

## **Combined effect of drip irrigation and fertilizer application on growth, yield and water-fertilizer expense**

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**ABSTRACT :** An experiment was carried out to study the effect of fertigation on papaya (Cv. Pusa Delicious) at the experimental farm of Horticultural Research Station, Birauli (Rajendra Agricultural University, Pusa, Bihar) during 1998-99 with three fertigation treatments and conventional application of N-fertilizer and irrigation as control. In fertigation treatments 946 liters of water was applied per tree/year through drip with 100 (T<sub>1</sub>), 80 (T<sub>2</sub>) and 60 (T<sub>3</sub>) per cent of recommended dose of nitrogenous fertilizer. In control treatment (T<sub>4</sub>) irrigation application was done through check basin. Fruit characteristics of papaya were found superior with 100 per cent fertigation, followed by 80 per cent, control and 60 per cent fertigation treatment. The quality of fruits in terms of length, circumference and weight under fertigation treatment was significantly superior to conventional cultivation. Maximum yield of papaya was obtained in treatment T<sub>1</sub> followed by T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>. The treatment T<sub>1</sub> and T<sub>2</sub> gave 43.0 per cent and 15.0 per cent more yield, respectively in comparison to control. Water expense efficiency was found maximum in T<sub>1</sub> (3.01 t/ha-cm) where as fertilizer expense efficiency was maximum in treatment T<sub>3</sub> (16.75). A close examination of the result revealed that T<sub>3</sub> having only 60 per cent recommended nitrogen dose with drip irrigation produced similar yield (90.62 t/ha) as that of treatment T<sub>4</sub> having 100 per cent fertilizer dose with basin irrigation in which yield was 88.70 t/ha. The optimum value of fertilizer dose was found to be 7.1 t/ha, which can be recommended for drip irrigation system. At this dose the fertilizer expense efficiency would be 14 and water expense efficiency 2.4 t/ha-cm.

**Key Words:** Check basin, fertigation, fertilizer expense efficiency, water expense efficiency.