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Influence of nutrient management on growth, yield and quality attributes of cole crops: A review

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Abstract

This article as a small review showed the knowledge on nutrient management which had influenced several growth and yield characteristics of Cole crops and its uptake of nutrient rate by affecting in soil system by level of nutrients. Cole crops are a major crop and are consumed by most of human population. Current nutrient management programme has moved its essence towards view of eco friendliness and sustainability. The improper nutrient management effected both the growth and yield of crops. It was important to increase the productivity by proper adoption of nutrient management strategy and its effect under Cole crops cultivation. The effect of combining chemical fertilizers with organic added on biometric attribute and ultimately on growth and yield of Cole crops and are discussed in detail.

Keywords: Nutrient management, Cole crops, yield, growth, quality

Introduction

The term Cole crops used to relate various vegetables in the mustard family. Cole crops are vegetable belongs to family brassicaceae. The cauliflower, broccoli, Brussels sprouts etc are some Cole crops. They are cold tolerant crops mostly grown in cool seasons. Some Cole crops like collards, kale can be direct sown in the field because they are quickly growing crops. The right management of nutrient is important otherwise the nutrients will get with the water of soil and may go into lower surface of soil and leach down. The integrated nutrient management cover the way to control these issues, which includes concurrence use of chemical as well as improvement of soil health. (Kirthisinghe, 2006) [11] There are multiple nutrients which are needed for growth of plants. Out of many important nutrients nitrogen is essential key element for growth of plant, development and reproduction. Nitrogen could rises productivity of Cole crops. (Savei, 2012) [21] Mineral nutrition determines the characteristics of crops and health of soil degraded because of regular use of chemical fertilizers. (Lodhi *et al*, 2017) [14]. To maintain long term health of soil and productivity, there is requirement of integrated nutrient management by using bio fertilizers and organic manures aside from costly chemical fertilizers for superior quality, yield and for maintain good character of soil.

Table 1: Effect of nutrient management on growth characteristics

Nutrient	Effects in plant
Nitrogen	Nitrogen the component frequently immersed in soil by plants developed under common state. For this point and due to excessive mobility in soil, N is also the nutrient that is maximum inferior for most crops all over the world.
Phosphorus	Phosphorus necessary for performing of all plants mostly for mainly root establishment.
Potassium	Potassium required for the forming of all plant cells and is essential in controlling their water stability.
Magnesium	Important for the production of chlorophyll.
Calcium	An element of plant cell walls and managing biochemical processes.
Iron	Iron used for mainly biochemical plant processes and production of chlorophyll.
Manganese	Manganese regulated by plants as a main benefactor to varied biological systems of plants.

Effect of nutrient management on growth characteristics Cauliflower

Shree *et al*, (2014) conducted an trial on effect of integrated nutrient management on cauliflower and found that for increase quality and yield ½ recommended dose of NPK through with farm yard manure (5t/ ha)+ poultry manure (2t/hac) as well as inoculation of

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Seedling with azospirillum was effective.. Powar and Barkule (2017) [20] conducted an experiment on effect of different nutrients on several traits of cauliflower and found that the largest diameter of stem was 3.3cm was under the composition of treatment 75% of NPK + azotobacter (10kg/hac) + farmyard manure (10kg/ha) + azospirillum (10kg /hac).

Broccoli

Mohapatra *et al.*, (2013) [18] studied the effects of INM on growth, yield quality and economic of sprouting broccoli in Odessa region and conclude that the dose of 50% NPK/hac along with vermicompost of 2.5 tonnes was initiated to be ideal for greater growth.

Cabbage

Singh *et al.*, (2015) [22] conducted an experiment on integrated nutrient management modules on growth yield and quality attributes of cabbage and observed that growth of cabbage was considerably influenced by integrated nutrients management and higher vitamin C content with Maximum growth of plant.

Knolkhol

Mishra *et al.*, (2012) [16] this experiment was carried out in Orissa on influence of INM on growth and yields of knolkhol and found that by adding lime yield increases 11% by comparing with non limed plots.

Table 2: NPK Significance in Cole crops and their consequences

Significance of nutrients	Consequences	References
Inorganic fertilizers with vermicompost	Higher content of chlorophyll, higher leaf area index and maximum weight of head in cabbage	Chaterjee, 2010 [5]
Application of nitrogen with biofertilizers	Increase in character of morphological and quality while treating nitrogen with biofertilizers as differentiate to non treating nitrogen with biofertilizers.	Bashyal,2011[2]
Application of nitrogen with bio nitrogen <i>azospirillum brasilence</i>	The maximum vegetative growth and good quality of head was noted in broccoli.	Abou El-Magd <i>et al.</i> , 2014 [1]
RDF(50%)+ vermicompost	Maximum growth of plant, higher yield and return for broccoli.	Mohanta <i>et al.</i> , 2015 [17]
Application of chemical fertilizers with organic manure and PGPR	By this implementation there was Higher uptake of nutrients by plants in cauliflower.	Thakur <i>et al.</i> , 2019 [23]

Influence of nutrient management on yield and quality

Broccoli- Thapa *et al.*, (2016) [24] conducted a trial on effect of B and Mo on different characters of cauliflower and found that the implementation of borax and ammonium molybdate @ 1.8 kg was favourable for Broccoli. Hammad *et al.*, (2019) [8] studied on effect of manure on growth and yield of broccoli and revealed that use of chicken litter was a better option for good growth and yield of cauliflower.

Knolkhol- Choudhary *et al.*, (2017) [6] evaluated the influence of biofertilizer on knol khol and found that highest standard volume of knob by application of biofertilizer inoculants.

Cauliflower –Kumar *et al.*, (2011) [12] studied on effect of NPK and biofertilizers cauliflowers and found that application of PSB @ 4kg/hac + 80% NPK resulted in maximum head diameter as compare to other treatments.

Table 3: Application of biofertilizers and INM practices for high yield in Cole crops

Effects of nutrients	Consequences	References
100% NPK along with FYM @ 10t + azotobacter	Highest head yield and growth in cabbage	Singh <i>et al.</i> (2010)
50%NPK+50% FYM+ Biofertilizers	Highest head yield and Optimum production of cabbage.	Hazarika (2016) [9]
Higher NPK content	NPK content gave higher glucosinolate contents than sheep manure and no fertilizers.	Ovsthus <i>et al.</i> (2015) [19]
Application of 75% NPK+ inoculation with azotobacter 4kg	Maximum head yield and good quality character like height of plant and stem height.	Devi <i>et al.</i> (2017) [7]
Application of 60kg N+ 40kg P and 55kg K	Better yield and quality of broccoli	Fernandez <i>et al.</i> (2018) [15]

Cabbage

Kathkar *et al.*, (2018) [10] studied on the effect of different nutrient on the performances of different characters of cabbage and concluded that application of NPK 75% + vermicompost + Azospirillum gave higher yield and head of cabbage.

Effect of micro nutrient content in seed yield

Buragohain *et al.*, (2010) [3] studied on effect of boron and molybdenum on early cauliflower seed production and evaluated that 10 kg borax/hac shows the maximum height of plant, leaves per plant and length of siliqua. Chandan *et al.*, (2013) [4] conducted an experiment on response of boron and lime on growth and seed yield of snowball cauliflower and found that implementation of lime and borax as basal@500 kg/hac and 5.0 kg/hac gives maximum content of siliqua, no leaves and highest plant height. Kumar *et al.*, (2014) [13] conducted an experiment on influence of boron and lime on growth and seed yield of snowball cauliflower and revealed

that by the implementation of lime and borax @ 500kg/hac and 5.0kg/hac followed by foliar spray of boron @0.50% was the best treatment it gives higher number of plant height, siliqua content and number of leaves.

Conclusion

It can be concluded that different methods of integrated nutrient management lead to development of different growth features (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 suggest the farmer to follow the integrated nutrient management in Cole crops over the traditional methods.

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