ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 10, Issue, 04, pp.68372-68376, April, 2018

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

DETECTION AND ANALYSIS OF SUSPECTED DRUGS FOR FORENSIC CONSIDERATION

[1]Yashit Kumar, [2,*]Manoj K Verma and [1]Munish K Mishra

[1]Master in Forensic Science, Department of Forensic Science, SHUATS, Allahabad.
[2]Chemistry Division, Forensic Laboratory, Lucknow, Uttar Pradesh.

ARTICLE INFO

Article History:
Received 25th January, 2018
Received in revised form
04th February, 2018
Accepted 18th March, 2018
Published online 30th April, 2018

Key words:
Benzodiazepines,
Marijuana,
Opium,
Physio-chemical method,
TLC, R*f* value.

ABSTRACT

The Drug trade is a highly organized and creates a global black market economy that is responsible for the crime. However, in case of individuals who consume drugs excessively and commit crimes. These issues play an important role in understanding the risk of crime and drug use. Most addicts should be held liable for most criminals motivated by addiction, but that addiction can affect one's capacity for self-control over one's action. Drugs in the form of powders, tablets and capsules, living plants or dried vegetable matter and in liquid are encountered in the Forensic Science Laboratory as Suspected Drugs. The aim of this paper is to describe the most common methods for testing suspected drugs like benzodiazepines, opium, marijuana, etc by physio-chemical method, and recommend the most appreciate analysis by Thin Layer Chromatography for the determination of its purity through R*f* value. Drug analysis serves as a formal reference for forensic consideration to identification of suspected drugs that are commonly abused and help the court to determine appreciate sentencing.

Citation: Yashit Kumar, Manoj K Verma and Munish K Mishra, 2018. "Detection and analysis of suspected drugs for forensic consideration", *International Journal of Current Research*, 10, (04), 68372-68376.

INTRODUCTION

A drug is a substance that when ingested is capable off inducing a change in the body. Drugs are used to treat or prevent disease, to reduce pain, to promote sleep, and so on. The term drugs and medicine are often used interchangeably, despite this distinction. Obviously not all drugs or medicine are illegal. But the two factors that are important when a government agency decides if possessing a drug is suspected. First, if the drug has potential to be abused, then it is likely to be controlled in some way, as abuse could cause harm. Secondly any substance seized in violation of laws regulating the sale, manufacture, distribution or we can say that any substance whose possession or supply is restricted by law because of its potential harmful effect on the user. Such drugs are known as controlled or suspected drugs. For example in INDIA, the Narcotic Drugs and Psychotropic Substances (NDPS) Bill 1985, was introduced in the Lok Sabha on 23 August 1985. It was passed by both the houses of parliament and it was assented by the President of India on 16 September 1985 as the NDPS act, 1985. Under the NDPS act, it is illegal for a person to produce/ manufacture/ cultivate, possess, sell, purchase, transport, store, and/or consume any narcotic drug.

The Illegal Drugs trade creates a global black market economy that puts the public at risk, not just from the substances being distributed, but also from the subsequent crimes committed by users and manufacturers. These crimes typically include burglary, assault and fraud, but can also involve more serious crimes such as homicide, abduction and human trafficking. The person who contravenes laws in relation to production, manufacture, possession, sale, purchase, transport, storage, import, export or use is punished with 10-20 years of rigorous imprisonment and/or a fine of rupees 1-2 lakhs in India.

Evidence collected during an investigation involving illegal drugs can include the substance itself, containers used to transport the substance, utensils used to manufacture or use the substance or in the case of manufacturing the component chemicals used to create, an illegal substances. Suspected drugs through physio-chemical method and thin layer chromatography performed in the forensic science laboratory on submitted evidence detects and identifies suspected drugs, and help the investigators pursue legal action against individual suspected of a drug related crime. The aim is to determine whether the material submitted contains an illegal substance. Based on the results of the analysis law enforcement can pursue criminal charges and the court can determine appreciate sentencing

***Corresponding author:* Manoj K Verma ,**
[2]Chemistry Division, Forensic Laboratory, Lucknow, Uttar Pradesh.

MATERIALS AND METHODS

Collection of Suspected Drugs as a sample, proceeding for dissertation work was facilitated by Chemistry division of Forensic Science, Lucknow., Uttar Pradesh, India.

DETECTION BY PHYSIO-CHEMICAL METHOD

Benzodiazepines (BZD, BZS, BENZOS)

Benzodiazepines were globally the most prescribed medications. Most are now rarely prescribed and abused is restricted largely to pharmaceutical preparations that contain 34 benzodiazepines, the most common benzodiazepines such as diazepam, nitrazepam, alprazolam, and lorazepam are typically abused in Uttar Pradesh, India, drug also gained a certain state of being famous or well-known for some bad quality or deed for its association with '*date rape',* come as suspected drug in the form of tablets and powders to forensic science lab to detect and analysis for forensic consideration.

Color test: Formaldehyde sulphuric acid test (1:1 ratio of sulphuric acid and formaldehyde) added to the small quantity of the powder which is known as suspected and it will give the orange color for the primary presence benzodiazepines.

Cannabis or Hemp: Cannabis herbal or Marijuana means all parts of the plant Cannabis Sativa L, consist of 5 to 11 separate leaflets and material encountered in block of dried flowering tops and dried leaves or we can say GANJA. Cannabis resin (hashish) or CHARAS is a compressed solid made from the resinous parts of the plant. A sample of the material is extracted with petroleum ether or chloroform/carbon tetrachloride. The solvent was removed and evaporated to dryness.

COLOR TEST

Negm's reagent :- 0.4gm vanillin + 5 drops acetaldehyde + 20ml alcohol. Now extract material + 2ml conc. HCL + 2ml Negm Reagent

Extracted material	Color
Bhang	Pink to Violet
Ganja	Dark Violet
Charas	Pale color is appear immediately turn into slate grey after 10 minutes indigo blue and then after 30 minutes it will turn in to violet

Beam reagent: - Absolute alcohol + dry hydrochloric acid. Its color is same as Negm's reagent but it takes time

Extracted material	Color
Bhang	Pink to Violet
Ganja	Dark Violet
Charas	Pale color is appear immediately turn into slate grey after 10 minutes indigo blue and then after 30 minutes it will turn in to violet

Opium: Opium is the dried latex obtained from the opium poppy (scientific name– Papaver Somniferum). Opium contains two main groups of alkaloids. Phenanthrenes such as morphine, codeine, thebaine, are the psychoactive constituents and other one is, Isoquinolines such as paperverine and noscapine, which have no significant central nervous system. Opium latex contains approximately 12 percent of the analgesic alkaloid morphine, which is processed chemically to produce heroin and other synthetic opioids for medicinal use and for illegal drug trade. The latex also contains the closely relates opiates codeine and thebaine, and non-analgesic alkaloids such as papaverine and noscapine.

COLOR TEST

TEST	COLOR
Nitric Acid	Red
Hydrochloric Acid	Pink
Ferric Chloride	Brown
Sodium Hydroxide	Turbid
Mayer's Test	White ppt
Fehling's Test	Reduced

MORPHINE: Morphine is a naturally occurring member of large chemical class of compounds are called alkaloids. The name, which derives from *Morpheus* (themythologic God of dreams) was coined in 1802 by German Adolf Serturner to designate the main alkaloid in opium. Opium comes from thr poppy plant. Encountered in lab in paper or plastic packs of white crystalline powder or colorless and can be extract by ethyl alcohol.

Morphine sample	Color
Marquis Reagent (9.5% concentrated sulphuric acid + 0.5% formaldehyde)	Violet
CONC. Nitric Acid	Red
Ferric Chloride	Blue

Heroin: The Opium Poppy (Papaver Somniferum L) is cultivated and the poppy head is scored and the opium latex is collected, the morphine is the isolated from the latex and the morphine is treated with an acetylating agent and the formation of diacetylmorphine take place which is also known as Heroin.

Street level heroin (Diacetylmorphine) is normally encountered in the laboratory in paper or plastic packs that typically contain 100 mg to 200 mg of brown powder or sometimes in white.

COLOR TEST

Heroine sample	color
Marquis reagent (formaldehyde 0.5ml + conc. sulphuric acid 9.5ml)	Purple
Forehdes reagent (concsulphuric acid 9.5ml + sodium molybdate 0.5ml)	Purple
Con nitric acid	Yellow

COCAINE/COKE

Cocaine is a most powerful stimulant which affects the central nervous system. Cocaine is a naturally occurring alkaloid found in certain varieties of plants of the genus 'Erythroxylum'. Its production is from the extraction of crude coca paste from coca leaf, Purification of the coca paste to cocaine base, Conversion of cocaine base to cocaine hydrochloride. Encountered in laboratory in paper or plastic packs of white powder and can be analysed without extraction

COLOR TEST

Cobalt thiocyanate test or modified cobalt thiocyanate test (Scott Test):- 2% cobalt thiocyanate dissolve in water and dilute glycerine (1:1). Suspected test tube + 5 drop solution then shake it blue color will be formed then add Hydrochloric acid, blue color disappear and pink color solution formed and afterwards add chloroform then the layer intense blue color.

TLC

Thin Layer Chromatography is a special application of adsorption chromatography, in which a thin layer adsorbent coated onto a flat surface is utilized, instead of a column of adsorbent, as used in column chromatography. The most commonly used adsorbent in TLC is silica gel and the flat surface is a plain rectangular or square glass plate. The separation of the components of a mixture depends on adsorption-desorption equilibrium between compounds adsorbed on the solid stationary phase and in the moving liquid phase. The extent of adsorption of a single component depends upon the polarity of the molecule, the activity of the adsorbent, and the polarity of mobile liquid phase. The choice of the proper adsorbent will depend on the types of compounds to be chromatographed. Elution, or development of the chromatogram, is accomplished by capillary movement of the solvent up the thin layer of adsorbent. The sample is applied in a small drop a short distance from one end of the plate, and the solvent evaporated off. The plate is then placed vertically into a closed jar with its lower edge dipping into a pool of eluting solvent. Separation is stopped by removal of the plate when the solvent front approaches the top edge, fluorescence producing reagent can be sprayed onto dried plate, to render the spots visible. Once the spots are located, their retention factor or Rf value can be calculated from the equation:

RF = Distance travelled by solute/Distance travelled by solvent system.

ANALYSIS OF SUSPECTED SEIZED SAMPLES OF DRUGS THROUGH TLC

- Extract formed was spotted on the TLC plate through capillary tube from bottom edge and dried it.
- TLC plates were kept in solvent chamber containing below in the table

SAMPLES	SOLVENT SYSTEM	SPRAYING REAGENT
Diazepam	A	Dragendroff
Alprazolam	A	Dragendroff
Nitrazepam	A	Dragendroff
Lorazepam	A	Dragendroff
Charas	B	Fast Blue B
Ganja	B	Fast Blue B
Heroin	C	Dragendroff
Buprenorphine	A	Dragendroff
Opium	D	Dragendroff
Morphine	C	Dragendroff
Cocaine	E	Dragendroff

A - Chloroform : Acetone (8:2)ml
B - Benzene : Chloroform (6:4)ml
C –Methanol : Ammonia (9.5:0.5)ml
D – Benzene : 1,4 Dioxane : Methanol : Ammonia (5 : 4 : 0.5 :0.5)ml
E – Methanol : Chloroform : Methanol (2 : 7.5 : 0.5)ml

- The plates were removed from the chamber after solvent reaches ¾ and dried it.
- Spray the reagent on the TLC place as given the detail in table no 2.2 and observe the spot development on the plate.

PREPARATION OF REAGENT

Dragendroff Reagent: - Bismuth sub-nitrate 1.7g, Glacial Acetic Acid 20ml, water 80ml and 50% potassium iodide in water, mix together and store as stock solution.

Take 10ml of stock solution, 20ml Glacial Acetic Acid and make up to 100 ml with water gives the working solution.

Fast Blue B Reagent

-0.5g fast blue B salt is dissolved in 100ml water.

RESULTS AND DISCUSSION

The present work is concerned with the physic-chemical test and application of TLC technique of all the sample of suspected drugs that are encountered in the forensic lab. In which primary test that is color test shows the presence of suspected drugs and further TLC of drugs after extracted runs by using different types of solvent system for different suspected drugs but the most accurate result obtained by solvent system in TLC technique is shown in table 2.2.

According to the table 2.2, performing the TLC in the solvent system is now proceed to the spraying reagent, then the spot will be appear in the TLC as shown in the table 3.1 and calculate the *Rf* value and drugs came in the form of powders, tablets and capsules, unidentified plants and in the form of injection will be known to us.

TLC Plates

Sample: Diazepam

Retention Factor (Rf) Value: 0.72

TLC Plates

Sample: Nitrazepam

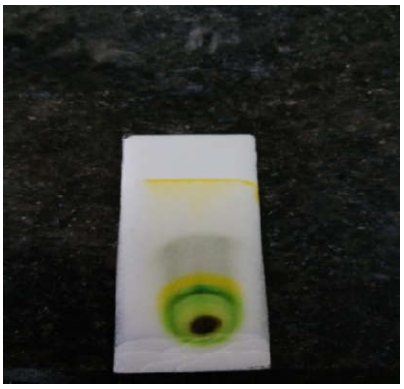
Retention Factor (Rf) Value: 0.63

TLC Plates

Sample: Lorazepam
Retention Factor (Rf) Value: 0.51

TLC Plates

Sample: Alprazolam
Retention Factor (Rf) Value: 0.48



TLC Plates

Sample: Charas
Retention Factor (Rf) Value:
THC (tetrahydrocannabinol) , shows a red color– 0.52
Cannabidiol (CBD), orange color – 0.63
Cannabinol (CBN), purple color – 0.48

TLC Plates

Sample: Ganja
Retention Factor (Rf) Value:
THC (tetrahydrocannabinol) , shows a red color– 0.49
Cannabidiol (CBD), orange color – 0.56
Cannabinol (CBN), purple color – 0.42

TLC Plates

Sample: Heroin
Retention Factor (Rf) Value: 0.47

TLC Plates

Sample: Buprenorphine
Retention Factor (Rf) Value: 0.61

TLC Plates

Sample: Opium
Retention Factor (Rf) Value: Nicotine-0.81, Papaverine-0.62
Thebaine-0.45, Codeine-0.28, Morphine-0.21

TLC Plates

Sample: Morphine
Retention Factor (Rf) Value: 0.36

TLC Plates

Sample: Cocaine

Retention Factor (Rf) Value: 0.18

SUMMARY AND CONCLUSION

The result of research work shows that many other types of drugs and evidence are encountered in the laboratory in the form of prescription drugs, odd white powders, unidentified plants, and a myriad other types of samples for analysis. For evidence of suspected of containing drugs, the role is to determine if indeed an illegal substance is present. Therefore, the physio-chemical test and TLC method was successfully for screening test and qualitative analysis, determination of its color and its purity through R*f* value. From the result, it has been clear and conclusively demonstrated that some of the evidence which encountered as suspected drugs were found to be fake or addition of adulterants as they differ in color and R*f*value and may be considered as an error during the time of examination. After the analysis of the result helps the Law Enforcement can pursue criminal charges and the court can determine appreciate sentencing. The application of TLC is arguably the most significantly important one being carried out in the world today. It is simple, sensitive, rapid, inexpensive and reliable method for such qualitative examination.

REFERENCES

Alina Pyka, 2014. Detection progress of selected drugs in TLC. *"Biomed Research International"* Volume 2014, Article ID 732078, 19 Pages

Bruno D. Sabino, Wanderson Romao, Morena L. Sodre, Deleon N. Correa, Denise B. Rocha Pinto, Fabio O.M. Alonio, Marcos N. Eberlin 2011. Analysis of cocaine and crack cocaine via Thin Layer Chromatography coupled to easy ambient sonic-spray ionization mass spectrometry, "*American journal of Analytical Chemistry",* 2, doi: 104236|ajac.2011.26075 published online October 2011.

Eric J. Schurter, Lois Anne Zook and Paul Szaley 2011. Analysis of a suspected drug sample. *"Journal of Chemical Education."* Vol 88, Issue 10: Pages 1416-1418, Publication date- August 19 2011.

Frank, R.S. and Gunn, J.W. 1974. Standardization of Forensic Drug Analysis *"Journal of forensic science",* vol. 19, Issue 1, pp-163-167.

Janovsky TJ, Bono JP. 2001. The Scientific Working Group for the Analysis of Forensic Drug Samples(SWGDRUG) – Discussion of SWGDRUG recommendations, "*Proceedings of the American Academy of Forensic Sciences"*;7:26.

Mills T, Roberson JC, Mc Crudy H, Wall W.1992. Instrument data for drug identification. 2nd edition. Vol. 5. New York. Elsevier.

Mohammad, A., Sharma, S and Bhawani, S.A. 2009. Reversed phase TLC of five co-administered drugs with surfactant modified solvent system *"Indian journal of chemical technology"*, Vol. 16, pp-344-350.

Sammnal, A, 2003. Analysis of counterfeit medicines through TLC *"International journal of Forensic Medicine and Toxicology"*, Volume 21, pp-225-230

Sherma, J. 2007. Analysis of counterfeit drugs by Thin Layer Chromatography *"depart of chemistry, Lafayette college, Easton, PA"*, 18042, USA. ACTA Chromatographic, volume 19.

World Health Organization (2004) Neuroscience of psychoactive substance use and dependence P.89 ISBM 9789241562355, Archived from the original on 30 April 2016.

Opiates Home health.uk.com Archived from the original on October 31, 2011, retrieved October 7, 2011.

Treating Alcohol and Drug problems in Psychotherapy practice doing what works New York. Guilford Publications.2011.P.47 ISBN 9781462504381.

****