

The effect of urban wastewater treated by trickling filter on chickpea (*Cicer arietinum* L.) growth

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Abstract

The irrigation with treated wastewater (TWW) can be a promising solution to mitigate the dependence on fresh water in agriculture. For this purpose and after physicochemical analysis of TWW (T°, pH, electrical conductivity, TSS, BOD₅, COD, PO₄³⁻, TKN, Cl⁻, etc.), their effect on the agro-physiological parameters of chickpea (*Cicer arietinum* L.) was assessed. Indeed, a pot experiment was conducted under natural conditions for eight weeks using different ratios of TWW against natural water (NW) as control. Results showed that TWW was classified as non-biodegradable (BOD₅/COD < 0.3). For chickpea responses, result proved that the 75% TWW showed the best effects on chickpea growth, in terms of plant height, leaf area, shoot fresh and dry weight, with an improvement of 18.5%, 62.3%, 13.0% and 25.6% respectively than control plants. Moreover, an appearance of flowers and pods was observed by this dilution (75%) with an increase in chlorophyll content by 8.2% and 41.3% than chickpea under NW and 100% TWW, respectively. In contrast, no remarkable difference was stated between plants growth irrigated with NW and those irrigated with 100% TWW, the last one is the only one that does not result in any flowering than all other treatment. For water status, the relative water content was significantly ($p < 0.05$) decreased in chickpea irrigated with 100% TWW than other treatment and control plants. In conclusion, the random use of this TWW in raw form present a risk for chickpea plants. However, TWW diluted at 75% can be recommended for irrigation purpose.

Keywords: Chickpea growth, treated wastewater analysis, treated wastewater reuse, Trickling filter, Water status