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The Effect of Spraying with Gibberellin and Ethephon on Yield Component and some Qualitative Characteristics of Rapeseed (*Brassica napus* L.)

S K J Alhilfi and L M S Al-freeh

Department of field Crop, College of Agriculture, University of Basrah, Iraq

Corresponding author email: sundus.jabar@uobasrah.edu.iq

Abstract: A field experiment was conducted at the College of Agriculture's Agriculture Research station, University of Basrah, Karma Ali site, in Basrah Governorate for the two agricultural seasons 2021-2022 and 2022-2023, in order ascertain the impact of concentrations of gibberellin G0=0, G1=200, and G2=400 mg L^{-1}), and spraying with ethephon E0=0, E1=0.75, and E2=1.5 ml L^{-1}), on yield and some quality characteristics of rapeseed crop. Var. Pactol. The experiment was designed according of factorial experiments in three replications, utilizing randomized complete blocks (RCBD). The results obtained showed a superiority of G2 concentration in yield of seeds (2.58 and 2.73 tons ha^{-1}), proportion of protein (17.17 and 18.72%), and protein yield (0.45- and 0.53 tons ha^{-1}) throughout the course of the two seasons, and oil percentage and oil yield for the first season only, which amounted to 38.67% 0.98 tons ha^{-1} respectively. Additionally, the outcomes showed that foliar spray treatments with ethephon at concentration E2 significantly affected for both seasons, on yield of seeds (2.59 and 2.90 tons ha-1), oil yield (0.97 and 1.10 tons ha^{-1}), and protein yield (0.44 and 0.55 tons ha^{-1}). Gibberellin and ethephon have a substantial interaction in terms of seed production and oil yield, and protein yield during its second season. The combination E2x G1 had the greatest average seed yield, the yield was 3.15 tons ha^{-1} and did not substantially differ from the G2xE2 combination, with an average of 3.00 tons/ha-1. The combination G1xE2 achieved the highest average for the oil and protein yield, about 1.19 and 0.61 tons ha^{-1} respectively.

1. Introduction

Rapeseed crop, Brassica napus L., is among the most significant basic sources of vegetable oils all over the world. The global cultivated area was estimated at about 37.77 million hectares, with an expected production of about 71.15 million tons and a yield of 1.89 tons ha-1 [1]. Thus, it ranks third in production after soybean and oil palm crops, and is distinguished by a high concentration of unsaturated fatty acids represented by oleic (60%) and linoleic (20%), with a low proportion of saturated fatty acids (6%) [2]. In addition, its seeds contain a percentage of natural phenols and natural flavonoids, (antioxidants), in addition to polyphenols, flavanols derivatives, and vitamin E, which makes it a high-quality food oil [3]. It is appeared from recent studies carried out in various regions of the world that growth regulators, both promoting and inhibiting, have a major role in the plant physiological processes of plants by via changing the balance of both photosynthesis and respiration. Especially gibberellin acid, which works to increase photosynthesis in plant leaves, which leads to improved growth characteristics, increased plant height, and increased yield per unit area (4 and 5). Growth retardants usually work to stimulate or modify one of the physiological processes when sprayed at the suitable concentration and suitable growth stage for the plant, as ethephon has a significant part in controlling the relationship between the source and sink by dividing the metabolic products between the various areas of the plant and boosting its capacity to use these products to enhance the yield and its components