



## Short Communication

# STUDIES ON INTEGRATED POTASH MANAGEMENT ON GROWTH AND YIELD OF MAIZE (*Zea mays* L)

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**Abstract:** Among the different integrated potash management treatments, application of MPKV KMB strain as seed treatment (25 gm kg<sup>-1</sup> of seed) along with the 75 percent recommended dose of potash significantly increased the growth and yield attributes of maize including plant height, number of green leaves at harvest, dry matter per plant, number of cobs per plant and grain yield which were at par with 100 percent recommended dose of fertilizer treatment.

**Keywords:** Maize, Yield, Potash Mobilizing Bacteria, Recommended Dose of Potash

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## Introduction

Use of chemical fertilizers alone for increasing crop yield is not sustainable on long term basis since it may lead to nutrients imbalance. The efficiency of applied fertilizers has been affected by many factors and it has been reported only 30-50 percent. Besides this, with the escalating costs of energy based fertilizer materials, integrated nutrients supply approach, combining organic and biological sources along with chemical fertilizers would be more remunerative for getting higher returns with considerable fertilizer economy. Madhavi, *et al.*, (1996) [1] have reported that, better metabolism is found in maize plants which results in better grain yield in which poultry manure is used to substitute some of the NPK recommendations in additions to inorganic fertilizers. The work of Panwar, *et al.*, (2001) [2] revealed that seed inoculation of maize seeds with *Azotobacter* and *Azospirillum* increased the maize yield by 7-12 percent. Das (1998) [3] and Tilak (1998) [3] reported that, biofertilizers fixes the nutrients in cereals. The present experiment was conducted with view to study the effect of potash mobilizing bacteria seed inoculation as a bio fertilizer sources in combinations with inorganic potash supplied through muriate of potash on growth and yield of maize.

## Materials and Methods

The field experiment was conducted at Agriculture Research Station, Karad during rainy seasons of 2013, 2015 and 2016. The experimental field soil was medium deep black colour having pH of 7.8, EC-0.15 dsm<sup>-1</sup>, organic carbon content 0.60 percent and available NPK were 225.5 kg ha<sup>-1</sup>, 26.4 kg ha<sup>-1</sup>, 362.0 kg ha<sup>-1</sup>, respectively. The experiment was laid out in a randomized block design having seven treatments which were replicated thrice. The treatments comprises of 1. MPKV KMB strain. 2. MPKV KMB strain + 75 percent RDK. 3. MPKV KMB strain + 50 percent RDK. 4. 75 percent RDK. 5. 50 percent RDK. 6. 100 percent RDF. 7. Control. The maize seeds were treated with KMB strain (25 gm kg<sup>-1</sup> of seed) as per the standard procedure and according to treatments requirements.

## Results and Discussion

### Growth Components

The growth components viz. plant height, dry matter per plant, days to 50% flowering, green leaves at harvest [Table-1] differed significantly amongst various treatments. Significantly higher values for plant height (185.00 cm), Dry matter per

plant (103.01 gm), Days to 50% flowering (62) and number of green leaves at harvest (6.67) was observed under the treatment where recommended dose of fertilizers was applied which was at par with the MPKV KMB strain+ 75 % RDK, in all growth attributes except number of green leaves at harvest. These results are in lines with the findings of Rout, *et al.*, (2001) [5] who reported that seed inoculations with biofertilizers in additions to inorganic applications produces higher values of growth attributes. This might be due to sufficient availability nutrients for maize plants initially due to inorganic fertilizers which was later supplemented by potash fixation in the rhizosphere of maize plants by potash mobilizing bacteria and was available to maize plants. The above results are in line with the findings of Vadivel, *et al.* (2001) [6].

### Yield components and Yield

The number of cobs plant<sup>-1</sup> and grain yield were found to be significantly influenced by recommended dose of fertilizers which was at par with MPKV KMB strain+ 75 % RDK treatments [Table-1]. Among the various potash mobilizing bacteria combination treatments, MPKV KMB strain+ 75 % RDK treatments recorded the highest number of cobs plant<sup>-1</sup> and grain yield ha<sup>-1</sup> (1.38 and 45.57), respectively. The probable reason for higher yield components and yield obtained under MPKV KMB strain+ 75 % RDK might be due to better nutrients during initial growth of maize due to basal application of potash along with seed inoculation of potash mobilizing bacteria helps in better availability of potash during entire growth period of maize than the potash alone application. Similar line of findings was reported by Mishra, *et al.*, (1998) [7] in maize under integrated nitrogen management by substituting chemical nitrogen biofertilizer seed inoculation. It can be concluded that, application of MPKV KMB strain as seed treatment along with 75 percent of potash helps in significant increase in yield of maize over the rest of the treatments.

**Application of research:** This research is helpful for reducing the use of chemical fertilizers for sustainable agriculture and maintenance of soil health.

### Abbreviations

MPKV KMB-Mahatma Phule Krishi Vidyapeeth Potash Mobilizing Bacteria.  
RDK-Recommended Dose of Potash.  
RDF- Recommended dose of Fertilizers.

Table-1 Effect of integrated potash management on growth and yield attributes of maize (pooled means)

SN	Treatments	Plant height (cm)	Dry matter plant <sup>-1</sup> (gm)	Days to 50% flowering	No. of Green leaves at harvest	No of cobs per plant	Yield q ha <sup>-1</sup>
1	MPKV KMB strain.	166.0	97.00	62.33	4.67	1.11	31.92
2	MPKV KMB strain +75 percent RDK.	177.3	102.33	62.00	6.20	1.38	45.47
3	MPKV KMB strain + 50 percent RDK	161.3	100.0	62.33	5.22	1.33	40.29
4	75 percent RDK	166.3	83.00	62.33	4.78	1.22	40.65
5	50 percent RDK	164.7	87.00	62.33	5.22	1.11	39.93
6	100 percent RDF	185.0	103.00	62.00	6.67	1.44	47.84
7	Control	153.7	83.33	64.67	4.78	1.00	26.55
	SE±	2.94	5.41	0.28	0.16	0.06	1.82
	CD at 5 %	9.08	16.66	0.85	0.54	0.17	5.62
	CV %	8.06	10.04	0.80	5.24	7.90	8.12

MPKV- Mahatma Phule Krishi Vidyapeeth, KMB-Potash Mobilizing Bacteria, RDK- Recommended dose of Potash, RDF- Recommended dose of fertilizers

**Research Category:** Soil Science

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