

Efficacy of Agro Charger as yield enhancer in cumin and coriander

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Abstract

An experiment was conducted during two consecutive *rabi* seasons of 2018-19 and 2019-20 to study the efficacy of Agro Charger as yield enhancer in cumin and coriander. The results of field experiment showed maximum seed yield (495 kg ha^{-1}) of cumin recorded in treatment receiving Agro Charger @ 2 ml litre^{-1} . Seed yield increased by 17.29 % and 43.89 % over control and Agro Charger @ 4 ml litre^{-1} respectively with the use of Agro Charger @ 2 ml litre^{-1} in cumin. The maximum essential oil (4.15%) in cumin recorded with treatment receiving Agro Charger @ 5 ml litre^{-1} . In coriander, maximum seed yield (797 kg/ha) was registered with Agro Charger @ 3 ml litre^{-1} . Seed yield increased by 29.80 % over Agro Charger @ 2 ml litre^{-1} with the use of Agro Charger @ 3 ml litre^{-1} . Agro Charger @ 2 ml litre^{-1} and @ 3 ml litre^{-1} in cumin and coriander respectively is better and eco-friendly source of nutrition in order to achieve safe and sustainable yield of cumin and coriander.

Key words: Agro charger, cumin, coriander, efficacy, yield

Introduction

India is well known for quality of spices and condiments and considered as 'The Home of Spices'. India is endowed with varied agro-climatic conditions which provide suitable conditions for spices cultivation. Among spices, seed spices have unique position. It is mostly grown in arid and semi-arid zones of India like the desert portion of Rajasthan and Gujarat. Seed spices are the commodity of economic significance. Seed spices are important horticultural commodity and form integral part of Indian agriculture and economy. Among the seed spices cumin and coriander covers more than 80 percent of area and production. India is the largest producer, consumer and exporter of seed spices in the whole world. Cumin and coriander are important major seed spices occupying first and second position respectively in term of area. Cumin and coriander occupy 10.36 and 6.32 lakh ha area respectively. Annual production of cumin and coriander are 7.25 and 8.01 lakh ton MT respectively during 2021-22 (spice board, 2022). Cumin and coriander contribute 42.08 and 12.32 % share in export of seed spices. Recently export of seed spices from India is gaining momentum due to their unique aroma and flavor. To maintain the this increasing trend of export, the quality of seed spices need to be improved which would attract the demand of seed spices of other countries, resulting in more foreign exchange at global (Meena *et al.*, 2019).

Cumin and coriander are low input crops, their nutrition and other requirement are very less. Farmers in the greed of more production are using excessive chemical

fertilizers and pesticides, which is major factor of deteriorating quality of seed spices as well soil, which may result in reduction of export from India. At present peoples are more concern about their health as consuming chemicals and other pesticides may cause serious diseases and other ailments.

In this scenario, there is urgent need of sustainable and eco-friendly source of nutrition. In the view of this the present experiment was planned to study the efficacy of agro charger as yield enhancer in cumin and coriander.

Agro Charger, a product of M/s. Shukla Ashar Impex Private Limited, Rajkot is fundamentally an augmented bio-remediation technology derived from a relatively new field of advanced materials science known as organic colloidal chemistry. Using proprietary manufacturing process, renewable, sustainable plant and vegetable oils are blended to create a truly eco-friendly particle that is too small. Agro Charger acts on the soil and breakdown the nutrient thereby increasing bio-availability of nutrient for the plant. Increased absorption of nutrient ultimately augments the yield of the crop.

Materials and methods

Field experiment was conducted at experimental farm of NRCSS, Ajmer during consecutive two *rabi* seasons of 2018-19 and 2019-20 in Randomized Block Design with six treatments and three replications to determine the efficacy of Agro Charger in as yield enhancer in cumin and coriander. GC 4 (Cumin) and ACr 1 (Coriander) varieties were selected for the study. Treatments details: T₁: Untreated control, T₂: Agro Charger @ 1 ml lit.^{-1} T₃: Agro Charger @ 2 ml lit^{-1} . T₄: Agro Charger @ 3 ml lit^{-1} . T₅:

Agro Charger @ 4 ml lit⁻¹. T₆: Agro Charger @ 5 ml lit⁻¹. T₁: untreated control was supplied with recommended dose of fertilizers. Other treatments were receiving Agro Charger with given dose at every two weeks interval as nutrition source. Agro Charger was applied by drenching to the soil near root zone of the plant by knapsack sprayer with high volume fitted hollow cone nozzle. Growth, yield attributing and yield observation were recorded from five randomly selected plants in each plot. The data were statistically analyzed as suggested by Gomez and Gomez (1984). A probability of P = 0.05 was considered significant.

Results and discussion

Effect on growth, yield attributing and yield of cumin

A perusal of pooled means of data (Table 1) on effect of Agro Charger on growth, yield attributing and yield during 2018-19 and 2019-20 were significantly affected by various dose of Agro Charger. The maximum plant height (36.56 cm), number of primary branches (5.90), number of secondary branches (20.00), number of umbel plant⁻¹ (20.93) were registered in treatment receiving Agro Charger @ 4 ml litre⁻¹. Whereas maximum number of umbellate plant⁻¹ (5.10) recorded in control receiving recommended dose of fertilizers. Maximum seed yield (495 kg ha⁻¹) was recorded in treatment receiving Agro Charger @ 2 ml litre⁻¹. Seed yield increased by 17.29 % and 43.89 % over control and Agro Charger @ 4 ml litre⁻¹ respectively with the use of Agro Charger @ 2 ml litre⁻¹. Seed yield was found maximum with Agro Charger @ 2 ml litre⁻¹. It might be due to increased bio availability of nutrients with the 2 ml litre⁻¹ dose of Agro Charger. Agro Charger @ 2 ml lit⁻¹ might be increased breakdown of nutrients which resulted in increased bio availability of nutrients. Agro Charger @ 2 ml litre⁻¹ could be facilitated in absorption of nutrients. In other words it could be interpreted as Agro Charger @ 2 ml litre⁻¹ might be able to supply nutrient at critical stage viz. onset of flowering and

seed formation, which could be resulted in improved source sink relationship. Minimum seed yield (344 kg ha⁻¹) was recorded in treatment receiving Agro Charger @ 4 ml litre⁻¹. In this treatment other parameters such as plant height, number of primary branches, number of secondary branches and number of umbel plant⁻¹ were found maximum, but yield recorded was minimum it might be resulted due to poor source sink relationship, as biological yield was highest in this treatment could be due to highest straw yield. These results are close conformity with results found by Zala *et al.* (2016) in which Agro Clean, a nano herbal product increased the yield of cotton. These results are also in agreement with the results obtained by Mehta *et al.* (2014), Patel *et al.* (2004), Singh and Rao (2006), Fageria *et al.* (2008) and Baligar *et al.* (2001). The maximum essential oil (4.15%) recorded with treatment receiving Agro Charger @ 5 ml litre⁻¹.

Effect on growth, yield attributing and yield of coriander

A perusal of pooled means of data (Table 2) on effect of Agro Charger on growth, yield attributing and yield during 2018-19 and 2019-20 were significantly affected by various dose of Agro Charger. The maximum plant height (211.7 cm) was recorded with Agro Charger @ 1 ml litre⁻¹. Maximum number of primary branches (6.10), secondary branches (19.53) and umbellate plant⁻¹ (5.93) were registered with Agro Charger @ 4 ml litre⁻¹. Maximum number of umbel plant⁻¹ was recorded with control. Maximum seed yield (797 kg ha⁻¹) was registered with Agro Charger @ 3 ml litre⁻¹. Seed yield increased by 29.80 % over Agro Charger @ 2 ml litre⁻¹ with the use of Agro Charger @ 3 ml litre⁻¹. It might be due to increased bio availability of nutrients with the 2 ml litre⁻¹ dose of Agro Charger. Agro Charger @ 3 ml l⁻¹ might be increased breakdown of nutrients which resulted in increased bio availability of nutrients. Agro Charger @ 3 ml litre⁻¹ could be facilitated in absorption of nutrients. In other words it could be interpreted as Agro Charger @ 3 ml litre⁻¹ might be able to supply nutrient at critical stage

Table 1. Effect of Agro Charger on growth, yield attributing and yield of cumin (Pooled data of 2018-19 and 2019-20)

| Treatment | Dose (ml/lit.) | Plant height (cm) | No. of primary branch | No. of secondary branch | No. of umbel /plant | No. of umbellate /plant | Seed yield (kg/ha) | Essential oil (%) |
|--------------|----------------|-------------------|-----------------------|-------------------------|---------------------|-------------------------|--------------------|-------------------|
| Control | untreated | 35.40 | 5.50 | 13.66 | 16.50 | 5.10 | 422 | 3.15 |
| Agro Charger | 1 | 35.10 | 5.66 | 12.80 | 14.96 | 5.06 | 347 | 3.10 |
| Agro Charger | 2 | 34.90 | 5.73 | 17.80 | 19.00 | 5.03 | 495 | 3.75 |
| Agro Charger | 3 | 34.76 | 5.76 | 16.00 | 16.70 | 4.90 | 477 | 3.43 |
| Agro Charger | 4 | 36.56 | 5.90 | 20.00 | 20.93 | 5.00 | 344 | 3.60 |
| Agro Charger | 5 | 35.73 | 5.73 | 16.16 | 16.73 | 4.96 | 438 | 4.15 |
| CD at 5% | | 5.25 | 0.80 | 3.62 | 3.75 | 0.38 | 321 | 0.65 |

Table 2. Effect of Agro Charger on growth, yield attributing and yield of coriander (Pooled data of 2018-19 and 2019-20)

| Treatment | Dose (ml/lit.) | Plant height (cm) | No. of primary branch | No. of secondary branch | No. of umbel /plant | No. of umbellate /plant | Seed yield (kg/ha) | Essential oil (%) |
|--------------|----------------|-------------------|-----------------------|-------------------------|---------------------|-------------------------|--------------------|-------------------|
| Control | untreated | 116.0 | 6.03 | 19.56 | 24.26 | 5.83 | 783 | 0.40 |
| Agro Charger | 1 | 211.7 | 6.03 | 17.40 | 22.50 | 5.73 | 791 | 0.36 |
| Agro Charger | 2 | 112.0 | 5.83 | 17.66 | 22.73 | 5.43 | 614 | 0.36 |
| Agro Charger | 3 | 113.0 | 5.83 | 18.26 | 21.10 | 5.66 | 797 | 0.36 |
| Agro Charger | 4 | 115.8 | 6.10 | 19.53 | 23.96 | 5.93 | 773 | 0.46 |
| Agro Charger | 5 | 112.4 | 6.00 | 16.03 | 23.60 | 5.46 | 658 | 0.73 |
| CD at 5% | 168.1 | 0.90 | 9.30 | 9.08 | 0.64 | 242 | NS | |

viz. onset of flowering and seed formation, which could be resulted in improved source sink relationship. An increased dose of Agro Charger (3 ml litre⁻¹) in coriander comparison to cumin (2 ml litre⁻¹) might be due greater biomass of coriander than cumin, which could be able to fulfill the increased demand of nutrient supply in coriander. These results are close conformity with results found by Zala *et al.* (2016) in which Agro Clean, a nano herbal product increased the yield of cotton. The results are also in agreement with results obtained by Tripathi (2009) and Godara (2014). In coriander also maximum essential oil (0.73 %) recorded with treatment receiving Agro Charger @ 5 ml litre⁻¹.

Conclusion

Nutrition in plant plays a vital role with respect to yield level. All crops respond well, if nutrition requirement is fulfilled at proper rate, time and method of application. Soil has inherent fertility status to sustain the plant growth, if bioavailability of nutrition is made available to facilitate absorption at critical stage of growth and development. Agro Charger acts on the soil and breakdown the nutrient thereby increasing bio-availability of nutrient for the plant. Increased absorption of nutrient ultimately augments the yield of the crop. So based on the results obtained it can be concluded that Agro Charger @ 2 ml litre⁻¹ and @ 3 ml litre⁻¹ in cumin and coriander respectively is better and eco-friendly source of nutrition in order to have safe and sustainable yield of cumin and coriander.

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