



Maricopa County Sheriff's Office

Paul Penzone, Sheriff



INCIDENT REPORT

EVENT	Reported Date:	Reported Time:	IR #:	Original/Supp?	Hand Written?	Info Only	Access Level:	Case Status:	MC (Event) #:
	6/26/2019	14:48	IR19019413	ORIGINAL	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	Open	Exceptionally Cleared	MC19132198
	Serial #: S2148	Last Name: SHAY, M			Shift Supervisor: Z7284		Name: KASKAVAGE, M		
	Body Camera Activated?	Reason not Active: not issued							
	Break in Video?	Reason for break:							
INCIDENT	Radio Code:				From Date:	From Time:	9-1-1 Tape Requested:		
	267 NARCOTICS/OTHER DRUGS				6/5/2019	09:00	No		
					To Date:	To Time:			
	Location:			City:	ZIP:	The number of Additional MCSO Personnel On Scene:			
	2627 S 35TH AVE			PHOENIX	85009	2			
	Is this IR related to others? NO								
Additional MCSO Personnel On Scene:		Serial#:	Last Name:						
		S1676	MILLER, J						
Additional MCSO Personnel On Scene:		Serial#:	Last Name:						
		S1586	FELIX, J						

SYNOPSIS

CANNABIS EXTRACTION REPORT 2.5 OZ MARIJUANA MCSO / HIDTA / MCDST

Extraction yield results using high grade marijuana for both mechanical and non polar chemical extraction processes on 2.5 ounces of marijuana.

Based on the below analysis, experiments, extractions , training and experience the results show that 2.5 ounces of marijuana will produce less than 9 grams of cannabis.

PERSON	ID:	Type:	Name Type:	VR Form & Pamphlet Given?	Reason NOT Given:					
	1	RESPONSIBLE PARTY	Maricopa County	VR_PamphletDeliveryMethod:						
	Name - Last:			First:	Middle:	Suffix:	DL/ID #:	St.:	Status:	
	Home	Street Nbr.	Dir:	Street Name	Suffix:	Dir:	Unit/Apt	City:	State:	ZIP:
	Cell Phone:		Home Phone:		Email Address:					
	Race:			Sex:	Ethnicity:	SSN:	DOB:	Age Range:	Juvenile:	
								From: To:	Unknown	
	Resident of Jurisdiction?		Height Range:		Weight Range:		Hair:		Eye Color:	
			From: To:	From: To:						
	Was consent to search the Person requested?				Consent Given?		Person Search Conducted?			
	Search Options:									
	Was this an Investigatory Detention?				Arrested?		ARS:		Type:	
	Work	Work Business Name:					Work Phone:			
Street Nbr.		Dir:	Street Name:	Suffix:	Dir:	Unit/Apt	City:	State:	ZIP:	
FBI#:		SID:		BK#:		Scanned Address:				

NARRATIVE

Extraction yield results using high grade marijuana for both mechanical and non polar chemical extraction processes on 2.5 ounces of marijuana.

Based on the below analysis, experiments, extractions , training and experience the results show that 2.5 ounces of marijuana will produce less than 9 grams of cannabis.

Background

NARRATIVE

In May, 2019 the Arizona Supreme Court ratified that narcotic cannabis (hash), "Resin and by extension hashish" was included in the Arizona medical Marijuana's definition of a AMMA Product and offers immunities to a valid, lawful cardholder under ARS 13-2801.8

The court further noted that "The AMMA's weight limitation is based on "two and one half ounces" of dried flowers of the marijuana plant and the product manufactured by those flowers" AND "We therefore read 36-2801(1) and (15) to mean qualified patients are allowed two-and-one-half ounces of dried flowers, OR mixtures and preparations made from two-and-one-half ounces. (Court opinion State V Jones CR-18-0370-PR).

Since the majority of product manufactured, possessed, sold , transported and transferred as "medical Marijuana" under the Arizona Medical Marijuana Act is (as of 2019) Cannabis oil, or its distilled, purified by-products, it becomes incumbent for law enforcement, courts and prosecutors to understand the yield that are "made from two-and-one-half ounces"

Shortly after the ruling and the court's opinion, investigators from the MCSO/HIDTA/MCDST unit received multiple requests for opinion based on training and experience as to how much yield 2.5 ounces of dried marijuana flower could produce.

The three investigators involved in conducting these extractions have a combined 55 years of law enforcement experience, 28 of which were as narcotic investigators. All three are certified in clandestine laboratory investigations and are certified instructors who regularly provide training across the state on topics including Marijuana, Marijuana Production, Cannabis and cannabis manufacture. This group has been conducting weekly extractions of cannabis oil using a non-polar (butane) extraction method since March 2018 as part of an on-going training class, and one investigator has been conducting chemical and mechanical extractions for at least 5 years.

All three investigators have interviewed dozens of "black market" cannabis extraction suspects as well as numerous licensed dispensary extraction agents about their methods, results and yields during chemical extractions of both dried marijuana flower and marijuana leaf material.

Investigators participating in this opinion, extraction, tests and trials

Detective Matthew Shay #2184 Maricopa County Sheriff's Office / HIDTA / MCDST

Detective Jason Felix #1586 Maricopa County Sheriff's Office / HIDTA/ MCDST

Detective Jason Miller#1676 Maricopa County Sheriff's Office / HIDTA/ MCDST

Understanding Marijuana, cannabinoids, trichomes and THC

Extraction of cannabis from the marijuana plant, manufacture of the narcotic cannabis or "hashish" (hash):
The indoor production of marijuana has become a sophisticated and expensive proposition that has resulted in female marijuana plants yielding far more product and with a far higher potency that previously documented. Your affiant has personally manicured numerous plants from a variety of grows to understand each plants production capabilities. On average the indoor adult female marijuana plant yields one pound of usable product and 1/3 pound of unusable(stalk and stem) material.

The adult marijuana plant contains a number of cannabinoids that are woven into its genetic make-up. Several of these chemicals found with-in the plant have been found to modify the behavior of the human brain, body, and nervous systems.

The most potent is a psychoactive cannabinoid that has been identified and designated Delta-9- tetrahydrocannabinol, commonly known as THC. The female marijuana plant produces more THC than the male plant, and the removal of the male plant causes the female plant to flower longer and more potently in search of the male pollen, producing more THC.

The majority of the THC in the female marijuana plant is contained in small nodules found clustered in and near the flowering ends of the female plant in teardrop shaped sacks called trichomes. Those trichomes consist of a non-polar coating that traps THC (or other cannabinoid) oils inside. Removal of the trichome from the marijuana plant, and further separation of plant material during this process produces a chemically rich and potent cannabinoid compound called "Cannabis" or Hashish (Hash).

Trichomes can be removed from the plant in a variety of methods resulting in a similar variety of end products, each of which can be further purified and modified for different commercially desirable narcotics. The removal of these trichomes generally falls into one of two methods (1) mechanical (shake, freeze, screen or scrape the trichomes loose and separate them from plant material using a fine screen) or (2) chemical extraction which (typically) uses a non-polar substance, commonly Butane, Propane, Hexane, ether, or Isopropyl alcohol. This form of extraction also extracts some fats, lipids, oils, and waxes comprising the trichome head and becomes part of the yield, which makes the potency levels remain at or around 80%. To further increase the potency a series of further purification and distilling needs to be conducted which while increasing the potency significantly, reduces the yield the same significance.

Less common is utilizing a polar solvent to extract the cannabinoids. Pressurized and heated supercritical CO₂ and ethanol can be used with less fats and lipids extracted, but the process is much more expensive (in the case of CO₂) and causes the chlorophyll to rinse out with the solvent making a green tint to the oil that will later need to be further distilled.

Since the flowering buds hold a value themselves (currently sold up to \$300 per ounce) the cannabis manufacturer will commonly use the "sugar" leaves nearest the buds to extract residual THC that would have, in the past, been discarded and disposed of. In addition poorly formed flower, some flower that has become visibly undesirable, wet, or otherwise deemed unusable are regularly bagged and called "larf".

Larf buds (flower) are generally found on the lower branches or sections of the plant where light levels are low. Their appearance is described as "fluffy" or "wispy". Larf cannabis is usually deemed to be of lower aesthetic quality, which typically lowers its market value and is often found to be lower in potency (excerpt from "maximumyield .com")

Larf and sugar leaves still have a moderate amount of trichomes on them which are made of material that consists of non-polar molecules and contains a modest amount of THC within.

The goal in production of hash is the removal of plant material (marijuana) from cannabis (hash) making it a narcotic drug, where "Marijuana" may have a THC potency of 2-20%, depending on the quality of the plant and sophistication of the cultivator, Cannabis can have a THC potency of 80-90%. Cannabis (hash) can be manufactured mechanically (physically) or chemically.

Mechanical extraction of hash is commonly accomplished by freezing the marijuana, making the trichomes to become brittle and susceptible to breaking free from the plant then shaking, scraping, or agitating the plant to collect the THC rich trichomes through a series of increasingly fine screens.

Common names for mechanically manufactured hash include "kief", "Bubble Hash" and "water hash" and "crumble". Chemical manufacture of hashish is commonly accomplished by using a solvent to make the trichomes separate from the plant material.

Butane is most often used, which is also a non-polar solvent is used. The trichomes are mixed in with the liquid in the solvent, drained through a fine filter and then evaporated or cooked off leaving THC rich and potent oil. An additional "cook" method using acetone, alcohol or other solvent is the latest addition to remove the majority of remaining plant material. Common names include "Oil", "BHO" (Butane Hash Oil), "Shatter", "Dabs", "Wax", "honey Oil" and "Budder".

Further "Cooking" the product in a vacuum oven which allows a lower atmosphere to boil and cook the oil at lower temperature and creates a glass, crumbled or ribbon candy style product.

Methods

Based on the Supreme Court ruling and the requests from multiple sources, investigators from the Clandestine Laboratory Investigations Team of the MCSO/HIDTA unit (MCDST) conducted a series of extractions in an effort to show the potential yield from 2.5 ounces of dried flowers.

This group conducted four extractions using dried (high grade) marijuana flower in June, 2019.

Two extractions were using a non-polar solvent (butane) to absorb the THC content contained in the marijuana flower and produce a high grade, potent oil. This was then dried to a tacky honey like texture, allowing the butane to evaporate and the product (yield) was weighed.

Two other extractions conducted were "mechanical" in nature, using screening or sifting methods as well as traditional

ice wash/bubble hash methods to conduct extractions.

For each experiment, the MCSO/HIDTA/MCDST investigator(s) signed out a quantity of previously seized and adjudicated dried high grade marijuana flower that has been set aside for training and investigations at MCSO property management.

For each individual extraction 2.5 ounces of the dried marijuana flowers were weighed out on a certified scale and placed in a bag. If one was to be utilized, a receptacle tray or container was weighed and photographed on a certified scale to establish a "zero" weight. In the case of Butane and Screening extractions, the marijuana flower was then ground or chopped using a coffee grinder to separate the compressed flowers and allow access to the maximum plant surface for the solvent and to assist in the separation of the plants trichomes in the case of mechanical extraction.

That ground plant material was then subjected to the various extractions

In the case of the chemical extraction, investigators utilized a commercially produced glass cannabis extraction vessel (Biz-E-Bee Xtractor tube), a fine metal 50 micron screen, and three or four 10 ounce "extra Purified" butane gas solvent. The plant material was loosely packed in the extractor, the solvent run over the material and solvent was allowed to run (three or more cans) until the liquid draining through the screen was completely clear. The cannabis infused butane was placed on a tray and the butane was allowed to evaporate off until the product had a consistency of thick honey. This was then weighed against the established "zero" weight on the same certified scale producing as "yield" for that 2.5 ounces of marijuana. This method maximized the amount of THC material to extract from the plant material as the non-polar butane absorbs the non-polar trichomes and cannabis from the plant material and rinses it off the plant rather than forcing it free as in a mechanical extraction. The butane evaporates along with much of the non-polar trichomes coating leaving a oil that thickens into a honey or sap like product containing THC. This is an acceptable method of obtaining a product that would qualify in the industry as cannabis oil and sometimes referred to as "crude oil" with a potential potency of just over 80%.

In the case of the mechanical extractions, investigators used two different and currently popular accepted methods of producing hashish.

The first was a "screening" or "sifting" method where the ground cannabis is rubbed or sifted back and forth against a fine 100 micron screen from a standard "trim bin" cannabis or "pollen" collection tray. This fine micron screen allows the fine trichome hairs containing THC to filter through keeping the majority of the lower potency plants material out of the collection tray. The fine powder was scraped from the tray and placed in a pre-weighed baggie. This was then weighed against the established "zero" weight on the same certified scale producing as "yield" for that 2.5 ounces of marijuana This method allows for more inert plant material to mix with the finished product than a solvent extraction, but is an acceptable method of obtaining a product that would qualify in the industry as cannabis with a potential potency of just over 50%.

The second method has been popular for centuries and commonly associated with the production of hashish from Morocco and similar destinations. "Bubble Hash" or "Ice Water" hash has also been popular in the United States since at least the 1960's and has increased in popularity with the growth of the medical and recreational marijuana markets, both licensed and not.

Investigators filled a large bowl, in this case a salad spinner with 2/3 water and ice and immersed dried, broken up marijuana flowers. These were allowed to sit in the cold water for almost one hour. This period of waiting allows for maximum exposure of the plant material and the loosening and freezing of trichomes to assist in their falling free from the plant material. Over the period of an hour, the marijuana was agitated in the ice and water and on several occasions the spinner was activated to use the force of gravity to further assist in the separation of THC laden trichomes from the plant material.

The marijuana plant material, now separated from the majority of the trichomes and by default the THC floats in the water and was extracted by two strainers one finer than the other. That plant material was then set back into a bowl for a second run of extraction. The water, once the plant material was removed was then strained through a coffee filter. The water that strained through the filter was added back into the bowl for the second run. The product that was captured in the coffee filter was a pliable brown to dark green that was allowed to dry for 15 minutes to allow the water to drain free, The marijuana was run through the process a second time to ensure the maximum amount of cannabis was extracted and a total of 4 coffee filters were set aside to dry until the product inside has a soft putty like texture. The material was scraped from the filters and placed in a pre-weighed baggie. This was then weighed against the established "zero" weight on the same certified scale producing as "yield" for that 2.5 ounces of marijuana This method

NARRATIVE

allows for more inert plant material to mix with the finished product than a solvent extraction, but is an acceptable method of obtaining a product that would qualify in the industry as cannabis with a potential potency of just over 50%.

Previous experience and interviews

As stated previously the investigators have conducted extraction of cannabis using, primarily, non-polar solvents, more than 50 times in the past 5 years. Since at least March 2019, the group had had regular extractions during training for Phoenix metropolitan Fire / HAZMAT teams, law enforcement investigators and as annual training for MCSO deputies. Additional training provided in four and eight hour classes to narcotic investigators across Arizona have included sifting, isopropyl alcohol and ice water hash extraction.

The investigators have seized and investigated dozens of extraction tube "blasting" cannabis extraction operations and almost an equal number of larger "closed loop" butane/propane extraction systems that were producing "black market" cannabis using flower, leaf and larf. As a rule of thumbs in these extractions investigators have found that they produce between 1 and 2 grams of cannabis per ounce of marijuana in chemical extractions and possibly 5-7 grams of lower potency "kief" cannabis using grinding, sifting or screening. Closed loop systems purport to produce a one ounce to one pound ratio when used regularly. 1.7 grams per ounce or 1/16th yield all are consistent with the yields from the experiments.

The investigators have interviewed at least four different licensed cannabis extraction agents and well as dozens of unlicensed cannabis extraction suspects. Each has held to the same standard, 1-2 grams per ounce, one ounce per pound.

The internet provides another avenue of resources, however the claims and purported yields are of such a wide range that these un-supported and un-sourced claims are not deemed reliable and many of the public forums conflate yield with potency (IE estimating a 25% yield when their product is believed to be 25% potency). Investigators did make note of many of the claims which have an average of 7-10% yield for a "run" of butane over an ounce or pound of marijuana (up to 2.8 grams per ounce).

All of which still maintains a level under 9 grams per ounce.

Standard single user quantities

A "usable" quantity of cannabis for the average user is in the range of 1/10th to 1/20th of a gram of marijuana or in perspective the size of the head of a pin. Oils, or oil produced by products are typically smoked using a smoking device called a "rig". Mechanically extracted products are sometimes added to a cigarette or to increase the potency of a marijuana cigarette and 1/10th of a gram (100 MG) per use.

Edible products support this conclusion as typically a single edible contains 100mg of "THC" and the user is advised to only ingest a portion (1/4th) of the product at any one time.

The most common (non-cannabis vaporizer product) amount of cannabis sold or offered for sale from dispensaries is between 1/8th to 1 gram (running between \$10-25) and advertised as having multiple single uses for that quantity.

In the case of cannabis vaporizer cartridges, now estimated to be 60% of the dispensary product market and a similar percentage or more of the black market, the product is offered in and one gram quantities. Average users will be able to "smoke" off of a gram cartridge for 1-3 days.

Findings

On June 5th, 25th and 26th Members of the MCSO/MCDST unit conducted both chemical and mechanical extractions from 2.5 ounces of high grade marijuana in an effort to determine yield of cannabis using accepted extraction methods. In all four extractions were conducted using the methods described above.

These methods were designed to make maximum extractions using pre-distilled or purified cannabis which, in an actual dispensary extraction scenario would have removed more of the plant material before declaring it a "usable" product. The BHO extractions were weighed as soon as the butane was evaporated. In a normal dispensary or moderately sophisticated "kitchen" or lab, the pure BHO oil would be purged and vacuum cooked reducing the yield by another percentage. In the case of the product being prepared as oil or for use in a vaporizer cartridge, this "crude oil" would have been distilled to further clarify and purify it reducing the yield yet more (up to half of its weight)

In the case of the mechanical extraction "Screening" this produces a product that is typically just slightly over 50%

NARRATIVE

potency for high grade marijuana plant and thus contains almost 50% plant material. Thus one would expect significantly more product to be created using this method that extracting via a solvent.

Even in this case the yield was only 7 grams of "kief" cannabis.

The results of the extractions were:

Yield 1: 4 grams
(Non-Polar Butane extraction 2.5 ounces high grade marijuana) 06/05/19

Yield 2: 7 grams
("Kief" screen or sift extraction from 71.8 grams high grade marijuana) 06/25/19

Yield 3: 3.5 grams
(Bubble Hash/Ice Wash cannabis extraction from 71.5 grams of high grade marijuana) 06/25/2019

Yield 4: 5.5 grams
(Non-Polar Butane extraction 71.1 grams high grade marijuana) 06/26/19

EDIBLES, TOPICALS, TINCTURES, TOPICALS AND DRINK.

Narcotic cannabis is added to a very wide variety of cannabis products ranging from brownies, rice crispy treats, and gummy products to energy drinks. For the most part, the legal, licensed locally (Arizona) produced products contain between 50-100 MG per product and should be clearly marked. These products were not considered as part of this evaluation and do not have a direct correlation to "yield" and examined here.

Summary

It is the opinion of the investigators that 2.5 ounces of high grade marijuana will yield less than 9 grams of narcotic cannabis, and depending on the process, likely significantly less. This "9 grams" includes a 2 gram safety margin for even the most low grade contaminated product extracted.

Additionally for the vast majority of these extractions, the weighed result was not a generally acceptable usable product "as is" cannabis extracted using butane, hexane and propane would be further processed to remove residual solvents, fats and lipids resulting in an actual lower yield.

Attachment:	
	Description: Property Sheets impound MJ and hash

Attachment:	
	Description: word doc and photos

HISTORY

Completed By: S2148	SHAY, M	On: 6/26/2019	At: 16:16
Reviewed By: Z7284	KASKAVAGE, M	On: 6/27/2019	At: 07:50
Approved By: Z7284	KASKAVAGE, M	On: 6/27/2019	At: 07:50

Maricopa County Sheriff's Office

Property and Evidence Report

Print Date: 6/26/2019 3:18:49PM

Case Number: 19-019413

Investigator: SHAY, MATTHEW (S2148)

Crime/Charge: NON-CRIMINAL

Seizure Officer: SHAY, MATTHEW (S2148)

Case/IR Date: 06/26/2019

Entered By: SHAY, MATTHEW (S2148)

Persons Involved:

Person Type	Person Name	Person Address	Person Phone

Items Involved:

Owner	Barcode	Item #	Color	Hold As	Make
	00451953	000100		EVIDENCE	
Serial #	Amount	Weight	Category	Specific Area of Recovery/Seizure	Model
	0.00	2.30 OZS	NA-MARIJUANA	2627 S 35th Avenue	
Item detail			Notes		
quantity of ground up marijuana , post cannabis extraction via butane . previously 2.5 ounces removed from stash by miller on 06052019			do not destroy.		

Owner	Barcode	Item #	Color	Hold As	Make
	00451957	00100a		EVIDENCE	
Serial #	Amount	Weight	Category	Specific Area of Recovery/Seizure	Model
	0.00	4.00 GM	NA-HASHISH	2627 S 35th Avenue	
Item detail			Notes		
plastic tray with narcotic cannabis oil . cannabis extracted from item 100 (2.5 ounces of marijuana)			do not destroy		

Owner	Barcode	Item #	Color	Hold As	Make
	00451954	000200		EVIDENCE	
Serial #	Amount	Weight	Category	Specific Area of Recovery/Seizure	Model
	0.00	7.00 GM	NA-HASHISH	2627 S 35th Avenue	
Item detail			Notes		
quantity of ground up marijuana and the "kief" cannabis extracted from it using a "trim bin" . marijuana original weight 71.8 grams. kief weight 7 grams . marijuana originally obtained from "stash" on 062519 dr19-002831 item 203					

Owner	Barcode	Item #	Color	Hold As	Make
	00451955	000300		EVIDENCE	
Serial #	Amount	Weight	Category	Specific Area of Recovery/Seizure	Model
	0.00	71.50 GM	NA-MARIJUANA	2627 S 35th Avenue	
Item detail			Notes		

quantity of ground up marijuana , post cannabis extraction via butane . previously 71.5 grams removed from stash 19-002831 item 203	do not destroy.
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Owner	Barcode	Item #	Color	Hold As	Make
	00451958	00300a		EVIDENCE	
Serial #	Amount	Weight	Category	Specific Area of Recovery/Seizure	Model
	0.00	3.50 GM	NA-HASHISH	2627 S 35th Avenue	
Item detail			Notes		
coffee filter with narcotic cannabis Hashish (bubble hash) . cannabis extracted from item 300 (71.5 ounces of marijuana).			do not destroy		

Owner	Barcode	Item #	Color	Hold As	Make
	00451956	000400		EVIDENCE	
Serial #	Amount	Weight	Category	Specific Area of Recovery/Seizure	Model
	0.00	71.10 GM	NA-MARIJUANA	2627 S 35th Avenue	
Item detail			Notes		
quantity of ground up marijuana , post cannabis extraction via butane . previously 71.1 grams of marijuana removed from stash by shay 062419 from 19-002931 item, 203			do not destroy.		

Owner	Barcode	Item #	Color	Hold As	Make
	00451959	00400a		EVIDENCE	
Serial #	Amount	Weight	Category	Specific Area of Recovery/Seizure	Model
	0.00	5.50 GM	NA-HASHISH	2627 S 35th Avenue	
Item detail			Notes		
quantity of narcotic cannabis oil and pan it was extracted on to .cannabis extracted from item 400 (71.1 ounces of marijuana).			do not destroy		

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The most potent is a psychoactive cannabinoid that has been identified and designated Delta-9-tetrahydrocannabinol, commonly known as THC. The female marijuana plant produces more THC than the male plant, and the removal of the male plant causes the female plant to flower longer and more potently in search of the male pollen, producing more THC.

The majority of the THC in the female marijuana plant is contained in small nodules found clustered in and near the flowering ends of the female plant in teardrop shaped sacks called trichomes. Those trichomes consist of a non-polar coating that traps THC (or other cannabinoid) oils inside. Removal of the trichome from the marijuana plant, and further separation of plant material during this process produces a chemically rich and potent cannabinoid compound called "Cannabis" or Hashish (Hash).

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Mechanical extraction of hash is commonly accomplished by freezing the marijuana, making the trichomes to become brittle and susceptible to breaking free from the plant then shaking, scraping, or agitating the plant to collect the THC rich trichomes through a series of increasingly fine screens.

Common names for mechanically manufactured hash include includes "kief" "Bubble Hash" and "water hash" and "crumble". Chemical manufacture of hashish is commonly accomplished by using a solvent to make the trichomes separate from the plant material.

Butane is most often used, which is also a non-polar solvent is used. The trichomes are mixed in with the liquid in the solvent, drained through a fine filter and then evaporated or cooked off leaving THC rich and potent oil. An additional "cook" method using acetone, alcohol or other solvent is the latest addition to remove the majority of remaining plant material. Common names include "Oil" "BHO" (Butane Hash Oil) "Shatter" "Dabs" Wax" "honey Oil" and "Budder".

Further "Cooking" the product in a vacuum oven which allows a lower atmosphere to boil and cook the oil at lower temperature and creates a glass, crumbled or ribbon candy style product.

Methods

Based on the Supreme Court ruling and the requests from multiple sources, investigators from the Clandestine Laboratory Investigations Team of the MCSO/HIDTA unit (MCDST) conducted a series of extractions in an effort to show the potential yield from 2.5 ounces of dried flowers.

This group conducted four extractions using dried (high grade) marijuana flower in June, 2019.

Two extractions were using a non-polar solvent (butane) to absorb the THC content contained in the marijuana flower and produce a high grade, potent oil. This was then dried to a tacky honey like texture, allowing the butane to evaporate and the product (yield) was weighed.

Two other extractions conducted were “mechanical” in nature, using screening or sifting methods as well as traditional ice wash/bubble hash methods to conduct extractions.

For each experiment, the MCSO/HIDTA/MCDST investigator(s) signed out a quantity of previously seized and adjudicated dried high grade marijuana flower that has been set aside for training and investigations at MCSO property management.

For each individual extraction 2.5 ounces of the dried marijuana flowers were weighed out on a certified scale and placed in a bag. If one was to be utilized, a receptacle tray or container was weighed and photographed on a certified scale to establish a “zero” weight. In the case of Butane and Screening extractions, the marijuana flower was then ground or chopped using a coffee grinder to separate the compressed flowers and allow access to the maximum plant surface for the solvent and to assist in the separation of the plants trichomes in the case of mechanical extraction.

That ground plant material was then subjected to the various extractions

In the case of the chemical extraction, investigators utilized a commercially produced glass cannabis extraction vessel (Biz-E-Bee Xtractor tube), a fine metal 50 micron screen, and three or four 10 ounce “extra Purified” butane gas solvent. The plant material was loosely packed in the extractor, the solvent run over the material and solvent was allowed to run (three or more cans) until the liquid draining through the screen was completely clear. The cannabis infused butane was placed on a tray and the butane was allowed to evaporate off until the product had a consistency of thick honey. This was then weighed against the established “zero” weight on the same certified scale producing as “yield” for that 2.5 ounces of marijuana. This method maximized the amount of THC material to extract from the plant material as the non-polar butane absorbs the non-polar trichomes and cannabis from the plant material and rinses it off the plant rather than forcing it free as in a mechanical extraction. The butane evaporates along with much of the non-polar trichomes coating leaving a oil that thickens into a honey or sap like product containing THC. This is an acceptable method of obtaining a product that would qualify in the industry as cannabis oil and sometimes referred to as “crude oil” with a potential potency of just over 80%.

In the case of the mechanical extractions, investigators used two different and currently popular accepted methods of producing hashish.

The first was a “screening” or “sifting” method where the ground cannabis is rubbed or sifted back and forth against a fine 100 micron screen from a standard “trim bin” cannabis or “pollen” collection tray. This fine micron screen allows the fine trichome hairs containing THC to filter through keeping the majority of the lower potency plants material out of the collection tray. The fine powder was scraped from the tray and placed in a pre-weighed baggie. This was then weighed against the established “zero” weight on the same certified scale producing as “yield” for that 2.5 ounces of marijuana This method

allows for more inert plant material to mix with the finished product than a solvent extraction, but is an acceptable method of obtaining a product that would qualify in the industry as cannabis with a potential potency of just over 50%.

The second method has been popular for centuries and commonly associated with the production of hashish from Morocco and similar destinations. “Bubble Hash” or “Ice Water” hash has also been popular in the United States since at least the 1960’s and has increased in popularity with the growth of the medical and recreational marijuana markets, both licensed and not.

Investigators filled a large bowl, in this case a salad spinner with 2/3 water and ice and immersed dried, broken up marijuana flowers. These were allowed to sit in the cold water for almost one hour. This period of waiting allows for maximum exposure of the plant material and the loosening and freezing of trichomes to assist in their falling free from the plant material. Over the period of an hour, the marijuana was agitated in the ice and water and on several occasions the spinner was activated to use the force of gravity to further assist in the separation of THC laden trichomes from the plant material.

The marijuana plant material, now separated from the majority of the trichomes and by default the THC floats in the water and was extracted by two strainers one finer than the other. That plant material was then set back into a bowl for a second run of extraction. The water, once the plant material was removed was then strained through a coffee filter. The water that strained through the filter was added back into the bowl for the second run. The product that was captured in the coffee filter was a pliable brown to dark green that was allowed to dry for 15 minutes to allow the water to drain free, The marijuana was run through the process a second time to ensure the maximum amount of cannabis was extracted and a total of 4 coffee filters were set aside to dry until the product inside has a soft putty like texture. The material was scraped from the filters and placed in a pre-weighed baggie. This was then weighed against the established “zero” weight on the same certified scale producing as “yield” for that 2.5 ounces of marijuana This method allows for more inert plant material to mix with the finished product than a solvent extraction, but is an acceptable method of obtaining a product that would qualify in the industry as cannabis with a potential potency of just over 50%.

Previous experience and interviews

As stated previously the investigators have conducted extraction of cannabis using, primarily, non-polar solvents, more than 50 times in the past 5 years. Since at least March 2019, the group had had regular extractions during training for Phoenix metropolitan Fire / HAZMAT teams, law enforcement investigators and as annual training for MCSO deputies. Additional training provided in four and eight hour classes to narcotic investigators across Arizona have included sifting, isopropyl alcohol and ice water hash extraction.

The investigators have seized and investigated dozens of extraction tube “blasting” cannabis extraction operations and almost an equal number of larger “closed loop” butane/propane extraction systems that were producing “black market” cannabis using flower, leaf and larf. As a rule of thumbs in these extractions investigators have found that they produce between 1 and 2 grams of cannabis per ounce of marijuana in chemical extractions and possibly 5-7 grams of lower potency “kief” cannabis using

grinding, sifting or screening. Closed loop systems purport to produce a one ounce to one pound ratio when used regularly. 1.7 grams per ounce or 1/16th yield all are consistent with the yields from the experiments.

The investigators have interviewed at least four different licensed cannabis extraction agents and well as dozens of unlicensed cannabis extraction suspects. Each has held to the same standard, 1-2 grams per ounce, one ounce per pound.

The internet provides another avenue of resources, however the claims and purported yields are of such a wide range that these un-supported and un-sourced claims are not deemed reliable and many of the public forums conflate yield with potency (IE estimating a 25% yield when their product is believed to be 25% potency). Investigators did make note of many of the claims which have an average of 7-10% yield for a “run” of butane over an ounce or pound of marijuana (up to 2.8 grams per ounce).

All of which still maintains a level under 9 grams per ounce.

Standard single user quantities

A “usable” quantity of cannabis for the average user is in the range of 1/10th to 1/20th of a gram of marijuana or in perspective the size of the head of a pin. Oils, or oil produced by products are typically smoked using a smoking device called a “rig”. Mechanically extracted products are sometimes added to a cigarette or to increase the potency of a marijuana cigarette and 1/10th of a gram (100 MG) per use.

Edible products support this conclusion as typically a single edible contains 100mg of “THC” and the user is advised to only ingest a portion (1/4th) of the product at any one time.

The most common (non-cannabis vaporizer product) amount of cannabis sold or offered for sale from dispensaries is between 1/8th to 1 gram (running between \$10-25) and advertised as having multiple single uses for that quantity.

In the case of cannabis vaporizer cartridges, now estimated to be 60% of the dispensary product market and a similar percentage or more of the black market, the product is offered in ½ and one gram quantities. Average users will be able to “smoke” off of a ½ gram cartridge for 1-3 days.

Findings

On June 5th, 25th and 26th Members of the MCSO/MCDST unit conducted both chemical and mechanical extractions from 2.5 ounces of high grade marijuana in an effort to determine yield of cannabis using accepted extraction methods. In all four extractions were conducted using the methods described above.

These methods were designed to make maximum extractions using pre-distilled or purified cannabis which, in an actual dispensary extraction scenario would have removed more of the plant material before declaring it a “usable” product. The BHO extractions were weighed as soon as the butane was evaporated. In a normal dispensary or moderately sophisticated “kitchen” or lab, the pure BHO oil

would be purged and vacuum cooked reducing the yield by another percentage. In the case of the product being prepared as oil or for use in a vaporizer cartridge, this “crude oil” would have been distilled to further clarify and purify it reducing the yield yet more (up to half of its weight)

In the case of the mechanical extraction “Screening” this produces a product that is typically just slightly over 50% potency for high grade marijuana plant and thus contains almost 50% plant material. Thus one would expect significantly more product to be created using this method than extracting via a solvent. Even in this case the yield was only 7 grams of “kief” cannabis.

The results of the extractions were:

Yield 1: 4 grams

(Non-Polar Butane extraction 2.5 ounces high grade marijuana) 06/05/19

Yield 2: 7 grams

(“Kief” screen or sift extraction from 71.8 grams high grade marijuana) 06/25/19

Yield 3: 3.5 grams

(Bubble Hash/Ice Wash cannabis extraction from 71.5 grams of high grade marijuana) 06/25/2019

Yield 4: 5.5 grams

(Non-Polar Butane extraction 71.1 grams high grade marijuana) 06/26/19

Photo examples: Extraction 1 June 5th 2019 Butane Honey Oil Extraction

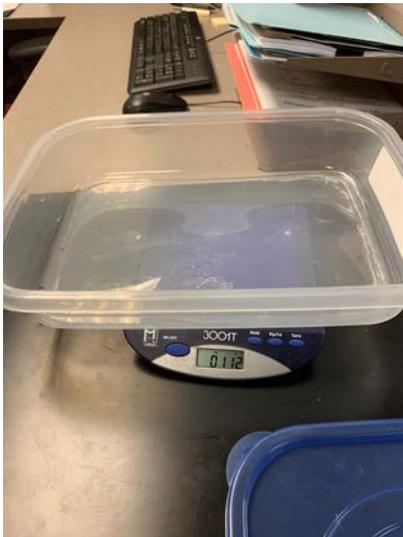




Photo examples: Extraction 2 June 25th 2019 "Kief" Screening

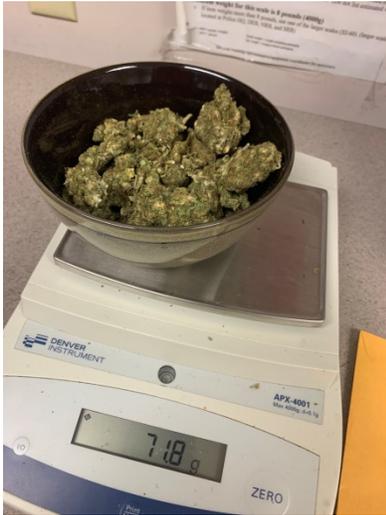


Photo examples: Extraction 3 June 25th 2019 "bubble Hash" "Ice Wash"

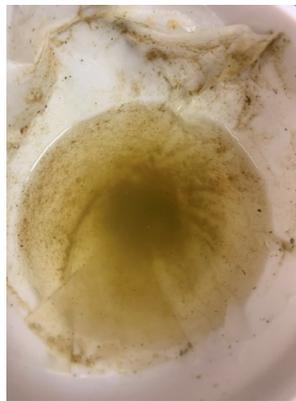
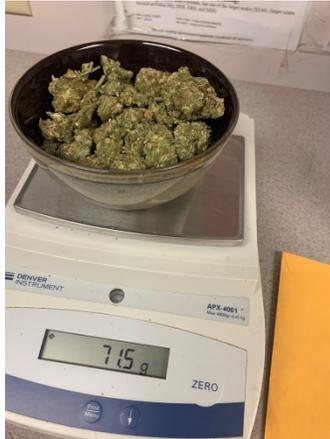
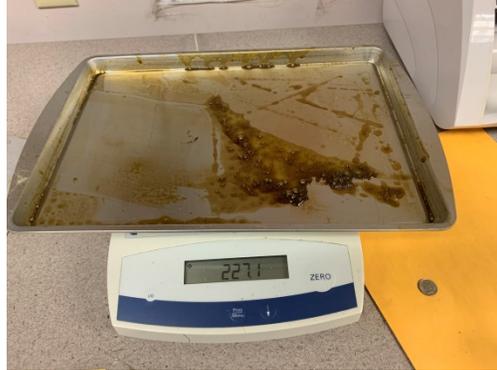
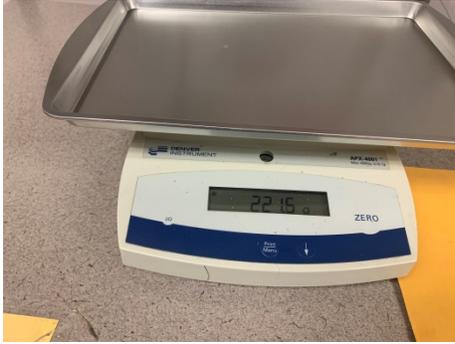


Photo examples: Extraction 4 June 26th 2019 Butane Honey Oil Extraction



EDIBLES, TOPICALS, TINCTURES, TOPICALS AND DRINK.

Narcotic cannabis is added to a very wide variety of cannabis products ranging from brownies, rice crispy treats, and gummy products to energy drinks. For the most part, the legal, licensed locally (Arizona) produced products contain between 50-100 MG per product and should be clearly marked. These products were not considered as part of this evaluation and do not have a direct correlation to “yield” and examined here.

Summary

It is the opinion of the investigators that 2.5 ounces of high grade marijuana will yield less than 9 grams of narcotic cannabis, and depending on the process, likely significantly less. This “9 grams” includes a 2 gram safety margin for even the most low grade contaminated product extracted.

Additionally for the vast majority of these extractions, the weighed result was not a generally acceptable usable product “as is” cannabis extracted using butane, hexane and propane would be further processed to remove residual solvents, fats and lipids resulting in an actual lower yield.



Maricopa County Sheriff's Office

Paul Penzone, Sheriff

SUPPLEMENT



INCIDENT REPORT

EVENT	Reported Date:	Reported Time:	IR #:	Original/Supp?	Hand Written?	Info Only	Access Level:	Case Status:	MC (Event) #:
	7/23/2019	15:26	IR19019413	SUPPLEMENT	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	Open	Exceptionally Cleared	MC19132198
	Serial #:	Last Name:		Shift Supervisor:			Name:		
	S2148	SHAY, M		Z7284			KASKAVAGE, M		
INCIDENT	Body Camera Activated?	Reason not Active: not issued							
	No								
	Break in Video?	Reason for break:							
INCIDENT	Radio Code:	From Date:		From Time:		9-1-1 Tape Requested:			
	267 NARCOTICS/OTHER DRUGS	6/5/2019		09:00					
	Location:	City:		ZIP:		The number of Additional MCSO Personnel On Scene:			
	2627 S 35TH AVE	PHOENIX		85009					
Is this IR related to others? NO									

SYNOPSIS

On 072319 Detectives Shay Miller and Felix conducted a "Rosin Press" extraction on one ounce of "usable marijuana", which under ARS 36-2801.15 is defined as - the dried flowers of the marijuana plant. This marijuana was considered "high grade" with clearly visible trichomes on the flower or "bud" material. The resulting yeild, after three presses of one ounce was less than 2 grams of narcotic cannabis that tested positive for THC.

NARRATIVE

On 072319 Detectives Shay Miller and Felix conducted a "Rosin Press" extraction on one ounce of "usable marijuana", which under ARS 36-2801.15 is defined as - the dried flowers of the marijuana plant.

This marijuana was considered "high grade" with clearly visible trichomes on the flower or "bud" material. The resulting yeild, after three presses of one ounce was less than 2 grams of narcotic cannabis that tested positive for THC.

narrative-

On 072319 detectives Shay, Felix and Miller of the Maricopa County Drug Suppression Task force in a continued experiment as to how much cannabis may be extracted from "usable marijuana" as defined under the Arizona Medical Marijuana Act. In this extraction example we utilized a seized "rosin press" utilizing 190-195 degrees of heat and 2500 lbs of pressure over a minute and a half to "press" out liquefied trichome material (THC) from the plant material

That "Rosin" was collected on sheets of parchment paper as is industry standard. The marijuana flower was pressed three separate times in an effort to extract the most cannabis possible. the resulting "pull" that was extruded was less than 2 grams. Extrapolating this out would have resulted in a maximum yeild of 5 grams using 2.5 ounces of dried marijuana flower.

the parchment paper, rosin oil, and marijuana "puck" (heated, pressed marijuana flower) was impounded under this report .

The marijuana was taken from "stash" IR evidence item 19-002831 Item 000204 barcode 00435506. It was weighed on a digital scale, and the weight, marijuana bud quality and pressing were all photographed during the process.

The Rosin Press utilized was a "Soilgrown Solventless" "Rosin Press" with hydraulic press and regulated temperature control.

This investigation continues.

Attachment:	Description:

HISTORY

Completed By: S2148 SHAY, M

On: 7/23/2019 At: 15:47

Reviewed By: **Z7284** **KASKAVAGE, M**

On: **7/29/2019** At: **08:37**

Approved By: **Z7284** **KASKAVAGE, M**

On: **7/29/2019** At: **08:37**



Maricopa County Sheriff's Office

Paul Penzone, Sheriff

SUPPLEMENT



INCIDENT REPORT

EVENT	Reported Date:	Reported Time:	IR #:	Original/Supp?	Hand Written?	Info Only	Access Level:	Case Status:	MC (Event) #:	
	7/29/2019	12:17	IR19019413	SUPPLEMENT	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	Open	Exceptionally Cleared	MC19132198	
	Serial #: S2148	Last Name: SHAY, M			Shift Supervisor: Z7284		Name: KASKAVAGE, M			
	Body Camera Activated? No	Reason not Active: not issues								
INCIDENT	Break in Video? No		Reason for break:							
	Radio Code:	From Date: 6/5/2019			From Time: 09:00		9-1-1 Tape Requested:			
	267 NARCOTICS/OTHER DRUGS	To Date:		To Time:						
	Location: 2627 S 35TH AVE	City: PHOENIX		ZIP: 85009		The number of Additional MCSO Personnel On Scene:				
Is this IR related to others? NO										

SYNOPSIS

On Wednesday 07/24/2019 and Thursday 07/25/2019 Detectives Shay, Felix and Miller conducted 6 extractions from known quantities of high grade marijuana in a continuing effort to document the amount of cannabis that can be produced from 2,5 ounces of dried marijuana flower. In each occasion the total amount of product fell below 7 grams.

NARRATIVE

On Wednesday, July 24th 2019 and Thursday July 25th 2019 Detectives Shay, Felix and Miller were presenting instruction to investigators law enforcement support personnel and prosecutors at the 31st annual Arizona Narcotics Officers Association. The three MCDST investigators provided two classes of four hour blocks between those two dates to an audience of no less than 50 law enforcement personnel each.

During each class, the investigators, assisted by members of the class and observed by the entire class, conducted three extractions using known weights of high grade marijuana flower. The results were weighed and the resulting narcotic cannabis impounded under this report along with the used marijuana product.

The high grade dried marijuana flower was obtained through MCSO Stash item 19-002831 Item 204.

2 "MECHANICAL EXTRACTIONS "BUBBLE HASH"

On each day one mechanical extraction (bubble hash) of 2.5 ounces of dried marijuana flower was conducted. For this set of 2 extractions, the amount of flower and a quantity of parchment paper was pre weighed for the class.

The high grade dried marijuana flower was obtained through MCSO Stash item 19-002831 Item 204.

Several members of the class were chosen randomly and after the dried flower weight was verified , the extraction was conducted. Instructors utilized a full set of "BubbleBag" ice water hash manufacturing micron mesh bags to extract THC from the dried flowers. Using the instructions provided by the manufacturer, ice, dried marijuana flower and cold water were placed in the initial bag and after allowing to sit and soak the marijuana material was agitated for 20 minutes. The plant material was then removed and the water drained into a common bucket which was then placed in the remaining micron bags and allowed to strain.

The cannabis was collected from the last two bags and the process was repeated with the already "run" marijuana plant material to make sure all of the usable product was recovered. again the usable product was recovered from the last two bags.

The total weight was 4 grams of product that was still damp up to the time of weighing (IE it was heavier than final usable product is normally)

EVEN if all of the plant material and cannabis was recovered from the last 4 bags the total weight would not have exceeded 7 grams.

This experiment was conducted during the next class using the same methods with the same results.

The cannabis extracted during those two experiments was impounded under the IR as item 600b (barcode 0455627 and 700b (barcode 00455631) and the wet marijuana from both extractions was impounded as item 650 (barcode 004555624)

2 MECHANICAL EXTRACTIONS " ROSIN PRESS"

10 grams of dried marijuana flower was conducted. For this set of 2 extractions, the amount of flower and a quantity of parchment paper was pre weighed for the class.

The high grade dried marijuana flower was obtained through MCSO Stash item 19-002831 Item 204.

The Rosin press machine used was the same used in the previous Rosin Press experiment and utilized 2500lbs of pressure and 190 degrees of heat on a known quantity of dried marijuana flower.

the process included placing the marijuana flower inside parchment paper and pressing and heating the marijuana flower to cause the THC oils to emerge from the plant material. This extraction was done while all of the class participants watched.

The resulting recovered usable "rosin" hash was no greater than 2 grams, and likely closer to one gram of usable cannabis. the weight discrepancy is accounting for some of the oil that was still attached to the plant material.

As a comparison to this extraction, and by using the same process, the class was shown the "U-Tube" video of a rosin extraction conducted by "pioneer Nuggets" a washington based extraction company based in Washington state. In that video the cannabis extraction "artist" confirmed that his typical yield was "ten percent" and revealed this by pressing 40 grams of dried flower and gaining 4 grams of rosin hash (<https://www.youtube.com/watch?v=hU4PFJCiUog>)

The cannabis yielded from these two extractions was impounded under this report as item 700C (barcode 00455632) and 600d (Barcode 0455629) and the marijuana used to extract the rosin was impounded under item 500 (barcode 00455130)

2 CHEMICAL EXTRACTIONS BUTANE HONEY OIL

On each day one "chemical" extraction using a non polar solvent , in this case Butane, (BHO) of 2.5 ounces of dried marijuana flower was conducted. For this set of 2 extractions, the amount of flower and collection tray were both pre weighed before class and then just prior to the experiment the flower was ground up using a coffee grinder and re-weighed to confirm it still weighed 2.5 ounces.

The high grade dried marijuana flower was obtained through MCSO Stash item 19-002831 Item 204.

That material was then placed in a glass extraction tube and a 5 micron screen was sealed around the extraction end. The entire class observed while (wednesday - Shay , thursday - Felix) an investigator , outfitted in appropriate PPE gear ran three 16 ounce canisters of 7X butane over the plant material. On both days the liquid rinsing from the extractor ran clear after the second canister,, but a third cannister was still used to ensure the maximum amount of cannabinoids were extracted from the material.

The resulting oil was collected in the pre-weighed collection tray and after waiting approximately one hour (far less than the industry standard) the resulting oil was weighed.

on the first "pull" the resulting cannabis was 6 grams of hash oil and the second was 4.5 grams.

NOTE: this product is generally not at this point generally considered "usable" in using industry standards the product will dry for a considerably longer time to ensure all , or at least the maximum butane residuals will evaporate , this process take several hours to a day. this would result in more loss of weight of the product.

In some other finishing processes, the product would be placed in a vacuum or vacuum oven in an effort to remove more butane and unwanted residues, again resulting in a lighter product. (shatter, crumble, and similar finished products)

NARRATIVE

The most popular finished product made from cannabis oil is using it in a vaporizer. This process takes this base oil and using a distilling method which includes immersing it in a polar solvent (to remove chlorophyll) and then a series of other solvents (to properly distill off the "Heads and Tails" (fats, lipids, terpenes) When this process is used the finished product (IE usable cannabis oil) then weighed almost half of the original BHO oil.

Thus this form of extraction resulted in a yield of no more than 5 grams of hash oil on both attempts. These results were weighed before members of the class to show the actual results.

The finished BHO oil from the first pull was emersed in a polar solvent (isopropyl alcohol) to show the class the look, odor and feel of "crude oil" used in vaporizer style product extraction. this was then impounded as item 600B (Barcode 00455627) and the second yield was impounded still in the tray it was gather in as item 700a (barcode 00455630) the original plant material was impounded under item 700 (barcode 00455625)

NOTE: this extraction result mirrors the expected maximum yield of cannabis per dried flower material as reported from no less than two licensed extraction processors from local dispensary. those subjects (several times) have reported their expected yield of cannabis oil from a closed loop system to be 1 ounce (cannabis oil)per pound of material. or 1/16th yield

Using that calculation (1/16 th = .0625) 70 grams of dried flower material x 0.625 = 4.375 grams

CONCLUSION:

in all 6 extraction experiments conducted using industry standards and compared to industry yield reports, each and every extraction or 2.5 ounces of dried flower resulted in LESS THAN 7 grams of cannabis. those results were recorded and impounded under this report number.

Attachment:	
	Description: Precision extraction yield chart

HISTORY			
Completed By:	S2148 SHAY, M	On: 7/31/2019	At: 14:47
Reviewed By:	Z7284 KASKAVAGE, M	On: 8/2/2019	At: 12:43
Approved By:	Z7284 KASKAVAGE, M	On: 8/2/2019	At: 12:43

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Understanding & Maximizing Production Capacity

Input Material & Operator Experience



One of the most common questions that we're asked at Precision® is, "How much material will my lab be able to process per shift?" While the question may seem simple on the surface, the answer is much more complicated with a variety of factors coming into play.

The easy part of the analysis begins with the size of the extractor, solvent being used and power of the recovery pump, which is pretty straightforward.

Recent Posts

- > [Precision FPI Filter Press – Filtration of Cannabis Miscella, Crude, and Fines Filtration](#)
- > [CO2 vs Solvent-Based Extraction: The Key to Unlocking Cannabis' Chemistry](#)

Thereafter, the two most determinative factors of production capacity are i) input material density and ii) operator experience.

INPUT MATERIAL DENSITY

Cannabis input material can vary greatly in its inherent traits and characteristics. Densities range from a fluffy as a cotton ball to almost as dense as a rock, with the majority of material falling somewhere in the middle.

Add to this matrix of characteristics varying moisture levels (which can add or up four times the dry weight if fresh frozen) coupled with different methods of harvesting and material preparation, and you can see how the answering the question of yield and throughput becomes compounded into more of an analytical matrix.

Moisture Content

The moisture content of fresh frozen material will be as close to 100% as you are going to get. This will not only make the weight of the material 4 times as heavy as dried material, but the yield to weight ratio will also be effected. Very specific processes for live resin production need to be followed in order to have an efficient production, and since most labs have multiple output products from multiple input materials, calculating the total production of a facility becomes more complicated.



> [The ASE 100 – Automated Solvent Evaporator: Solvent Recovery Designed for Cannabis & Hemp](#)

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Most labs also take in a variety of other input materials such as dried flowers (with greatly varying densities) and dry trim. General moisture levels from these products can range in the 5-30% range with greatly varying densities. However, with the proper material preparation (which may consist of grinding and drying) a more universal stability is reached with dried material. It is crucial to have an operator who is experienced and fully understands these variables.

Looking at the above data from an objective standpoint, one must intimately understand the input material of an operation to accurately calculate throughput. Because material changes harvest to harvest and batch to batch, **it is always prudent to play it on the safe side and invest in more production capacity than is needed.** The initial upfront cost will pay for itself ten-fold over in the first year of a professionally run operation.



OPERATOR EXPERIENCE

Trying to define the experience level of a cannabis extraction technician operating your lab seems like a simple and clear-cut process. You just take them at their word when you hire them right? Wrong. The skill sets of a highly competent operator need to be

refined over time, and as technology and methodology develops, so must their skillset evolve, or be left behind. So what does it take to be considered an “experienced operator?”

The first thing to look for is general experience level. It is best to find an operator with at least 2,000+ hours (a year of full-time extraction) operational experience on professional closed loop extraction systems.

CBD

cbd extraction

cbd oil

chief operating officer
job

closed loop

closed loop extractor

co2 supercritical

diamonds

essential oil extraction

ethanol extraction

equipment

ethanol extraction

machine

ethanol extraction

system

ethanol extractor

extraction compliance

extraction equipment

extraction equipment
company

extraction lab

regulations

This doesn't mean just turning valves. You should look for someone with a vast variety of competencies including column packing, material preparation, and post processing procedures. Unfortunately, such birds of a rare feather are increasingly hard to find in such a demanding market, and highly experienced operators will command a commensurate salary to match their skillset.

Short of finding a rare and highly qualified operator. The absolute best alternative is professional extraction training for your staff. Failing to provide the very best training is paramount importance to achieving your company's goals. The bottom line being, skilled operators are crucial in the success of your extraction business.

THE MATRIX

To put the above pieces together in a simplified format, the entire technical team at Precision® sat down with the nation's top lab operators to come up with a yield matrix chat to make sense of production capacity. Please use the following as a general guideline for starting or planning a lab with Precision® PX equipment.

extraction return on investment

extraction system

HCFSE

Hemp Extraction

Hemp Extraction Equipment

hemp oil extraction

high terpene extraction

hiring coo

how are extracts made

HTFSE

marijuana expo

marijuana oil extraction

medical marijuana oil

pennsylvania

starting an extraction business

Terps

ul listed extraction
equipment

PX YIELD MATRIX

Please use the following formula to approximate how much material may be processed per 8-hour shift on each PX machine.

$$\begin{aligned} \text{PX1} & - 50\text{lbs} * (\text{Md} + \text{Oe}) / 2 = T \\ \text{PXP} & - 125\text{lbs} * (\text{Md} + \text{Oe}) / 2 = T \\ \text{PX40} & - 400\text{lbs} * (\text{Md} + \text{Oe}) / 2 = T \end{aligned}$$

Whereas:

Md = Material Density

Oe = Operator Experience Rating

T = Total material throughput (in lbs)

Material Density - (Md)

Trim - Dry	70%
Trim - Wet	80%
Flower, Dense - Wet	100%
Flower, Dense - Dry	90%
Whole Plant - Wet	50%
Whole Plant - Dry	60%
Flower, Fluffy - Dry	70%
Flower, Fluffy - Wet	80%

Operator Experience Rating - (Oe)

2,000+ Hours on PX system	100%
1,000+ hours on any professional system	80%
General Extraction Experience	50%
No experience/Little experience	30%

For example, a PXP utilizing "Whole Plant - Dry" with an Operator with "1,000+ hours on any professional system" is subject to the following equation: $125\text{lbs} * (.6 + .8) / 2 = T$. Hence, total material throughput in an 8-hour shift is approximately equal to 87.5 lbs.

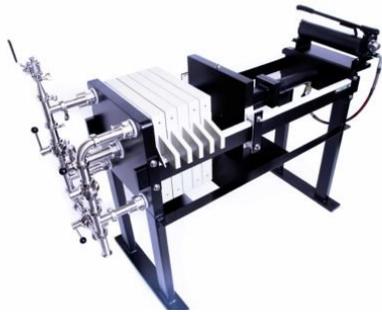
As can be seen by the above, startup operations need to not only understand material density, but also have highly trained personnel to have a full understanding of production capacity to achieve operational goals. Consequently, as much effort should be put into building a highly competent production team as choosing [the highest quality professional extraction equipment](#) for your project.

By [precisionextraction](#) | October 24th, 2017

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Maricopa County Sheriff's Office

Paul Penzone, Sheriff

SUPPLEMENT



INCIDENT REPORT

EVENT	Reported Date:	Reported Time:	IR #:	Original/Supp?	Hand Written?	Info Only	Access Level:	Case Status:	MC (Event) #:
	8/21/2019	11:37	IR19019413	SUPPLEMENT	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	Open	Exceptionally Cleared	MC19132198
	Serial #: S2148	Last Name: SHAY, M			Shift Supervisor: Z7284		Name: KASKAVAGE, M		
	Body Camera Activated?	No	Reason not Active: not issued						
Break in Video?	No	Reason for break:							
INCIDENT	Radio Code:	From Date: 6/5/2019			From Time: 09:00		9-1-1 Tape Requested:		
	267 NARCOTICS/OTHER DRUGS	To Date:			To Time:				
	Location:	City:		ZIP:	The number of Additional MCSO Personnel On Scene: 0				
	2627 S 35TH AVE	PHOENIX		85009					
Is this IR related to others? NO									

SYNOPSIS

This supplement is created to continue documentation of our efforts to identify the amount of cannabis that can be extracted from 2.5 ounces of dried marijuana flower.

NARRATIVE

On August 7th, 14th and August 21st Investigators from MCSO conducted three additional "Butane Honey Oil" extractions at the MCSO Training facility. Each of these extractions were witnessed by at least 10 sworn officers , utilized a quantity of dried high grade marijuana flower and in each case, two canisters of high grade butane (non polar hydro carbon solvent)

The extraction on August 7th was conducted by Det Miller with Det Felix as site safety and narrator, The extraction on August 14th was conducted by Det Felix with Det Shay as site safety and narrator and the extraction On August 21st was conducted by Det Shay with Det Miller as site safety and narrator.

Each of the extractions, while not weighed before and after, resulted with a quantity of semi viscous BHO (Narcotic cannabis) oil that was less than 10% of the weight of the original flower and consistent with the other extractions conducted through out the year. All of the dried marijuana flower had been obtained from MCSO Stash item 19-002831 #206. Barcode 00435508. The resulting cannabis and used flower was collected and impounded under this same barcode .

The investigators have noticed that "ethanol" extraction product (IE Crude Oil) is becoming a frequently trafficked product. May times the product is recovered in a used ethanol 5 gallon container and the product is thick and viscus with a green tinge around the mouth of the jug while the oil itself is dark brown when viewed in bulk.

"Crude Oil" is commonly manufactured in one of two methods, the first using hydrocarbon extraction (butane, hexane, propane) and then further purifying in ethanol, or the second, which is growing in popularity is to simply "rinse" or "soak" the marijuana product in ethanol.

The resulting product has a similar look and consistency as used motor oil (hence the term crude oil) and is not generally considered consumable at that point as it still needs to be further refined and will loose yet another percentage of the product mass.

The basic principal; of this form of extraction is either at cool or room temperature (preferred) or at "warm" temperatures (more difficult) . The "warm" method consists of boiling the ethanol and then allowing it to drip through the product extracting fats, terpenes and cannabinoids from the plant material and into the ethanol which is evaporated off to produce "crude" the product is then refined to remove more of the ethanol, impurities, fats, and terpenes .

On or about August 12th, I had the opportunity to meet with a subject who conducts commercial sized cannabis extraction in Arizona using the Ethanol Only extraction technique. This subject utilizes 4 - 100 pound "socks" filled with marijuana (181200 grams of material) and obtains a ideal 10,000 gram yield of usable oil. This is approximately a 6%

NARRATIVE

yield oil to flower.

A "Cannabis Business Times" article from 2018 reported that a ethanol extraction using commercial grade equipment can extract a 10 percent extraction using "High Quality" outdoor flower. (IE: 7 grams from 70)

All of the following research and extractions continues to verify our estimate of 9 grams or less for the amount of cannabis extracted from 2.5 ounces of dried marijuana flower.

EOR 082119 2148

Attachment:	
	Description:

HISTORY

Completed By:	S2148 SHAY, M	On:	8/21/2019	At:	11:38
Reviewed By:	S1162 STUTSMAN, B	On:	8/28/2019	At:	17:51
Approved By:	S1162 STUTSMAN, B	On:	8/28/2019	At:	17:51



Maricopa County Sheriff's Office

Paul Penzone, Sheriff

SUPPLEMENT



INCIDENT REPORT

EVENT	Reported Date:	Reported Time:	IR #:	Original/Supp?	Hand Written?	Info Only	Access Level:	Case Status:	MC (Event) #:
	9/3/2019	17:10	IR19019413	SUPPLEMENT	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes	Open	Exceptionally Cleared	MC19132198
	Serial #:	Last Name:		Shift Supervisor:			Name:		
	S2148	SHAY, M		Z7284			KASKAVAGE, M		
INCIDENT	Body Camera Activated?	Reason not Active: not issued							
	No								
	Break in Video?	Reason for break:							
INCIDENT	Radio Code:	From Date:		From Time:		9-1-1 Tape Requested:			
	267 NARCOTICS/OTHER DRUGS	6/5/2019		09:00		No			
	Location:	City:		ZIP:		The number of Additional MCSO Personnel On Scene:			
	2627 S 35TH AVE	PHOENIX		85009					
Is this IR related to others? NO									

SYNOPSIS

This supplement is to document an interview and questions answered during non-criminal investigations at two different licensed dispensary cultivation sites in Arizona. The questions were to continually keep current knowledge in the types, methods, methodology, general practice and industry standards of cannabis extraction. This is INFO ONLY.

NARRATIVE

In February 2019 Detectives Felix, Miller and I had the opportunity to speak with an extraction team for a licensed dispensary in Metropolitan phoenix. We did so inside a licensed dispensary, invited for a tour of the facility to learn how it operates and see the equipment in operation by the current owner. We spoke to at least three different dispensary agents during that visit. Our conversations were all mutually respectful and there did not appear to be any hesitation to ask or answer questions on either side. The dispensary agents were curious as to the types of black market and diversion activities that law enforcement is encountering and how lawful dispensary activities can reassure themselves they are not, or will not become the target of law enforcement investigation.

We conversed about such activities as illegal delivery services, "Medical Marijuana" that is found to be diverted, Dispensary Agents transporting product with out a "trip Ticket" and the general methods used to ensure that DA's are operating well within the AMMA and can safely transport marijuana, cannabis and infused products between dispensary and dispensary cultivation locations.

We spoke at length about current technology and methods that licensed dispensary use to produce marijuana, to ensure their marijuana is quality product and the tracking system for marijuana. We learned what portions of the plants are used and for what purpose and what a single plant may yield, and what the majority of healthy plants are grown to yield in that particular dispensaries operations. We viewed marijuana in production, harvested and drying , preparation for sale and final product marijuana of various strains, quantities and potencies.

We were given a tour of the various extraction areas, where this particular extraction group used butane, propane and ethanol extraction techniques. There were numerous closed loop[systems and we were given instruction on the process from start to finish as to how that equipment turns "material" into final product (marijuana into cannabis) . This extraction group was involved in the manufacture of a wide variety of cannabis products, but the extracts were primarily Butane/propane based solids (crumble, shatter, Batter and Diamond THCA) and Cannabis vaporizer cartridges. The primary selling cannabis product being cartridges.

We were given a tour and instruction on this groups distillation method for purifying the THC oils used in the cartridges and this included the ethanol addition to butane /propane extraction oils, winterization and fractional distillation of the product with the removal of heads and tails using rotary evaporators , chillers and a variety of other equipment. This process also yielded terpenes and if isolated and the plant was a high producer made for CBD, CBD oils.

During these tours we learned that the standard yield this group was seeing using both trim and flower was approximately 10 % with high grade flower turned into distillate. The best estimate that was provided for the various butane/propane products was approximately one ounce of usable , quality product per pound of material. a 1 1/16th

NARRATIVE

yield. Basic batter yielded more and THC-a considerably less.

In August 2019 Investigators from MCDST and the Prescott Area Narcotics Task Force (PANT) conducted an investigation on a black market marijuana grow and extraction operation in Black Canyon City. During a short interview with the subject that was using a closed Colum extraction system, the suspect , who was making "shatter" products advised hat he used both flower and "trim" in his extractions and his yield was "not even" 10% from material to final product(shatter) this interview was recorded and the investigation was documented under MCSO 19-025828. The seized material and product recovered in that investigation was consistent with that subjects admission

Also in August 2019, members of the MCDST group was invited to tour another licensed dispensary location in Arizona. Sgt Breen, Detective Felix, Miller' Knuth and I went on this tour,

This tour was, like the previous one, conducted by gracious hosts who were welcoming, provided an excellent tour and were open to questions and answers. As in other visits to licensed dispensaries, Our conversations were all mutually respectful and there did not appear to be any hesitation to ask or answer questions on either side. The dispensary agents were curious as to the types of black market and diversion activities that law enforcement is encountering and how lawful dispensary activities can reassure themselves they are not, or will not become the target of law enforcement investigation.

We conversed about many of the same topics and were given guided access to the entire facility (save the drying room, as that could have introduced unwanted contaminants , environments and light to the process of curing the plant material. We were instructed on the various grow methods, cross breeding or strains as well as types (indica, sativa, ruderialis) of marijuana plants to influence grow cycle, potency, size and yield , Like the previous dispensary visit we also were given a tour of the extraction section of the facility where the extraction agents utilize both super critical Co2 extraction as well as ethanol extraction for their products. This particular organization primary product is the cannabis vaporizer cartridge and secondly supplying material for other extraction companies., They discovered that the Super Critical Co2 system was not fiscally sustainable as it is very costly and their standard yield (using 40pounds of product) was still only a 10% final product. \At one stage, however the tour guide, who was clearly well versed in the process said that if they ran the product twice and it contained both flower and trim then they may be able to get a 15% yield.

When asked about their yield on solventless extraction, the answer was simply that it produced a "lower" yield\ that their ethanol process.. There was some "kief" (screened trichomes from the marijuana plant) extraction in process as part of the flower preparation, and we were able to watch that process. The group also uses a rosin press on the very slim occasion as well as "live resin" processes. But these extractions are less than 5% of their work and were not in progress at the time.

The Ethanol extraction process was the primary for this group, in this process, this licensed dispensary does not submit the material to non polar solvents first but simply emerges "socks" of flower and trim into a vat of ethanol which is submitted to temperature and pressure changes to process as much of the plant material as possible. The majority of the ethanol is recovered via vacuums, then the "crude oil" is winterized, strained (through a 5 micron filter) more ethanol is recovered and then the now winterized crude oil is placed through a fractional distillation process resulting in a distillate cannabis oil that is between 86-94% pure. This yield, which the extraction agents said was set up to maximize product was 10.5 % material to oil.

Attachment:

Description:

HISTORY

Completed By: S2148	SHAY, M	On: 9/3/2019	At: 18:23
Reviewed By: Z7284	KASKAVAGE, M	On: 9/4/2019	At: 15:57
Approved By: Z7284	KASKAVAGE, M	On: 9/4/2019	At: 15:57