.43d	1.43bc	23.33c	0.19b	2.37c	6.19c	13.56b
Soaked in $MnSO_4$	T_4	72.80ab	1.94a	30.5b	0.30b	3.01b	8.10a	14.53ab
Soaked in $ZnSO_4$	T_5	75.50a	2.15a	36.80a	0.49a	4.01a	8.35a	16.49a

any two means not sharing a common letter differ significantly at 5 % level of probability

were supported by the findings of Pakroo and Kashirad (1981), Khan (1981) and Shaban and Eid (1982). Regarding the root length of seedlings (Table 1) the effect of seed treatments is highly significant with $ZnSO_4$ treatment giving the maximum value 8.35 cm. But the $FeSO_4$ treatment was recorded low than control due to late emergence and similar case was studied in shoot length of seedlings. The results are supported by the findings of Trifu (1974) and Naggapa (1983).

All the seed treatments i.e., soaking in water, $MnSO_4$ and $ZnSO_4$ proved beneficial except $FeSO_4$ treatment. Hence pre-sowing seed treatment of Peela Raya with micronutrients may be adopted to grow more seedlings and reduce soil pollution.

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