Abstract

The study and development of THC strip test aimed to determine THC in hemp easily and precisely. The THC strip test consisted of strip for testing and detector. Thin Layer Chromatography technique was still used for testing THC in hemp according to its efficacy in specificity, sensitivity and accuracy. Green analysis by using non-toxic solvents and reducing the solvents used was applied in both sample preparation and separation procedures. TLC system was developed to minimize separation time. The prototype of compact THC strip test could determine THC in hemp with the limit of detection (LOD) of 0.02 microgram. The trueness and bias of the developed THC strip test were evaluated comparing with GC, the standard method. The results showed no significant difference ($p<0.05$) and had positively correlation with coefficient of 0.911. The average of % bias between GC method and the developed test kit was 15%. The detector and software for THC determination were developed. Then, the method comparison study between the developed THC strip test and GC, the standard method was conducted to evaluate the efficiency of the kit. The validation and evaluation results in method comparison study showed no significant difference ($p<0.05$) and had positively correlation with coefficient of 0.942. The average of error mean between GC method and the developed test kit was 0.004 %w/w. Limit of detection (LOD) and Limit of quantification (LOQ) was 0.011 μg/g and 0.036 μg/g, respectively, meaning that the kit could detect and quantify the THC content containing in fresh hemp at the level of 0.02%d.w. and 0.08%d.w., respectively. The HorRat value and the z-score calculated from method comparison study and intermediate study were below 2. The results verified that this developed THC strip test had excellent precision and trueness. The user satisfaction in easily usage, easily understood direction, easily interpretation, the appearance and the overall satisfaction of the test kit was also measured. The results established the good satisfaction.

Keywords: hemp, THC, THC strip test