

**HYDRAULIC STUDY ON MEDIA FILTERS USING  
LOW-QUALITY WATER FOR COTTON  
IRRIGATION**

**BY**

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## ABSTRACT

**Heba Mohamed Fareed Mohamed El-waly: Hydraulic Study On Media Filters Using Low-Quality Water For Cotton Irrigation. Unpublished M. Sc.Thesis, Department of Agricultural Engineering, Faculty of Agriculture, Ain Shams University, 2020.**

The aim of this study is to investigate the effect of media depth on the performance of different types of emitters on pressurized irrigation system using treated wastewater. Also this study estimates the effect of using treated wastewater on the cotton (verity Giza 94) growth, quantity and quality. All field experiments were carried out at Sarapium Forest, Ministry of Agriculture and Land Reclamation in “Sarapium”, Ismailia Governorate, at 30°51'43 N, 32°32' 70 E. (15 x 60) m<sup>2</sup> plot area was selected for carrying out the experiments. The first experiment for filtration performance designed as a split-plot with three replications. Two media depths (50 cm and 70 cm) were selected for the main plots while the different operation times (0, 25, 50, 75 and 100h) were selected for sub-plots with three replications. The second experiment to irrigate cotton using treated wastewater. The main plots involved two plant distributions (Mutual and Opposite) and the sub-plots involved the three types of emitters namely: online 4 l/h compensative, online 4 l/h non-compensative and built-in 4 l/h-30cm non-compensative.

Results indicated that:

Increasing media filtration depth from 50 to 70 cm has led to decrease the filtration flowrate with increasing pressure losses, biological oxygen demand (BOD<sub>5</sub>) and total suspended solids (TSS). The filtration flowrate decreased by increasing operation time from 0 to 100 but pressure losses, BOD<sub>5</sub> and TSS was increased.

Emitters performance of online compensative and built-in non-compensative were generally better than the online non-compensative



under using treated wastewater and emitters performance decrease by increasing operation time from zero to 100 hours.

Plants distribution significantly effect on growth and yield components of cotton. Planting cotton by mutual method gave the highest values of number of opened bolls per plant, seed cotton yield (Ken. per fed.).

Using on-line compensative emitter gave the largest values of plant height, number of opened bolls per plant, boll weight and seed cotton yield (Ken./fed.).

Mutual planting method and online compensative gave the highest values of number of fruiting branches per plant, boll weight, number of opened bolls per plant, seed index and seed cotton (yield per fed.).

**Keywords:** Media filter, Treated wastewater, Water quality, Drip irrigation, Emitter types, Cotton Growth and Yield.