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## Increasing Water Use Efficiency in Saffron (*Crocus sativus* L.) Cultivation

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### Abstract

An experiment was conducted at the Gonabad Research Station of Agriculture and Natural Resources, Iran to demonstrate the effects of moisture stress on saffron yield and quality in 2012 and 2013. The statistical design was a randomised complete block design with five treatments and four replicates. The treatments were: irrigation till 70% field capacity (FC), 60% FC, 50% FC, first control (three irrigations), and second control (three irrigations + one in mid summer). Quantitative measurements were number of flowers, fresh weight of flowers, dry stigma, number of corms and corm weights, as well as at the end of the experiment amount of corm covering, and dry weight of leaves. Quality measurements included amount of picrocrocin, crocin and safranal. Combined analysis for two years showed no significant effects on quantitative characteristics but high significant effects on quality characteristics. By reducing irrigation to 50% FC quality factors increased and showed positive effects of moisture stress on saffron quality. However, there was a trend of decreasing quantity characteristics because of a reduction of soil moisture content. For increasing saffron stigma yield three irrigations + one irrigation in mid summer is optimum. For increasing the amount of picrocrocin, crocin and safranal a moisture stress is desirable. Actual, efforts are necessary to increase water use efficiency (WUE) in saffron with respect to the actual used 3000 m<sup>3</sup> water ha<sup>-1</sup> for an economical yield. Such a WUE optimisation is especially necessary because of recent drought years in the main areas of saffron cultivation in the great Khorasan. The results of this experiment showed that moisture stress as much as 70% FC can be recommended for both saffron quantity and quality.

**Keywords:** Quality factors, saffron covering, stigma