Oregon State Police

FORENSIC SERVICES DIVISION

NEWSLETTER

Fall 2019

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We believe great questions can come from anyone, anywhere. Have something you'd like to know? Send your questions toannalise.vine@osp.oregon.gov and you might see an answer in the next edition of our newsletter.

CHEMISTRY VISITS A HEMP FARM

THE PASSAGE OF THE 2018 USDA FARM ACT

With the passage of the 2018 USDA Farm Act, Oregon, already in the hemp business for many years, saw a surge in the number of people farming hemp. This law also impacted the way marijuana was being identified in the forensic laboratory. Previous analytical methods used to identify marijuana in the lab included a color test and a microscopic examination of the botanical properties of the plant material. These analytical techniques are specific to the Cannabis plant as a whole, a plant genus to which both hemp and marijuana belong, but do not aid in the identification of Tetrahydrocannabinol (THC) – the psychoactive component of marijuana. The main difference between marijuana and hemp is the concentration of THC. As defined by both Oregon and the Federal Government, Cannabis is considered hemp when it has less than 0.3% THC.

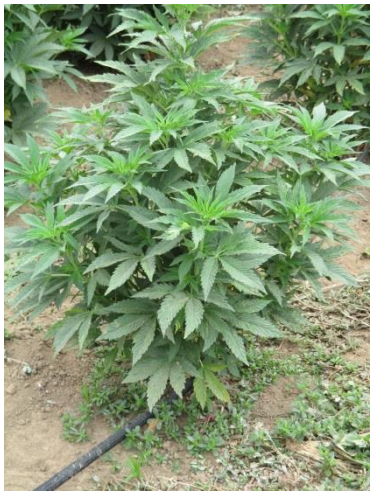
With the exception of methamphetamine, which requires a quantitative analysis for federal prosecution, the laboratory conducts a qualitative analysis on other drug evidence, determining whether or not a controlled substance is present. The purity of controlled substances is not something the lab is determining. Because analysis was not taking into account the concentration of THC in the Cannabis plant, it is possible that Cannabis with less than 0.3% THC was being reported out as marijuana. This is why, on July 9, 2019, the lab chose to stop accepting Cannabis-related evidence. While the laboratory works on validating procedures to analyze THC concentration, there remain several questions for drug chemists without answers in the literature. As the primary analytical technique for identifying marijuana was to visualize the botanical properties, the biggest question the lab needed answered was about the appearance. Current literature acknowledges a THC concentration difference between marijuana and hemp, but is that the only difference between them? Could there be a visible difference? The lab routinely receives evidence samples without a known identity, so looking at plant samples did not help identify possible differences as there was no way to distinguish between marijuana and hemp.

Members of the Chemistry Section at a hemp farm

A "FIELD" TRIP TO THE HEMP FARM

In order to answer this question, the Chemistry Section of the Portland Forensic Lab reached out to a licensed hemp farm and arranged an on-site visit. In early August, several chemists were able to tour fields of hemp and marijuana and talk to the growers about the increase of hemp cultivation. The tour started with a marijuana grow, a plant with which the chemists are very familiar. The visual appearance and odor were consistent with hundreds of lab submissions. The growers were curious about why the forensic lab had an interest in their fields, and the group explained to them that the lab must now differentiate between marijuana and hemp. The grower laughed and said, "Good luck. There is nothing visually different." Having only seen the marijuana fields at this point, the chemists were skeptical. The group continued on to the hemp fields, convinced there would be a visual difference. Unfortunately, the hemp fields looked almost identical to the marijuana seen so often in the lab.

It was hard to believe that there were no visual clues that corresponded to the lower level of THC - perhaps smaller flowers (buds), less of a distinct odor, or a different plant shape. However, after careful examination of both types of plants, the chemists determined that hemp is visually consistent with marijuana. Aside from the regulations surrounding marijuana grows, like fencing, camera requirements, and other security measures, there is nothing that visually differentiates marijuana from hemp.



Hemp plant (left) and hemp under stereomicroscope (above)

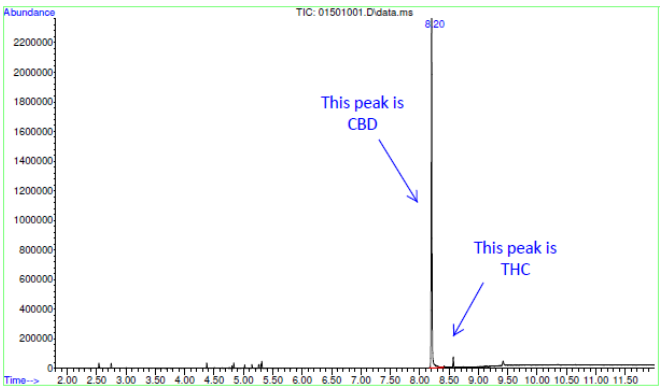
Marijuana plant (left) and marijuana under stereomicroscope (above)

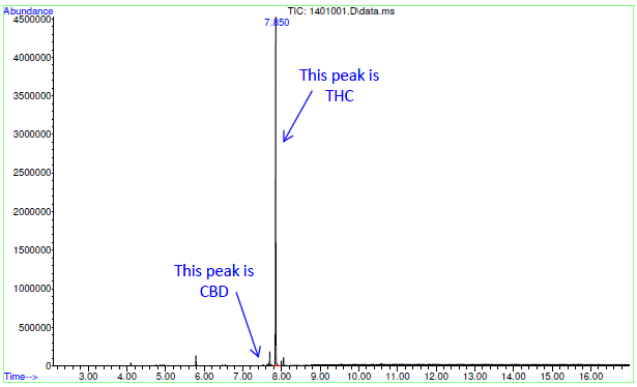
HEMP IN THE LAB

At the conclusion of the tour, a sample of hemp was taken back to the lab. Per the routine marijuana analytical scheme previously employed by the lab, a color test and microscopic exam were performed. The chemists were shown the results and asked what their conclusion would be. Everyone concluded the plant material was marijuana.

The hemp sample was then run on the Gas Chromatograph/Mass Spectrometer (GC/MS). The GC/MS is an instrument that separates a sample into its individual chemical components and provides a chemical "fingerprint" of each of the separated components. The results showed a very small THC peak relative to the CBD (Cannabidiol) peak. Although this type of analysis does not provide us with a percentage of THC, it does illustrate (as show in the pictures below) that the THC levels are very different in the hemp plant versus the marijuana plant.

The tour of the hemp farm was invaluable for the lab chemists. Hearing that hemp looks similar to marijuana didn't have the same effect as seeing (and later, analyzing) the hemp plants in person. By going out into the field (literally), the forensic lab was able to gain a better understanding of what types of samples will likely be submitted for analysis in the future.





GC/MS results for analysis of Hemp (left) and Marijuana (right)

BEND FORENSIC LABORATORY

LOCATION AND COUNTIES

Address

20355 Poe Sholes* Dr., Suite 200, Bend, OR 97703

Counties

Crook, Deschutes, Harney, Jefferson, Klamath, Lake, Wheeler

**Who was Poe Sholes? Answer: Deschutes Co. Sheriff Forrest "Poe" Sholes served from 1953-1981. He was born in Bend in 1919,and received the "Poe" nickname because his little brother had trouble pronouncing "Forrest".*
Source: Deschutes Co. Sherriff's Office

WHO ELSE WORKS HERE?

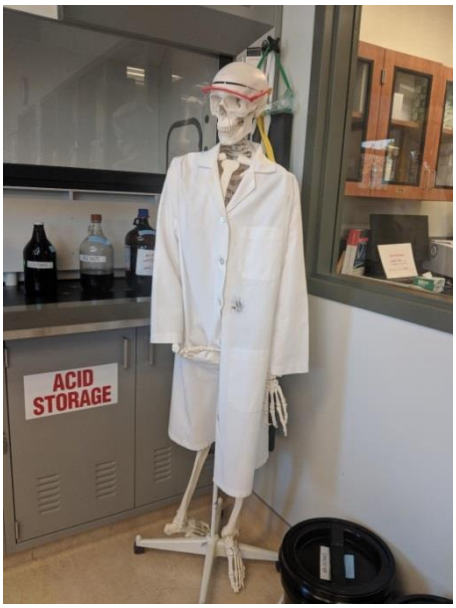
The Bend Laboratory shares the first floor of our building with the OSP Bend Patrol Office, which comprises about 35 people including management, detectives, troopers, evidence technician, and administrative staff. Troopers from the Madras, La Pine, and Prineville offices often stop by as well. The building second floor is occupied by Deschutes County 911 Dispatch.

DISCIPLINES OFFERED

Biology Processing
Drug Chemistry
Field Investigations
Latent Print Processing and Comparison

WHO WORKS HERE?

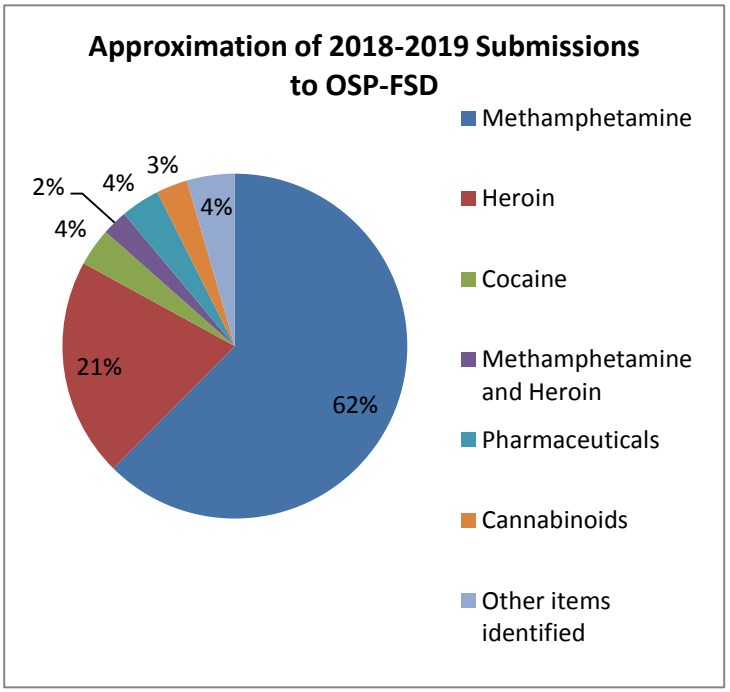
Currently 9 folks: Lab Director, Forensic Lab Specialist, and 7 Forensic Scientists



FORENSIC CHEMISTRY

WHAT IS IT?

In the Chemistry discipline, we test for the presence of controlled substances. We also analyze evidence from suspected clandestine laboratories to determine the chemicals and processes used to manufacture controlled substances. Quantitative (purity) analysis may be performed on an as needed basis only for methamphetamine cases that will be prosecuted federally. The discipline of chemistry is performed in all five laboratories in Oregon: Bend, Central Point, Pendleton, Portland Metro, and Springfield. Clandestine Laboratory analysis is only performed in the Central Point and Portland Metro laboratories and quantitative analysis is only performed in the Portland Metro Laboratory.



TYPES OF EVIDENCE

Samples in chemistry can be in liquid or solid form and range from residue amounts to larger multi-kilogram submissions in various types of containers (e.g., plastic bags, paper folds, smoking devices, etc.). Controlled substances commonly seen around the state include methamphetamine, heroin, cocaine, and many other compounds.

TESTING PERFORMED

The chemistry section uses a variety of techniques to provide a comprehensive analysis.

We use numerous presumptive or screening tests, which are designed to give results indicative of general classes such as opiates, amines, or other drugs of abuse. These include color tests and UV spectrophotometry.

Chemistry also uses various different confirmatory tests to positively identify compounds. These include Gas Chromatography/Mass Spectrometry (GC/MS) and Fourier Transform Infrared Spectrophotometry (FTIR). The GC/MS utilizes the separation capabilities of the gas chromatograph to isolate samples into their component parts. These are then introduced to the mass spectrometer allowing for the determination of the unique chemical fingerprint of a drug to be compared to known standards. FTIR works on the principle that compounds will interact in specific and unique ways when energized with infrared energy. This FTIR data is then compared to known standards to potentially identify submitted samples.

10,000TH CODIS HIT

Friday, September 20, 2019, the DNA section of the Oregon State Police Forensic Services Division obtained their 10,000th CODIS hit. CODIS (Combined DNA Index System) is a network of DNA databases maintained at local, state and national levels. Oregon participates in the CODIS network under the rules set forth by the FBI.

CODIS databases compare DNA profiles from evidence left behind at crime scenes to DNA profiles from offenders throughout the US. The results of these comparisons (hits) can enable investigators to identify putative perpetrators of crimes. For example, if a burglar were to leave behind blood after breaking a window, the DNA profile from the blood could be compared and matched to an offender's DNA profile in the CODIS database. Crimes can also be linked to each other through the use of the CODIS database. For example, DNA profiles recovered from the steering wheels of a group of stolen vehicles may match each other. This could allow investigators to pool information and other resources.
Oregonians benefit when these crimes are solved. A large portion of these crimes are property crimes. These crimes lead to concern for Oregonians' safety. CODIS can give investigative leads to law enforcement on the possible perpetrators of these crimes.

Oregon has participated in CODIS for the past 25 years, and achieved its first database hit on August 4, 1994. Oregon's 5,000th database hit came nearly 20 years later, in February, 2013. Today's 10,000th hit, only 6 years later, is due to the increased power of the database, and the participating law enforcement agencies heightened awareness of CODIS's capability and limitations. The more DNA profiles are entered into the database, the more powerful a tool it becomes for solving crime.

The evidence involved in Oregon's 10,000th CODIS hit was from a no suspect sex offense case that occurred in July, 2019. The DNA analyst who worked this case was hired using funding from Melissa's Law (Senate Bill 1571), which was passed by the Oregon Legislature in March, 2016. Melissa's Law requires mandatory testing of all sexual assault forensic evidence (SAFE) kits. This hit occurred on the final day of National Forensic Science week.