

HYDRAULIC PERFORMANCE OF DIFFERENT EMITTERS UNDER VARYING LATERAL LENGTHS

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ABSTRACT

Despite the acute shortage of water for irrigation and its enormous domestic consumption, the water users in Pakistan continue using water injudiciously. This has decreased the overall irrigation efficiency up to 30%. In order to enhance the irrigation efficiency, micro irrigation methods such as drip, sprinkler, and bubbler irrigation are being used in the developed countries. Among these, the drip irrigation method is considered as the most efficient method requiring only 20 to 30% of water as compared to conventional methods. However, the performance of drip irrigation system is based on the proper design of emitters, spacing of emitters and proper spacing between delivery lines etc. But the design of emitters plays a prime role in uniform distribution of water on the field. Thus, keeping the importance of design of emitters the present study was conducted on the hydraulic performance of different emitters under varying lateral lengths to evaluate emitter discharge and emission uniformity. An experiment was conducted at Lal Baksh Farm near Chotta Gate, Gadap town Karachi to study the performance of emitters under varying lengths of laterals to evaluate emitter discharge and emission uniformity. Two types of emitters (pressure compensated and micro tube) with varying length of laterals were tested. Results suggest that the pressure compensated emitters performed well as no significant differences between average discharges were found between locations as well as between lateral lengths. They were able to control the pressure variation along the lateral length whereas the micro tube type emitters were unable to compensate such variations hence the discharges were significantly different along the lateral length. Emission uniformity with pressure compensated type emitters was 91.2% for a lateral of 57.2 m length while it was 88.2% for the lateral of 71.2 m length. Micro tube type emitters of 57.2 m length produced 82.8% emission uniformity while it yielded to 79.4% with lateral of 71.2 m length. Results of the study revealed that the pressure compensated emitters perform better and manage the pressure losses at different locations along the laterals length, hence could be preferred over micro tube emitters.

Keyword: Drip irrigation, emitters/drippers, lateral lengths, emission uniformity.