

## **ABSTRACT**

### **INLINE EMITTER MODIFICATION FOR SUBSURFACE DRIP IRRIGATION**

**By  
Muhammad Fadil Hakim**

Subsurface drip irrigation has a relatively higher efficiency level compared with other irrigation systems, because it gives water only in plant root areas, so that it reduces water lost in irrigation. However, the conduct of this irrigation system deals with many problems, mainly in water flow distributions and soil wetting patterns that are not uniformed because emitters are clogged by tiny particles such as dust, sand, alga brought along the irrigation flows. More over, subsurface irrigation can only be applied by farmers or businessmen with larger capitals.

The objective of this research were to design simple subsurface drip irrigation with in-line emitter dripper type, using local component, to test performance of drip irrigation system, and to analyze the patterns of soil wetting distribution.

This research used emitter from TC (totteron cotton) cloth without additional materials, 3 layers, 10 cm and 15 fins with 100 cm and 200 cm operational heads. The irrigation system test was conducted by placing emitter in subsurface.

The results shows that the use of designs with 10 cm fin modification results in best uniformity of water distribution with the following emitter specification: discharge ( $q$ ) = 18.4 l/hour, dripper variance coefficient ( $C_v$ ) = 0.31, emission uniformity (EU) =75.4%, coefficient of discharge ( $K_d$ ) = 18.4, exponent ( $x$ ) = 0.75 with orifice dripper emitter type. The uniformity of distribution in sub unit of this design was 71.5% with 3.9 m average of wetting along planting plot (5 m) with water content ranging from 30% to 48% in one hour of irrigation. This range was still in range between field capacity and permanent withering point.

Keywords: simple drip irrigation, emitter, TC cloth