



**RESEARCH ARTICLE :**

## Comparative analysis of drippers

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Drip irrigation, Uniformity co-efficient, Emission uniformity, Co-efficient of variation, Discharge, pressure

**SUMMARY :** Drip or trickle irrigation is the method of irrigation which is becoming increasingly popular in areas with water scarcity and salt. An experiment was conducted to evaluate hydraulic performance of new drippers and to evaluate hydraulic performance of used drippers of different ages at Jawaharlal Nehru Krishi Vishwa Vidhyalaya, Jabalpur. The study was conducted to evaluate the hydraulic performance of drip irrigation system with new drippers of size 2lph, 4 lph and 8 lph. The different hydraulic measures viz., uniformity co-efficient, emission uniformity, co-efficient of variation and head discharge relationship at different operating pressure were determined by measuring discharge of different emission devices. The discharge of dripper have been measured along the lateral with dripper spacing of 1 m at five operating pressure (60 Kpa, 80 Kpa, 100 Kpa, 120 Kpa and 140 Kpa). The variation in discharge of 2 lph size dripper (for four replications) with 60 Kpa, 80 Kpa, 100 Kpa, 120 Kpa and 140 Kpa operating pressure has been depicted. The Uniformity co-efficient ( $C_u$ ) has been computed using Christiansen's equation. Replication wise  $C_u$  values have been presented for 2lph, 4 lph and 8 lph size new drippers. The maximum and best value of  $C_u$  is 98.38, 97.26 and 99.37 per cent at 2, 4 and 8 lph (new dripper) sizes at operating pressure of 100, 140 and 100 Kpa, respectively. The  $C_v$  value for three size of dripper as obtained during study. It has been observed from tables, that the average of  $C_v$  for different dripper size and at various operating pressure is in the range from 0.01 to 0.06. Emission uniformity is typically used to evaluate manufacturing quality of the drippers and it was calculated using the equation. The results show that all the drippers performed better at the pressure range of 60 to 140 Kpa, with the emission uniformity of 80.34 to 97.82 per cent. In this study, a relationship between flow rate and pressure head has been developed for 2 lph, 4 lph and 8 lph drippers. The discharge equations obtained are  $Q = 1.4564 \times 0.078$ , (For dripper size 2 lph),  $Q = 4.651 \times 0.023$ , (For dripper size 4 lph),  $Q = 6.001 \times 0.3456$  (For dripper size 8 lph).

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