EFFICACY OF VARIOUS HERBICIDES IN *Bt* COTTON (*Gossypium hirsutum* L.)
AND DETERMINATION OF THEIR PERSISTENCE THROUGH BIOASSAY
TECHNIQUE

**ABSTRACT**

*Key words: Cotton, herbicide, weed, herbicide residue*

A field experiment was carried out on medium black clayey soil at Junagadh Agricultural University, Junagadh during *Kharif* season of the year 2013-14 and 2014-15 to study the efficacy of various pre and post emergence herbicides and their integration with manual weeding on weed control in *Bt* cotton (*Gossypium hirsutum* L.) and determination of their persistence through bioassay technique”.

The results of the experiment revealed that next to the weed free treatment, application of oxyfluorfen 0.180 kg ha⁻¹ PE *fb* IC & HW at 30 & 60 DAS enhanced growth parameters *viz.*, plant height, monopodial & sympodial branches per plant, dry matter per plant, yield attributes *viz.*, number of bolls per plant, single boll weight, number of seeds per boll, seed cotton weight per plant, 100-seed weight, lint yield, lint index and ginning percentage along with seed cotton and stalk yield, quality parameters *viz.*, fibre length, fibre fineness, fibre strength, oil content and oil yield, and reduced weeds population and dry weight of weeds over other treatments. This treatment also inhibited depletion of nutrients (NPK) by weeds and increased uptake of nutrient by the crop and ultimately increased post-harvest soil fertility. The treatments *viz.*, oxyfluorfen 0.180 kg ha⁻¹ PE *fb* IC & HW at 30 & 60 DAS, closely followed by Pendimethalin 0.900 kg ha⁻¹ PE *fb* IC & HW at 30 & 60 DAS and IC & HW at 15-20 DAS *fb* quizalofop-ethyl 0.040 kg ha⁻¹ POE at 45 DAS were also found next best in this respect.
After pre-emergence application of herbicides oxadiargyl 0.090 kg ha\(^{-1}\), oxyfluorfen 0.180 kg ha\(^{-1}\) and pendimethalin 0.900 kg ha\(^{-1}\) showed significant persistence effect up to 30 DAS and post-emergence application of herbicides imazethapyr 0.075 kg ha\(^{-1}\), propaquizafop 0.050 kg ha\(^{-1}\) and quizalofop-ethyl 0.040 kg ha\(^{-1}\) showed significant persistence effect up to 60 DAS. At 90 DAS, pre and post-emergence application of herbicide did not show any significant persistence effect in cotton as indicated through sorghum and cucumber bioassay. The residue level in post-harvest soil of cotton is low and thereby leaving less residues (BDL) in the surface soil. There was no residual toxicity of above mentioned pre and post-emergence herbicides as observed through field bioassay after harvesting cotton crop and it was found safe to grow groundnut, green gram and pearl millet as succeeding crop.

Economical evaluation showed that oxyfluorfen 0.180 kg ha\(^{-1}\) PE fb IC & HW at 30 & 60 DAS was found economical by recording higher gross net returns (₹. 94,930) and B:C (3.66) closely followed by T\(_9\) (Weed free) and T\(_1\) (Pendimethalin 0.900 kg ha\(^{-1}\) PE fb IC & HW at 30 & 60 DAS).