

The Impact of Inconclusive Results of Thin Layer Chromatography for Marijuana Analysis and It's Implication on Forensic Laboratory Backlog

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Abstract : Forensic laboratories all over the world face a great challenge to overcome waiting time and backlog in many different areas. Many aspects contribute to this situation, such as an increase in drug complexity, increment in the number of exams requested and cuts in funding limiting laboratories hiring capacity. Altogether, those facts pose an essential challenge for forensic chemistry laboratories to keep both quality and time of response within an acceptable period. In this paper we will analyze how the backlog affects test results and, in the end, the whole judicial system. In this study data from marijuana samples seized by the Federal District Civil Police in Brazil between the years 2013 and 2017 were tabulated and the results analyzed and discussed. In the last five years, the number of petitioned exams increased from 822 in February 2013 to 1358 in March 2018, representing an increase of 32% in 5 years, a rise of more than 6% per year. Meanwhile, our data shows that the number of performed exams did not grow at the same rate. Product numbers are stationed as using the actual technology scenario and analyses routine the laboratory is running in full capacity. Marijuana detection is the most prevalence exam required, representing almost 70% of all exams. In this study, data from 7,110 (seven thousand one hundred and ten) marijuana samples were analyzed. Regarding waiting time, most of the exams were performed not later than 60 days after receipt (77%). Although some samples waited up to 30 months before being examined (0,65%). When marijuana's exam is delayed we notice the enlargement of inconclusive results using thin-layer chromatography (TLC). Our data shows that if a marijuana sample is stored for more than 18 months, inconclusive results rise from 2% to 7% and when if storage exceeds 30 months, inconclusive rates increase to 13%. This is probably because Cannabis plants and preparations undergo oxidation under storage resulting in a decrease in the content of Δ^9 -tetrahydrocannabinol (Δ^9 -THC). An inconclusive result triggers other procedures that require at least two more working hours of our analysts (e.g., GC/MS analysis) and the report would be delayed at least one day. Those new procedures increase considerably the running cost of a forensic drug laboratory especially when the backlog is significant as inconclusive results tend to increase with waiting time. Financial aspects are not the only ones to be observed regarding backlog cases; there are also social issues as legal procedures can be delayed and prosecution of serious crimes can be unsuccessful. Delays may slow investigations and endanger public safety by giving criminals more time on the street to re-offend. This situation also implies a considerable cost to society as at some point, if the exam takes a long time to be performed, an inconclusive can turn into a negative result and a criminal can be absolved by flawed expert evidence.

Keywords : backlog, forensic laboratory, quality management, accreditation

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