Modeling Basil (*Ocimum basilicum* L.) Response to Simultaneous Salinity and Nitrogen Deficit Stresses

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Abstract

Salinity and nutrient deficiency particularly nitrogen are two important limiting factors for yield production in arid and semi-arid regions. The objective of this study was to model basil response to combined salinity and nitrogen deficiency. To that end, modified Leibig-Sprengel (LS) and modified Mitcherlich-Baule (MB) and also some newly derived models based on combination of MB with salinity models of Maas and Hoffman (31), van Genuchten and Hoffman (36), Dirksen and Augustijn (17) and Homaee *et al.,* (23) were evaluated. The experiment was conducted under four salinities including 1.175, 3, 5, and 8 dSm^{-1} and four nitrogen levels including 100, 75, 50, and 0 percent of fertilizer requirements each with three replicates. Results indicated that from among the evaluated models, the derived models of MB and Maas and Hoffman (MB-MH) (nRMSE=4.9), MB and van Genuchten and Hoffman (MB-VG) (nRMSE=5.4), and also MB and Homaee *et al.,* (MB-H) (nRMSE=7.0) provide best fits to the measured data. Also, the comparison of two modified LS and MB models indicated that the estimated relative yield for irrigation water salinity levels by modified LS model (nRMSE=4.6) provides better results (nRMSE=5.9). However, for soil nitrogen levels and interactive effects of salinity and nitrogen, the modified MB model (nRMSE=10.3) provided better outputs (nRMSE=14.4). Consequently, instead of the modified LS and MB models the proposed models in this research can be recommended for use.

Keywords: Modified MB Model; Modified LS model; Nitrogen; Salinity.

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