

Effect of Surface Fertigation on Nutrient Uptake, Fertilizer Use Efficiency and Economics of Inter-Specific Hybrid *Bt* Cotton

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Abstract A field investigation on Effect of surface fertigation on nutrient removal, fertilizer use efficiency and economics of inter-specific hybrid *Bt* cotton was carried out at agronomy field unit, UAS, GKVK, Bangalore during *kharif* 2012. The experiment was laid out in randomized complete block design with 7 treatments and 3 replications involving treatment combinations of 3 splits (T_2 and T_3), 4 splits (T_4 and T_5) and 5 splits (T_6 and T_7) at 75 and 100 per cent dosages of recommended dose fertilizer as compared to recommended dose of fertilizer through soil application. It was observed that significantly higher N, P and K uptake (160.99, 28.57 and 134.87 kg ha⁻¹, respectively) was recorded in 100 per cent recommended dose of fertilizer with fertigation in 5 splits. The higher nutrient uptake in fertigation treatments was attributed to higher fertilizer use efficiency and nutrient availability in the soil as compared to recommended dose of fertilizer through soil application. Among different treatments, application of 100 per cent recommended dose of fertilizer with fertigation in 5 splits recorded higher net returns (79231 Rs. ha⁻¹) and B:C ratio (3.41). It is advisable to adopt 5 splits application of all the major nutrients under surface fertigation to achieve higher cotton productivity and increasing B: C ratio, besides higher cost of cultivation.

Keywords Surface Fertigation, Fertilizer Use Efficiency, Nutrient Uptake, Recommended dose of fertilizer

1. Introduction

Cotton (*Gossypium* spp.) popularly known as “white gold”, is an important commercial fibre crop grown under diverse agro-climatic conditions around the world. It provides fibre, an important raw material for textile industry. More than 70 per cent demand from Indian textile industries is met by cotton fibres. Even though, India ranks first with respect to area under cultivation, it stands third in total production after

USA and China. Fertigation has been found to increase the efficiency in the application of fertilizer besides reducing the quantity of fertilizers applied. This in turn, reduces the cost of production and also minimizes the ground water pollution thereby preventing ecological disturbances and health risks occurred due to leaching and accumulation of nitrates in the deeper layers. As such, use of fertigation could prove as a blessing for Indian farming may pave the way for efficient use of costly and scarce fertilizers. The fertigation technique is presently restricted to drip method of irrigation. In India, out of 633 lakh ha irrigated area only 4.5 lakh ha is under micro irrigation system and remaining area is under surface method of irrigation. The major limitation of drip irrigation is its higher initial investment. Applicability of fertigation technique in surface irrigation is more useful, as more irrigated area (>99 per cent) is under surface methods. Adopting fertigation under drip method also calls for use of fully soluble fertilizers to avoid clogging due to undissolved part of fertilizers. High cost and non-availability of water soluble fertilizers are the other disadvantages of drip fertigation technology. But, conventional fertilizers could be easily used in fertigation with surface methods facilitating easy adoption by more farmers. The suitability of fertigation technique in surface method of irrigation by using conventional fertilizers needs to be studied in this direction.

2. Material and Methods

A field experiment on Cotton was conducted at ZARS, GKVK, Bengaluru (12° 51' N, 77° 35' E and 930 m Above Mean Sea Level) during *kharif* season of 2012. The texture of soil was red sandy loam having neutral pH with organic carbon (0.52 %), available nitrogen (281.5 kg ha⁻¹), phosphorous (74.3 kg ha⁻¹), and potassium (198.08 kg ha⁻¹). The rainfall of 361.7 mm was received during cropping period. The daily mean maximum and minimum temperatures for the cropping period were 29.2° C and 16.2° C, respectively. The hybrid used was KDCHB-407 BG1. The experiment was laid out in a Randomized Complete Block Design with three replications involving 7 treatments