Detection of THC in Oral Fluid to Monitor Marijuana Use

American Clinical Solutions has recently unveiled a new testing service for delta 9-tetrahydrocannabinol (THC) in oral fluid. THC is the major psychoactive component of cannabis (marijuana). THC can bind to cannabinoid receptor-1 in the brain to generate the feelings of euphoria, disinhibition, and mentally “high”. The primary concern of short-term marijuana use is the risks associated with impaired judgment. For tasks demanding close attention such as driving and handling heavy machinery, using marijuana poses heightened safety risks to the user. Long-term use of marijuana has been linked with increased risks of developing psychotic diseases and smoking-related respiratory diseases. Marijuana has been the most commonly used illicit drug in the USA for the past ten years in a row, according to a national survey on drug use and health compiled yearly by the Substance Abuse and Mental Health Services Administration since 2002 [1]. The latest data (2012) showed that the rate of marijuana use among people ages 12 and older increased to 7.3% from 7.0% in 2011 [1]. A small yearly increase in the annual rate of current marijuana users has also been observed since 2007 [1], which might reflect the fact that medical use of marijuana has been gradually legalized in about 20 states in the USA in recent years. The prevalence of marijuana use is higher among patients under pain management. An internal study conducted by American Clinical Solutions found that THC-COOH, a metabolite of THC, was detected in about 11.2% of urine samples submitted by pain clinics across the country. Detection of THC-COOH in human urine has been well documented as a biomarker for acute and chronic marijuana use. However, in oral fluid, THC is the test of choice for that purpose. Studies have shown that although both THC and THC-COOH can be detected in oral fluid after marijuana use, a huge difference exists in terms of the actual amounts detected – THC is usually detectable at the ng/ml levels, while THC-COOH remains at the pg/ml level [2, 3]. Besides providing an alternative way of sample collection, testing THC in oral fluid also offers other distinct features in monitoring marijuana use. Detection of THC in oral fluid serves as an indicator of very recent marijuana use. After a single-dose marijuana administration (acute use), THC remained detectable for an average of 15 h in oral fluid [2].

Studies also demonstrated that after marijuana use by either smoking or oral consumption, THC detected in oral fluid appears to result from the direct release of oral deposits of marijuana accumulated during exposure, not from systemic transportation [2, 3]. Thus, oral THC is superior to urine THC-COOH in monitoring recent marijuana use among chronic marijuana users, which would be particularly pertinent to marijuana drug testing in a marijuana abstinence program. THC, as a lipid soluble compound, can be taken up by fat cells and stored in human fatty tissue. This can lead to a slow and steady release of THC into the circulation from its storage sites even long after last marijuana exposure. This phenomenon is especially prominent among heavy users, with whom urine THC-COOH can remain detectable for weeks or even months after the last self-reported marijuana use. For patients with a history of chronic marijuana use, detection of urine THC-COOH might not be able to help physicians determine a patient’s current status of marijuana use. Since systemic transportation of THC to oral fluid is minimal, detection of oral THC can be suitable for that purpose. Indeed, in a study with chronic, daily marijuana users in an abstinence program found that oral THC became negative within 48 hours after confirmed abstinence in most of the study subjects [3].