Eighth Article:

Article title	**Impact of plant density and humic acid application on yield, yield components and nutrient uptakes of sunflower (*Helianthus annuus* L.) grown in a newly reclaimed soil.**
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A study was carried out as field experiments at Demo experimental station, Fayoum district in summer seasons 2015 and 2016 to investigate the effects of plant density and humic acid soil application on oil content, nutrient uptakes, vegetative growth and yield of sunflower (*Helianthus annuus* L.) plants. A split plot layout within a randomized completely blocks design with 3 replications were used. Three treatments of plant density i.e., D_1=47,619 plant/ha^{-1} (0.7x0.3 m), D_2=71,428 plant/ha^{-1} (0.7x0.2 m) and D_3= 95,238 plant/ha^{-1} (0.7x0.15 m) were placed in the main plots. The subplot treatments were 5 levels (0.0, 1.25, 2.5, 3.75 and 5 kg ha^{-1}) of humic acid. The results indicated that the plant density D_1 gave the highest values of plant height, number of leaves plant^{-1}, leaf, stem and head dry weights plant^{-1} and seed yield plant^{-1}. However, the plant density D_2 recorded the highest seed yield ha^{-1}. Both plant densities (D_1) and (D_2) surpassed D_3 concerning on values of leaf and seed (N, P, K, Mg, Mn, Zn and Fe) uptakes. Soil addition of humic acid at rate of 5 kg ha^{-1} significantly produced the highest values of growth parameters, yield, its components as well as oil content and nutrient uptakes in both seasons. The highest sunflower seed yield was obtained when plant density was 71.428 plant ha^{-1} (D_2) and treated with 5 kg ha^{-1} of humic acid as a soil application.