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Influence of Foliar Spray with Stigmasterol on Growth, Productivity and its Quality and Stem Anatomy of Flax (*Linum usitatissimum* L.)

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Abstract: The present study was carried out during the two winter growing seasons of 2010/2011 and 2011/2012 to investigate the effect of foliar application with different concentrations (0, 30, 60, 90, 120 and 150 ppm) of stigmasterol on morphological characters and yield of flax cv. Sakha-1 from straw, fiber and seeds as well as on their related characters. Moreover, the effect on stem anatomy, seed oil percentage and composition of fatty acids were under consideration. The obtained results indicated that stigmasterol at the relatively low used concentration of 30 ppm showed no significant effect on all studied morphological and yield characters of flax cv. Sakha-1. On the other hand, foliar application with any of the other assigned concentrations of stigmasterol (60, 90, 120 and 150 ppm) induced significant promotive effect on all studied characters except those of number of seeds/capsule, seed oil percentage and composition of fatty acids of flax cv. Sakha-1. The maximum promotion was detected at 90 ppm stigmasterol which induced significant increases of 25.7, 23.8, 34.8, 19.5, 24.6, 9.2, 38.0, 29.4, 35.6, 14.1, 15.9, 31.6, 28.3 and 22.6% over those of the control for plant height, technical length of the main stem, length of fruiting zone, diameter of the main stem, number of capsules/plant, weight of 1000 seeds, seed yield/plant, seed yield/feddan, seed oil yield/feddan, straw yield/plant, straw yield/feddan, fiber yield/plant, fiber yield/feddan and fiber length; respectively. Microscopical examination revealed that the increase which was observed in stem diameter of flax cv. Sakha-1 due to foliar application with 90 ppm stigmasterol could be attributed mainly to the prominent increase in all included tissues. The thickness of epidermis, cortex, fiberous region, secondary phloem and xylem tissue as well as diameter of the pith were increased by 5.6, 47.1, 20.2, 14.1, 30.0 and 8.1% more than those of the control; respectively. Moreover, number of fiberous bundles/cross section increased in treated plants by 9.4% more than those of untreated ones.

Key words: Flax, *Linum usitatissimum* L., Stigmasterol, Growth, Productivity, Quality, Stem Anatomy.