



E-ISSN: 2278-4136  
P-ISSN: 2349-8234  
JPP 2019; SP4: 07-08

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**(Special Issue- 4)**  
**National Seminar**  
**“Role of Biological Sciences in Organic Farming”**  
**(March 20, 2019)**

## A review: Integrated nutrient management in cole crops

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### Abstract

Integrated nutrient management has emerged as an important tool for maintaining the soil fertility and crop productivity. It requires optimum use of organic, inorganic and bio sources of plant nutrients. Integrated use of fertilizer, manure and bio fertilizer improves soil fertility and crop growth. Studies reveal that use of different components of integrated nutrient management leads to higher yield, better quality, increased shelf life and also improves the soil physical and chemical properties of soil.

**Keywords:** nutrient, crop, fertilizer, productivity.

### Introduction

Cole crops are most popular winter vegetables. It requires balanced and sufficient supply nutrients for better growth and higher yield. Among the different group of vegetable the leafy vegetables occupy special importance of carotene, ascorbic acid. Cole crops are widely cultivated all over the world because of its high nutritive values, higher productivity and wider adaptability under different ecological conditions. Mineral nutrition influence the quality of crops and soil health deteriorates due to continuous use of chemical fertilizer (Savei 2012) [2]. To maintain long term soil health and productivity, there is need for integrated nutrient management through manures and bio fertilizers apart from costly chemical fertilizers for better quality, yield and for improving the physical properties of the soil. (Lodhi *et al.* 2017) [9]. Among the ten cultivated species of genus brassica (cabbage, cauliflower and broccoli) are mainly grown. In India cauliflower is grown in an area of 4.5 m ha with a production of 8557Mt, broccoli is grown in an area of 4 lakh ha with an annual production of 85 lakh metric tonnes and cabbage is grown in an area of 400Mha with a production of 8807MT (NHB 2017) [11].

### Effect of Integrated nutrient management on growth attributes

Abou El Magd *et al.* 2014 [3] studied the effect of bio nitrogen as partial alternative to mineral nitrogen fertilizer on growth, yield and head quality of broccoli and observed that better plant height 53.28 cm was reported under the inoculated plants with azotobacter. Kosterna in 2014 [4] evaluated the effect of different kind of mulch on the growth, quality and yield on broccoli and observed that the highest plant height 27.33 cm was obtained in the plots mulched with buck wheat straw as compared to other treatments.

Singh *et al.* 2015 [6] studied the effect of microbial inoculants and inorganic fertilizers on growth and yield of cabbage and recorded that inoculation with Azotobacter@4 kg/ha and NPK (160:80:80 Kg/ha) recorded maximum plant spread (52.74 cm) as compared to VAM, PSB and non inoculating treatments. Mauriya *et al.* 2017 [10] evaluated the influence of organic and inorganic fertilizers on growth and yield of broccoli. They reported the maximum stem diameter 3.14 cm was recorded from the treatment (application of 50% RDF +Vermicompost @4.5T/ha+ Azotobacter @4 kg/ha).

Powar and Barkule 2017 [12] studied the effect of integrated nutrient management on growth and yield of cauliflower. Maximum stem diameter 3.3. cm was recorded under the treatment combination 75% NPK +FYM@10 T/ha +Azotobacter @10 kg/ha +Azospirillum@10 kg/ha. Chaudhary *et al.* 2017 [7] evaluated the effect of biofertilizer on growth, yield and quality of

knoll khol. Application of 75 % NPK+ inoculation with azotobactor reported the maximum number of leaves per plant (23.93) as compared to control (19.73).

#### Effect of Integrated nutrient management on yield and yield contributing characteristics

Kumar *et al.* 2011<sup>[1]</sup> conducted an experiment to study the effect of ANPK and biofertilizer on the growth, yield and quality of cauliflower CV Pusa snowball K1 and observed that the application of PSB@4kg/ha+80% NPK of (120:60:60 kg/ha) resulted in the maximum head diameter (12.47 cm) as compared to other treatments. Singh *et al.* 2014<sup>[5]</sup> evaluated the effect of biofertilizer on yield and bio molecules of anti-cancerous vegetable broccoli. Better curd diameter (14.99 cm) was recorded under inoculated plants with azotobactor @4kg/ha as compared to other treatments.

Choudhary *et al.* 2017<sup>[7, 8]</sup> evaluated the effect of bio fertilizer on growth, yield and quality of knoll khol. Application of 75% NPK+ inoculation with Azotobactor reported the maximum average volume of knob (103.20 cc). As compared to control (91.67cc). Devi *et al.* 2017<sup>[8]</sup> evaluated the influence of organic manure and bio fertilizers on growth, yield and quality of cabbage. Application of vermicompost (8.5Tper ha) and Inoculation with Azotobactor (2kg/ha) significantly higher in volume of head (775.30cc) as compared to non-inoculants. Application of 75%NPK+inoculation with azotobactor (4 Kg/ha) reported the maximum head yield (38.78 T/ha) as compared to other treatments.

#### Conclusion

It can be concluded that different methods of integrated nutrient management led to improvement of different growth attributes (increased plant height, plant spread, stem diameter, lesser days to head or curd initiation), yield and yield contributing characters (increased the number of head/curd diameter of head/curd, and increased yield /ha). So will recommend the farmer to follow the integrated nutrient management in cole crops over the traditional methods.

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