



Influence of Selenium and Boron on Oil Production and Fatty Acids Composition of Canola (*Brassica napus* L.) Plant Irrigated with Saline Water

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Abstract : Salinity is a major factor that influences rapeseed production. Canola is now the third most important source of edible oil in the world and has many uses in modern medicine. Selenium and boron are required by plants in small quantities that involve several physiological and biochemical processes in plants. The aim of this investigation was to evaluate the effect of selenium (0, 2 and 4 mg l⁻¹ as sodium selenate) and boron (0, 2, and 4 mg l⁻¹ as boric acid) on oil production and fatty acids composition of *Brassica napus* plants irrigated with saline water (0, 2.5, 5 and 7.5 dS m⁻¹). Data revealed that salinity significantly decreased oil yield of canola and the highest oil yield (180.5 and 421.8 kg ha⁻¹ in the 1st and 2nd seasons, respectively) were obtained from the lowest level of salinity (2.5 dS m⁻¹) while increasing salinity up to 7.5 dS m⁻¹ resulted in the minimum values of oil yield (106.0 and 157.7 kg ha⁻¹). Plants irrigated with the lowest level of salinity (2.5 dS m⁻¹) and sprayed with selenium at 4 mg l⁻¹ and boron at 2 mg l⁻¹ gave the highest oil yield in the 2nd season (821.4 kg ha⁻¹). Gas Chromatography / Mass Spectrometry analysis pointed out that canola oil was characterized by containing a high relative concentration of unsaturated fatty acids. The major monounsaturated fatty acids was Oleic acid (46.2 - 75.6 %), followed by cis-11-Eicosenoic acid (1.4 - 11.5 %) and Erucic acid (0.8 - 10.8 %). Linoleic acid (11.2 - 24.8 %) was the main component of polyunsaturated fatty acids. Whereas the main saturated fatty acids were Palmitic acid (1.0 - 5.0 %) and Stearic acid (1.4 - 3.0 %). The highest relative concentrations of Oleic acid (63.3 and 64.4 %) were recorded with salinity at 2.5 and 5 dS m⁻¹, respectively. While increasing salinity level up to 7.5 dS m⁻¹ decreased Oleic acid (60.5%) and increased Linoleic acid (20.1%). Moreover, applying selenium at 2 mg l⁻¹ and boron at 4 mg l⁻¹ with plants irrigated with the lowest level of salinity 2.5 dS m⁻¹ recorded the maximum value (75.6 %) of Oleic acid and the lowest percentage of Linoleic acid (11.2 %), while increasing salinity up to 7.5 dS m⁻¹ resulted in the maximum values of Linoleic acid (24.4%) and Palmitic acid (5.0%). The application of selenium at 4 mg l⁻¹ and boron at 4 mg l⁻¹ to plants irrigated with the lowest level of salinity (2.5 dS m⁻¹) increased refractive index, specific gravity, saponification number, ester number and iodine number and decreased acid number. Canola oil has high antioxidant activity which gave the greatest value (82.5 %) with plants irrigated with the lowest level of salinity (2.5 dS m⁻¹) and sprayed with selenium at 4 mg l⁻¹ and boron at 2 mg l⁻¹.

Key words: Canola, salinity, selenium, boron, oil production, fatty acids, antioxidant activity.

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