

I. Purpose:

Historically, the Tennessee Bureau of Investigation has identified submitted plant material as marihuana by utilizing macroscopic, microscopic, and a chemical color test (modified Duquenois-Levine). This analytical scheme is widely accepted and used throughout forensic chemistry. Recently, Tennessee has legalized industrial hemp. Hemp has been defined as "...the plants and plant parts of the genera cannabis that do not contain a delta-9 tetrahydrocannabinol (THC) concentration more than three tenths of one percent (0.3%) on a dry mass basis, grown from seed certified by a certifying agency, as defined by § 43-10-103." This legislation requires the state to prove that the dry weight concentration of THC is greater than three tenths of a percent in criminal cases involving marihuana. The legal definition of hemp makes current testing procedures inadequate, as they are not capable of distinguishing hemp from marihuana. A new quantitative testing method is required. This study will validate the Tennessee Bureau of Investigation's methodology for determining the THC percentage of submitted plant material exhibits.

Many options are available when quantitating chemical compounds including but not limited to Gas Chromatography with Flame Ionization Detection, Ultra Violet-Visible Spectroscopy, titration techniques, Infrared Spectroscopy, Thin Layer Chromatography, Liquid Chromatography with Mass Spectroscopy, High Performance Liquid Chromatography, and Gas Chromatography with Mass Spectroscopy. There are advantages and disadvantages to each technique. Some of the techniques are not appropriate at all for the specific compound Δ^9 -THC or for the plant material matrix. For example, when comparing known hemp samples to known marihuana samples on the ultra violet-visible spectrometer the results were indistinguishable from each other. Therefore, we have decided to proceed with a method that utilizes Gas Chromatography with Mass Spectroscopy. These instruments are readily available in our laboratory and are instruments which are already used to occasionally identify Δ^9 -THC qualitatively in certain samples.