

TOPIC C3: Sustainability advances for the production of high value food components

No. 72 (A-150)

Effect of bio-fertilizer and organic fertilizer on yield and yield components of Cumin (*Cuminum Cyminum*) under drought stress

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Objectives

Cumin is mostly grown in China, Uzbekistan, Tajikistan, Iran, Turkey, Morocco, Egypt, Syria, Mexico, Chile and India. Drought stress may limit yield of medicinal and aromatic plants by reducing the harvest index. Secondary metabolites are synthesized by plants due to plant adaptation in response to biotic and abiotic stresses e.g. water stress, cold stress, high visible light. Water stress is the most influential factor affecting crop yield particularly in

Methods

A factorial split plot experiment was carried out based on randomized complete block design with two factor and three replicates at Research Field of Agricultural Faculty, Shahed University, Tehran, Iran in 2014-2016 years. The factors were irrigation with three levels (irrigation cutting after green stage, after flowering stage, and after seed formation stage) as main factor, and combination of biological fertilizers with two levels (bio-fertilizer inoculation, no inoculation) and organic fertilizer with two levels (20 t ha and composted animal manure and no manure) as sub factor.

Results

Drought stress had a significant effect on the number of umbels per plant. Also, the effect of fertilizer treatment and its interaction with irrigation on the number of umbrella per plant was significant and that was significantly different between times of irrigation. Interaction of irrigation and fertilizer treatments on number of umbrella per plant was significant. Results show the effects of irrigation times and fertilizers organic on cumin growth. Irrigation times, fertilizers organic and Interaction had significant effects on the number of umbelet per umbrella. Also results showed that the highest number of umbelet per umbrella was obtained from one times irrigation but in different levels of drought stress.

Conclusion

This study showed that highest (643.7 kg/ha) and lowest (252.1 kg/ha) seed yield was produced under the treatments 1 and 2 irrigations times respectively. Also, the application 20 t/ha animal manure treatment was obtained 534.3 kg/ha seed yield. Manure application improves the soil structure and soil moisture content, provides plant with essential elements, increases growth, number of umbrella per plant and biological yield and finally led to increase seed yield.