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Black Cumin (*Nigella sativa* L.) a member of the family Ranunculaceae is being used for edible and medicinal purposes in several countries of the world. To study effects of drought stress and nitrogen levels application on the quantitative and qualitative yield of this plant, an experiment was conducted at Zahak Agricultural Research station during 2010-2011 growing season. The experimental design was a split plot arrangement in RCBD with three replications. Four drought stress included; A₁= normal irrigation(control), A₂= stop irrigation from stem elongation to the start of flowering, A₃= stop irrigation from flowering to the start of capsule formation and A₄=stop irrigation in capsule formation and grain filling stages were assigned as main plots and four N levels (0, 30, 60 and 90Kg ha⁻¹) were randomized in sub plots. Analysis of variance showed that drought stress reduced yield, yield components and Fe content grain, but increased qualitative characteristics including essential oil, thymoquinone, oil, protein percent and grain mineral contents (N, K, P, Cu, Zn and Mn) significantly. Effect of nitrogen levels was significant on the all of quantitative and qualitative characteristics except harvest index, so that by increasing N application; plant height, branch number per plant, capsule number per plant, biological yield, grain number per plant, essential oil, oil, protein and nitrogen grain percent increased, but K, P, Zn and Mn grain content decreased. Meanwhile the most grain number per capsule, 1000- grain weight, grain yield, thymoquinone percent and Cu grain content were attained by 60 Kg ha⁻¹ N application whereas consumption of more fertilizer rate (90Kg ha⁻¹) had negative effects on these important traits. Interaction effect of drought stress × nitrogen levels was significant on the grain number per plant, essential oil, thymoquinone, oil, N, P, Cu, Zn, Fe and Mn grain content, but this effect wasn't significant for plant height, branch number per plant, capsule number per plant, grain number per capsule, grain and biological yield, harvest index, 1000- grain weight and K grain content. On the basis of these results, application of 60 Kg ha⁻¹ N under normal irrigation and under drought stress conditions in capsule formation and grain filling stages are respectively recommended for maximum yield grain and maximum active ingredients production.

Key words:

Drought stress, Nitrogen levels, Black Cumin, Yield, Active ingredients



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University of Zabol
Graduate school
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**The Thesis Submitted for the Degree of M.Sc
(in the field of Spice, Medicinal and Aromatic Plants)**

**Effects of drought stress and different
nitrogen levels on the quantitative and
qualitative characteristics of Black Cumin
(*Nigella sativa* L.) in Siatan region.**

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