

Response of Two Tomato Varieties to Irrigation with Sulphate Waters

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Abstract. Tomato (*Lycopersicon esculentum* Mill. (Var. Marmande and Pearson) plants were grown under greenhouse conditions, in a loamy sand calcareous soil (CaCO_3 , 26.5%) to study the growth and yield of tomatoes irrigated with SO_4^{2-} waters (15, 30 and meq/l).

Results indicated that total fruit weight and average fruit weight were not affected by SO_4^{2-} level. Fresh weight (FW), dry weight (DW) and maximum length (ML) of root system as well as total soluble solids (TSS) and acidity of fruit were significantly ($P \leq 0.05$) increased by high SO_4^{2-} level (45 meq/l).

The results also revealed that in Marmande cultivar, at the second stage (69 days) – the uptake of N, P, K, SO_4 , Fe, Zn, Mn and Cu was significantly ($P \leq 0.05$) increased as SO_4^{2-} level increased. Also, soil SAR and pH were significantly increased.

The results suggest that under prevailing conditions of the experiment, irrigating tomatoes with SO_4^{2-} waters having concentration in the range of (15–45 meq/l) can be tolerated by tomato plant and it would not restrict its growth and yield.

Introduction

Sulphur is often added in excess to plant needs in arid and semi-arid regions. This is because irrigation is a common practice and in some of these areas the sulphate (SO_4^{2-}) is the predominant anion in the irrigation water. This is the case in some cultivated areas of Saudi Arabia, particularly the central region (e.g. Aljelh, Tebrak).

The limited information concerning the effect of sulphate waters on plants and soils show a great deal of contradictions in results [1-3]. In general, use of high SO_4^{2-} waters may lead to gypsum precipitation. This is considered beneficial to soils because of the limited solubility of gypsum (31.35 meq/l in pure CaSO_4 system at 25°C) which does not create saline conditions in the soil [4,5]. However, an adverse effect may occur due to precipitation of Ca^{++} with SO_4^{2-} leading to an increase in concentration of Na^+ which raises the soil solution sodium adsorption ratio (SAR) [6]. These changes, which may cause beneficial or harmful effects, are greatly influenced