4th REGIONAL TIAFT MEETING IN TÜRKIYE

October 13th - 15th, 2022

The International Association of Forensic Toxicologists

TIAFT
The International Association of Forensic Toxicologists
Established 1963

2022 ONLINE CONGRESS

AKTOD
ADLİ VE KLİNİK TOKSİKOLOJİ DERNEĞİ
SOCIETY OF FORENSIC & CLINICAL TOXICOLOGY

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4th REGIONAL TIAFT MEETING IN TÜRKİYE

E-BOOK

October 13th-15th, 2022

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WELCOME

Dear colleagues and delegates,

After the pandemic session, this year we are making the postponed 4th Regional International Association of Forensic Toxicologists (TIAFT) Meeting in Turkey online between 13-15 October 2022.

It is our great pleasure to welcome you for the 4th Regional TIAFT on behalf of the Turkish Society of Forensic and Clinical Toxicology and TIAFT.

This meeting, with an innovative and forward-looking scientific agenda, will create opportunities for the forensic scientists, criminal specialists, police, lawyers, pharmacologists and toxicologists to share the latest research findings and to collaborate in view of recent advancements on the forensic toxicology. Participants will be able to present their experiences, explore new directions and debate topics in forensic toxicology and related forensic science.

Hope to welcome you with enjoyable online meeting. We cordially invite all of you to make the meeting an event to remember together, I hope you will be with us at the meeting.

With Warmest Regards

Chair of Congress
Serap Annette AKGÜR

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SCIENTIFIC PROGRAM

		13/10/2022, THURSDAY
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11:40-13:30	Hall A	**Oral Presentations - 1** **Moderator: Tayfun Uzbay** 11:40-11:50 Evaluation of the Relationship Between Pesticide Exposure and Oxidative Damage in Greengrocers / Amenah Raad Muslim Al Khazrajia 11:50-12:00 Occupational Exposure to Greenhouse and Agricultural Chemicals Throughout the First Trimester of Pregnancy / Ozan Özturk 12:00-12:10 Development of an Analytical Method to Investigate the Effect of Nicotine Metabolite Ratio in Tobacco Use Disorders / Duygu Yeşim Ovat 12:10-12:20 Thin Layer Chromatography Detection of Raftaar Super Insecticide Using a Novel Solvent System / Poonam Moon 12:20-12:30 Fronto-Parietal Cortical Activation in Cannabis Users / Berhan Faruk Akgür 12:30-12:40 Evaluation of the Effects of Pregabalin and the Concomitant Use of Pregabalin and Morphine in Rats / Nuran Ay 12:40-12:50 Designer Benzodiazepines: New Psychoactive Benzodiazepines / Aybike Nur Fırat 12:50-13:00 Literature Review on Pregabalin and the Risk of Addiction / Chebli Akli İslam 13:00-13:10 Evaluation of Gabapentinoid Use in Cases Diagnosed With Opioid Use Disorder / İnci Sağlam 13:10-13:20 Determination of Alcohol Biomarker Phosphatidylethanol (Peth) 16:0/18:1 in Dried Blood Spot Samples of Drivers Regranting Licence / Huseyin Dengiz 13:20-13:30 Application of the Modified Marquis Test for Detection of Club Drug in Spiked Drink Samples / Archana Kamble
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Oral Abstracts

OA1 - 01

Designer Benzodiazepines: New Psychoactive Benzodiazepines

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Since 2008, a new class of chemicals has started to be seen in the markets where illegal substances are sold. These substances, which are synthesized by small modifications on substances with known chemical structure, are named as "research chemicals", "Designer drugs" or "new psychoactive substances (NPS)". Some of these substances, in particular, are minor modifications of legally banned or bounded substances. New psychoactive substances are divided into four as stimulant, cannabinoid, hallucinogenic (dissociatives and psychedelics) and depressant (opioids and benzodiazepines).

Designer Benzodiazepines (NPS Benzodiazepines) are the least recognizable and distinguishable of NPSs are similar to drugs abused for recreational purposes.

New Psychoactive Benzodiazepines, also called Designer Benzodiazepines, are metabolites or modified forms of benzodiazepines known to have a chemical structure and are produced for human health. It has been observed that these substances are generally used to increase the effect or duration of action of other addictive substances, to control overdose and to 'high'. Almost no Designer Benzodiazepine substances other than those referred to as research chemicals have been subjected to clinical testing. There is insufficient information on many issues such as the effects of these substances and their interaction with other substances, and therefore these substances pose a serious threat to public health. Designer Benzodiazepines have been illegally procured by many benzodiazepine users, especially as a result of the problems in quarantine and drug supply that started worldwide during the COVID-19 period.

In this study, a general information will be given about the substances called benzodiazepines, which help to sustain human life when used as recommended, and Designer Benzodiazepines, which are modifications that cause them to become a major public health problem.

Keywords: Benzodiazepines, New Psychoactive Substances, NPS, NPS Benzodiazepines, New Psychoactive Benzodiazepines, Designer Benzodiazepines.

OA2 - 02

Evaluation of the Relationship Between Pesticide Exposure and Oxidative Damage in Greengrocers

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Introduction and Aim: Occupational diseases are diseases that cause chronic or temporary diseases or cause physical or mental disabilities to their workers. These disorders affect many functional human systems, including the neurological, respiratory, muscular, skeletal, excretory, and circulatory systems. Greengrocers who deal with pesticide and agricultural residues are among those who develop these diseases. The study aims to determine the concentrations of DNA oxidative stress among greengrocer workers in Istanbul using urinary 8-Hydroxydeoxyguanosine (8-OHdG) concentrations and to determine whether there is a causal relationship between the oxidative stress of greengrocer workers and chemical pesticides as a result of their working with fruit and vegetables. To gather data that may be useful in conducting the research, we have prepared a form or a questionnaire for all sample members.

Method: Sixty urine samples were collected, 40 were from greengrocers, and the other 20 were workers in different jobs. Each of the 8-OHdG levels and the creatinine levels was calculated using the ELISA commercial kits method in all samples. The 8-OHdG and creatinine concentrations of all participants (sample group and control group) were determined using the calibration curve. The resulting creatinine-corrected 8-OHdG concentrations (ng/mg) were used for biostatistical analyses.

Findings: In this study, 8-OHdG concentrations were determined to be higher in greengrocer workers than in the control group. The research results determined that there is a relationship close to the significance limits at $p \leq 0.05$, where it was 0.06. We did not find any significant relationship between the univariate and multivariate variables collected from the questionnaire with the concentrations of 8-OHdG/creatinine (ng/mg).

Conclusion: Our results provide a framework for further studies with clinical and epidemiological purposes in investigating the factors that examine the effects of pesticide exposure in greengrocery workers.

Keywords: Oxidative stress, 8-Hydroxydeoxyguanosine, greengrocer, pesticides.

OA3 - 03

Occupational Exposure to Greenhouse and Agricultural Chemicals Throughout the First Trimester of Pregnancy

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Introduction: Exposure to toxic substances during pregnancy worries the mother of teratogenicity and can cause serious problems. In this case, a pregnant woman exposed to toxic pesticides in a closed greenhouse environment without knowing she was pregnant was evaluated regarding maternal health and fetal development.

Case: A woman (37 years old) applied to our clinic when she was 12 weeks pregnant, and worked in an environment where a lot of greenhouse pesticides were used for 5 hours a day, three days a week, without a mask and protective equipment during the first- trimester of pregnancy. Exposed drugs are Cyprodinil+Fludioxonil, Tolclofos methyl, Flonicamid, Spinosad, Gliycine+Betain, Thiram, Pirimicarb, Dimethomorph, Daminozid, Kormequat klorid, Benzyladenine-6, Gibberellin A4/A7+6-benzyladenine, Captan, Tolclofos methyl, Spirotetramat, Chloratraniliprole+Abamectin, Fluopyram+Trifloxystrobin, Sulfoxaflor, Cyantraniliprole, and Propiconazole. Low dose acetylsalicylic acid was administered to the pregnant woman due to a history of preeclampsia and fetal growth restriction in her previous pregnancy. There was an increased risk of trisomy 21 in the first-trimester genetic screening test, then the result of amniocentesis at 16 weeks was reported as a normal karyotype. The gross fetal anomaly was not observed in the fetal anatomical evaluation performed at the 20th week, but the soft palate couldn't be evaluated in ultrasonography (USG). A chorioamniotic separation area was observed in the left lateral of the placenta. Alpha-methyl dopa was administered due to hypertension in the antenatal follow-up at 25th week. In the last antenatal follow-up at 28 weeks, fetal biometric measurements and Doppler USG findings were normal.

Conclusion: Clinical studies on exposure and teratogenic effects of greenhouse-agricultural chemicals during pregnancy are insufficient. The first-trimester is very risky for the development of organs. As pregnancy is often detected late, using protective equipment and awareness about it is crucial, especially in women of reproductive age who are occupationally exposed to toxic products.

OA4 - 04

Literature Review on Pregabalin and the Risk of Addiction

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Pregabalin is a gamma-aminobutyric acid (GABA) analogue used in the treatment of epilepsy, neuropathic pain, generalized anxiety disorder and currently being studied for other indications, there is an ongoing debate about the addictive potential of pregabalin. The objective of this study was to identify the number of cases of abuse or addiction to pregabalin published in the literature. The study consists of a census of the number of published cases of pregabalin abuse or dependence on PubMed and Science Direct up to the year 2021. A total of 130 cases of pregabalin abuse or dependence have been identified (mean age of 30 years, 73% male). The average daily dose of pregabalin was 3.1g. Psychiatric diagnoses other than substance-related disorders were reported in the largest number of patients, and almost all of the patients exhibited withdrawal symptoms after discontinuation of pregabalin. Current literature suggests a significant and growing concern for pregabalin abuse. The sociodemographic level, the availability of the drug as well as the legal vacuum can be possible risk factors for the hyperconsumption of pregabalin as well as the development of addictive behaviors related to this molecule.

OA5 - 08

Extraordinary Herbal Poisons: Toxi-Crime

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Introduction and Aim: Poisonous plants are classified according to their effects as; cardiac, anticholinergic, CNS effects, local irritation, bone marrow suppression, as well as cytotoxics, hepatotoxics, neurotoxics, nephrotoxics, hypoglycemics, cyanogenics, anticoagulants, etc. Some phytochemicals have wide safety margins. They don't adversely affect biological function, but plants with low therapeutic index or containing directly damaging components require caution. Knowing phytochemicals as glycoside, alkaloid, etc., which cause toxicity, helps to understand the effects of a certain plant on metabolism and evaluate its toxicity. Analytical techniques such as chromatography/spectroscopy are used in the rapid detection of the phytotoxins with low therapeutic index that can be used as chemical/biological weapons. Such interesting poisonous plants will be discussed.

Method: The information on less known toxic plants in literature was reviewed.

Findings: The list of poisonous plants such as hemlock, wolfsbane, belladonna, foxglove (digitalis) and castor bean containing ricin, which are used accidentally or for planned criminal behavior, is quite long. Acocanthera spectabilis is used as arrow poison, Rhododendron is used as a massacre weapon, Cerbera odollum, Cleistanthus collinus, Abrus precatorius, Colchicum autumnale and Datura metel for murder or suicide, Datura and Mucuna prurita, for theft on trains. Hippomane mancinella, one of the most dangerous trees in the world, an arrow poison, poisons even by touch and some plants in the Fabaceae family cause "Favism" due to hereditary G6PD enzyme deficiency and insufficiency (as Strychnos nux-vomica, Mandragora autumnalis). Poisonings with plants may vary depending on years, exposure type and plant parts.

Conclusion: Botany is important in investigating cases of murder, rape, theft, etc. For plants to be of evidentiary value, they must be interpreted by a botanist who has versatile botanical education and experience, with pharmacy, chemistry and genetics knowledge. All botanists do not have such training.

Keywords: Toxic plants, forensic toxicology, phytochemicals, crime, suicide

OA6 - 11

Determination of Toxic Elements Contents in Eye Shadows: Selected Products in Istanbul Bazaars

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Background and Aims: Cosmetic products contain organic/ inorganic substances as ingredients which absorbed into the body. Of these ingredients, toxic elements pose a threat for human health particularly when the amount of toxic elements is found above the permissible limits. This study aimed to determine toxic elements (Cr, Co, Cd, Pb, Hg, As, Sb and Ni) concentrations in eye shadows, which sold in Istanbul Bazaars, and to compare the results with reference limits implicated for cosmetic products by regulations.

Methods: Forty-nine eye shadow samples collected from three different local bazaars and they were analyzed by Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) in order to determine toxic element contents. The linearity, limit of detection (LOD), limit of quantification (LOQ), recovery, and repeatability parameters considered as well.

Results: The calibration curve is found to be linear in the range of 0.1-150 µg/mL with correlation coefficient (r_2) ≥0.9999 for all toxic metals. The LOD and LOQ values were less than 0.15 µg/mL and 0.20 µg/mL, respectively. The extraction recovery values were found to be between 90.91-111.11% with ≤ 15 relative standard deviation. The results indicated that all samples contain As, Hg, Cd, Pb, Cr, Co and Ni, of these As 67% (n=33), Hg 2% (n=1), Cd 16% (n=8), Pb 74% (n=36), Cr 100% (n=49), Co 100% (n=49) and Ni 100% (n=49) were found to be exceeded the reference limits except Sb.

Conclusion: In this study, toxic metal concentrations of eye shadow products have predominantly found to be exceeded the permissible limits, which would cause further significant health concerns in the case of long term exposure. In addition, all samples contain at least 3 toxic elements above acceptable limits.

In conclusion, there is a need for monitoring toxic elements contents of cosmetic products periodically and also, strict action must be taken through regulatory agencies against manufacturer and importer immediately.

Keywords: Cosmetics, ICP-MS, toxic element, eye shadow

OA7 - 15

Estimation of Anti-Diabetes Drug Metformin in Turkey Using Wastewater-Based Epidemiology

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Introduction: Metformin is the most commonly used drug to treat type 2 diabetes. Unlike other drugs, metformin is excreted about 70% through urine and feces. It is one of the most commonly found drugs in aquatic environments due to its incomplete metabolism in the human body. Measurable concentrations of metformin in different environmental matrices in sewers influent/sludge/effluent waters of wastewater treatment plants, surface waters and tap/drinking water is reported.

Purpose: This study used the wastewater-based epidemiological (WBE) approach to estimate metformin consumptions in different populations across Turkey.

Methods: Metformin was analyzed by using solid-phase extraction (SPE) and LC-MS/MS analysis. Twenty-four hours influent wastewater samples were collected from 19 wastewater treatment plants (WWTP) in 11 provinces across Turkey in 2019, 2020 and 2021 years.

Findings: Metformin were quantified in all samples at concentrations ranging from 19.84 to 159.9 µg/L (mean: 77.0 µg/L). The concentrations were converted to population-weighted average consumption and resulted in an average consumption of 22.1 (range: 1.88 - 63.8) grams/day/1000 persons in Turkey in 2019, 2020 and 2021 years. The lowest metformin consumption was in Kilis city (5.99 grams/day/1000p), while the highest consumption was found in Mersin city (31.4 grams/day/1000p). That the metformin usage was decreased from 2019 to 2021 years was estimated according to average metformin use in our WBE study. No significant change was observed in daily and weekly usage (p>0.05). There was a seasonal increase from spring to winter.

Conclusions: Our study, which can be used to develop public health strategies to reduce the overall burden of metformin use in specific regions, will provide further evidence on the distribution of metformin use across Turkey. Also, the monitoring spatial and temporal patterns of metformin consumption could provide contributions for type 2 diabetes treatment and distribution across populations.

Keywords: Wastewater, metformin, diabetes, consumption, spatial and temporal variability

OA8 - 16

Method Development and Validation for Simultaneous Determination of Opioids and Their Metabolites, Alkaloids and Adulterants in Blood and Tissues for Systematic Investigations into Postmortem Redistribution

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Introduction: Opioids are among the main causes of drug overdoses in recent years. In many countries, especially in the USA, the opioid epidemic has occurred as a public health crisis due to the use of heroin and illegally produced fentanyl. 46,802 opioid-related overdose deaths were reported according to the CDC in 2018. Developing accurate and sensitive analytical methods for the detection and quantitative analysis of opioid drugs in different biological matrices is of great importance to shed light on the mechanisms that have not yet been fully elucidated, such as postmortem redistribution.

Purpose: The aim of present study was developed and validated a rapid and accurate analytical methos to determine opioids and their metabolites, alkaloids and adulterants in blood and tissues for systematic investigations into postmortem redistribution, the impact of adulterants and diluents in street forms of opioids on post-mortem redistribution.

Method: We developed a rapid and simple analytical method for simultaneous measurement of Morphine, Codeine, 6-Monoacethylmorphine, Morphine-3-glucuronide, Morphine-6-glucuronide, Codeine-6-beta-glucuronide, Norcodeine, Fentanyl, Norfentanyl, Caffeine, Acetaminophen, Dextromethorphan, Thebaine, Papaverine and Noscapine in whole blood and liver using Liquid Chromatography-Tandem Mass Spectrometry.

Findings: All of the analytical validation parameters were detected below the limit values accepted according to the SWGTOX guidelines. The intra-day precision (RSD) and dilution integrity values were less than 18% for all analytes and inter-day bias was less than 10%. No marked carry-over and matrix effects were observed. The validated method was successfully applied to real blood and tissue samples of rats-administered opioids and their adulterants and alkaloids.

Conclusions: Determination of opioids and metabolites, their adulterants and alkaloids in biological specimens by using the present analytical methods will provide significant contributions to the studies to be conducted to clarify and characterize the mechanism of death and postmortem redistribution.

Keywords: Postmortem, toxicology, method validation, redistribution, heroin, fentanyl, opioid crisis

OA9 - 18

The Contribution of Non Lethal Metamphetamine Level to Death in Postmortem Toxicological Analysis: Two Case Reports

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Introduction and Aim: Toxicological analyzes are an indispensable part of autopsies. Especially in cases where there is not a traumatic lesion that may cause death and also there is no finding to explain the cause of death in histopathological examinations; toxicological analyzes of blood, urine, intraocular fluid, bile and internal organ samples guide the forensic medicine physician in determining the cause of death. However, the effect of the toxicological substance level on death should be evaluated. The aim of this study is to discuss the difficulties and possible approaches in determining the cause of death in cases with below lethal doses of methamphetamine according to the literature.

Cases: Case 1; It is reported that a 25-year-old male died in the hospital where he was taken after a fight. In the autopsy performed; although lesions such as bleeding under the scalp, laceration and abrasion in various parts of the body were detected, there was no finding that would directly explain the cause of death. In toxicology; 100ng/ml Methamphetamine, 20 ng/ml Amphetamine and 5 ng/ml Amisulpride were found in blood. Methamphetamine was also found in the internal organs, nasal swab and urine, and additionally ephedrine and pseudoephdrine were detected in the urine. Case 2; It is reported that a 50-year-old male died in the morning after vomiting the previous evening. Although there were some findings in the autopsy and histopathological examination, no findings that would directly explain the death were detected. In toxicology; (100ng/ml) Paracetamol, (10ng/ml) Amphetamine and (120ng/ml) Methamphetamine were found in blood, and Methamphetamine was in internal organs and urine.

Discussion and conclusion: In cases where Metamphetamine was detected below the lethal dose according to literature; the effect of Metamphetamine dose on death will be discussed in light of forensic investigation, drug interactions and other findings.

OA10 - 19

Rapid Analysis of Amphetamine Type Stimulants (ATS) with Solid Phase Microextraction Method in Urine

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Introduction and Aims: Amphetamine-type stimulants (ATS) are the second most abused group of substances after cannabis at worldwide. For this reason, it is important to analyze ATS by effective analytical methods in biological samples. It has been started to focus on micro-extraction methods that use less solvent, contribute to the green environment and provide the opportunity to work in small sample volumes. In this study, it is aimed to develop a solid phase microextraction method (SPME) method for fast and accurate chromatographic analysis of ATS in urine.

Method: Gas Chromatography-Mass Spectrometry (GC-MS) conditions were optimized for ATS in urine. Pentafluoropropionic anhydride (PFPA), acetic anhydride (AA) and trifoluoroacetic acid (TFA) were used in order to find the most effective derivatizing agents. Head Space (HS)-SPME method was developed using polydimethylsiloxane divinylbenzene (PDMS/DVB) fiber. Procedures were carried out by following the adsorption, derivatization, desorption and fiber cleaning steps. The factors that could be effective were scanned with the Plackett-Burman design and optimized with the central composite design (CCD), then validated.

Findings: HS-SPME method was developed successfully without using solvents. TFA was found to be the most effective derivatizing agent. The fiber was stripped and became unusable in the experiments performed with PFPA. It was determined that the best results are within 10 min. adsorption time, 800C derivatization temperature and 1 min. derivatization time. Method was validated in accordance with the limits in the guidelines.

Conclusion: A simple and fast method which is environmentally friendly, does not use any solvent and allows simultaneous extraction in a short time, has been developed. The damage done by the derivatization step to the fibers is concretely demonstrated. The method allows routine analysis. Especially with its automatizability, the usage area can get out of the limitation and expand.

OA11 - 20

Evaluation of Gabapentinoid Use in Cases Diagnosed with Opioid Use Disorder

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Aim: It has been reported that gabapentinoids use has increased rapidly in recent years and may have a potential for abuse in patients with opioid use disorder. In this study, it was aimed to evaluate the use of gabapentinoids in cases receiving opioid replacement therapy and who do not have a medical indication for gabapentinoids.

Method: The toxicological analysis results of the urine samples of the cases who admitted to the Manisa Mental Health and Diseases Hospital, Toxicology Laboratory with the diagnosis of 'opioid dependency syndrome' between July 2021 and July 2022 were screened, retrospectively. The results of the samples analyzed by high resolution mass spectrometry (HRLCMS/MS-Orbitrap) were obtained from the Laboratory Information System (PROLIS) and statistically analyzed with SPSS.025.

Findings: 255 cases between the ages of 20-64 who were diagnosed with "opioid dependency syndrome" were evaluated. The mean age of the cases was 36±9.9 years, and 69% (n=176) were between the ages of 25-45. 74.5%(n=189) of the cases was norbuprenorphine (NB) positive, pregabalin (PGB) in 10.6%(n=27) and gabapentin (GP) in 2.4%(n=6) was positive. None of the PGB and GP positive cases had a registered prescription. Illegal substance was detected in 55.5%(n=15) of PGB positive cases. While only 1.1%(n=2) of NB positive cases were morphine positive, PGB positivity was 9%(n=17). 87.5%(n=223) of the total cases were those who admitted to the alcohol and substance addiction treatment center (AMATEM) for treatment, 12.5%(n=32) were the cases in the probation program.

Conclusion: This study shows that cases with a history of opioid use are a risky group for gabapentinoid abuse. Therefore, caution should be exercised when prescribing gabapentinoids to patients with a history of opioid use. In addition, pregabalin and gabapentin should be included in the scope of screening in the toxicological analyzes of urine routinely performed during buprenorphine therapy.

OA12 - 21

Determination of Alcohol Biomarker Phosphatidylethanol (PETH) 16:0/18:1 in Dried Blood Spot Samples of Drivers Regranting Licence

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Introduction: A significant portion of traffic accidents occur under the influence of alcohol. For assessing driving under the influence of alcohol, blood alcohol concentration (BAC) determination is important, but the high elimination rate of ethanol makes it difficult to detect BAC. Another way of demonstrating alcohol consumption is to use direct ethanol biomarkers including ethyl glucuronide (EtG), ethyl sulfate (EtS) fatty acid ethyl esters (FAEE) and Phosphatidylethanol (PEth). Also, PEth is a direct biomarker of ethanol indicating excessive alcohol intake due to the long-term detection window. Dried blood spot (DBS) applications have recently been used in forensic and clinical fields due to their advantages in sample collection, transportation, storage and the prevention of PEth formation in vitro.

Purpose: The aim of the study was assessing alcohol consumption by analysing PEth in DBS samples of drivers regranting licence due to the advantages of DBS, such as sample collection, transportation, storage and the prevention of PEth formation.

Methods: DBS samples were collected from 37 volunteers during the driver behavior development training they attended during the license regranting process. At the same time, volunteers were asked to fill out a questionnaire that we used some of the AUDIT questions.

Findings: PEth concentrations were measured by the validated LC-MS/MS method. The mean age of 37 volunteers was 40.4±16.3 (range: 35-64 years), mean PEth was 44.86±24.07 (median: 37.35) ng/mL for positive cases, 36 (97.3%) of these cases were male and 1 (2.7%) was female. According to PEth concentrations, 78.4% of the volunteers were abstinence, 21.6% were social drinkers.

Conclusions: The study can be contribute improving the diagnostic information and the validated method will be used as a rapid, cost-effective and suitable method for determination and quantitation of PEth in DBS samples in in forensic and clinical applications.

Key words: PEth, DBS, driver licence, regranting, LC-MS/MS

OA13 - 22

Development of an Analytical Method to Investigate the Effect of Nicotine Metabolite Ratio in Tobacco Use Disorders

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Introduction and Aim: Presenting concrete laboratory data specific to individuals in smoking cessation treatments contributes to increasing the success of smoking cessation. It is aimed to develop analytical method for nicotine and its metabolites in order to create a personalized smoking cessation treatment plan with laboratory data that play an active role in nicotine metabolism and the effects of metabolic differences on treatment.

Method: 109 individuals admitted to Ege University BATI Institute Smoking Cessation Polyclinic were included. Fagerström Test for Nicotine Dependence (FTND) was applied. QuEChERS technique to be applied to the urine samples to calculate the nicotine metabolite ratio(NMR), which is a phenotypic surrogate of nicotine exposure, in order to improve the results of smoking cessation. Method was validated and nicotine, cotinine and 3-OH cotinine were extracted with this method and analyzed by gas-chromatography-mass spectrometry(GC-MS).

Findings: 73.4% of the participants(n=80) were male. According to the FTND, 41.4% of the female were low; 44.8% moderate; 13.8%of them have a high level of nicotine addiction. The R^2 value was >0.99, and linear results were seen in the 25-2000 µg/L. The LOQs for Nicotine, Cotinine and 3-OH Cotinine are 7.914, 9.168 and 18.763 µg/L, respectively. Average recoveries for Nicotine, Cotinine and 3-OH Cotinine range from 85.67 to 98.81 µg/L. According to NMR ratios, 21 of the cases were divided into two groups as slow(NMR<0.31) and 88 as normal/rapid metaboliser(NMR≥0.31).

Conclusions: In this study, a low-cost QuEChERS analysis technique was applied, which enables the use of less organic solvents in urine samples by optimizing a sensitive, environmentally friendly and reliable extraction method. Thus, a laboratory analysis method was created to be used in the treatment of smoking cessation, and the basis was laid to increase both the success of the treatment and the compliance of the patients with the treatment.

OA14 - 24

Mushrooms: Yet to be Explored- From Toxicological and Pharmacological Perspectives

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Foraging for mushrooms is popular worldwide. However, it is not uncommon to misidentify a poisonous mushroom as edible. Therefore, in case of mushroom poisonings, the main reason appears as consumption of toxic mushrooms instead of edible ones. The critical point here is the correct identification of cause of poisoning, unfortunately species responsible for poisoning are rarely identified. When the poison groups among the applications to the National Poison Information Center (UZEM) are examined, in 2018 the data distribution shows that 4157 cases were linked with wild mushrooms, 463 with cultivated mushrooms, 236 poisonings with other and unknown mushrooms. With respect to age, poisonings related with wild mushrooms appear in the second place with 206 cases in food poisoning cases in the <6 age group in 2018. The data of the same national report for 2019 indicate that under the heading of mushroom poisoning/wild mushrooms there was a decline to 2908, and there were 509 notifications for cultivated mushrooms, while 247 notifications for other and unknown mushrooms, similar to the previous year. In 2020, 3287 cases were reported for mushroom poisoning/wild mushrooms, 586 cases related to cultivated mushrooms, and 233 cases for other and unknown mushrooms. In the United States, mushroom poisoning data recorded in 2014-2021 show that approximately 6300 cases are encountered annually, and in general, specific mushroom species as the cause of poisoning cannot be determined in almost 80% of cases. Thus, careful inspection of signs and symptoms becomes critical to help in the clinical diagnosis and to guide treatment recommendations.

Besides the issue of "edible mushrooms" and easily misidentified "poisonous" species, therapeutic applications of some mushroom extracts due to bioactive compounds have been proposed. Interestingly, improvements in depressive symptoms with psilocybin therapy have been suggested. In this vein, mushrooms present a distinctive world yet to be explored!

OA15 - 25

Thin Layer Chromatography Detection of Raftaar Super Insecticide Using a Novel Solvent System

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Introduction: Insecticides can cause harmful effects on humans, animals and the environment if used in excess. Thin layer chromatography is one of the simple and cost-effective methods used for the detection of trace amounts of insecticides in a variety of samples. 'Raftaar super' is an insecticide which is made up of organophosphorus and pyrethroid compounds.

Aim: The present paper aimed to develop a new solvent system for the thin layer chromatography detection of Raftaar Super insecticide.

Method: sample spots were applied on pre-coated TLC plates and standard TLC procedures were used to develop a novel solvent system.

Findings: The solvent system consisting of cyclohexane, diethyl ether and acetone was found to be the best for the detection of Raftaar Super insecticide. The detection was possible even for diluted samples up to 32.7ppm.

Conclusion: Out of all the solvent systems tested, cyclohexane: diethyl ether: acetone was found to be the best.

Keywords: Organophosphorus, pyrethroid, Profenofos, Cypermethrin, thin layer chromatography

OA16 - 26

Application of the Modified Marquis Test for Detection of Club Drug in Spiked Drink Samples

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Introduction: Drug users have started abusing prescription medications like CNS depressants for recreational purposes. One of the prescribed drugs that is currently being utilized at clubs and raves is diazepam. Diazepam is a tranquillizer, prescribed by the doctors in treatment of insomnia, seizure, and panic disorders. Side-effects of diazepam includes dizziness, anterograde amnesia, unconsciousness and coma. Diazepam has synergistic effects when consumed with alcohol and/or other drugs.

Aim: Predators at clubs and parties spike the drink of the victim to commit crimes such as theft, drug facilited sexual assault (DFSA), violent crimes, etc. In such cases, the drink remnants collected from crime scene are crucial for determining the type of drug used to stupefy the victim. And color spot test of the sample can provide a quick estimation of presence or absence of any drug in the suspected beverage.

Method: In the present work we have demonstrated the application of modified marquis test for detection of diazepam in beverages and compared the results with UV-Visible spectrophotometer. The modified marquis reagent was prepared by adding 4ml of concentrated sulphuric acid to 6ml of formaldehyde.

Finding: The colour change in the standard as well as spiked beverages were documented and UV-Visible spectrophotometer was used to plot the absorbance spectra.

Conclusion: The detection however possible is often subjected to interpretative bias. More studies as well as other improvisation in the techniques are required.

Keywords: Drink spiking, Diazepam, Modified Marquis test, club drug, beverages, DFSA

OA17 - 27

Alcoholism and Its Impact On Work Force: A Case of Kenya Thika Prison

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The significant presence of alcohol problems in the workforce has been a trending worry for most organizations in Kenya. Most employees are showing irregular work attendance, poor productivity, poor health and safety risks because of problems associated with alcoholism. This presents a cardinal challenge and a major threat for progressive economic development. This study investigates the impacts of alcoholism in the workforce at the Thika Prison facility. The objectives of the study included investigating the impacts of alcoholism on employees' productivity at the Thika Prison based in Kiambu County. The study sought to establish the impact of alcoholism on social-economic status while also exploring the impact of alcoholism on work relations of employees. In addition, the study analysed the impact of alcoholism on employees' health and safety and investigated the interventions applied to curb alcoholism at the institution. The study collected data from amongst staff at the Prison unit through Questionnaires and in person Interviews. Data was processed using a statistical package for social sciences (SPSS) and the findings were presented in the form of charts. The findings of the study indicated that about 43% of the respondents consume alcohol while 57% of the workforce does not take alcohol. The research further indicates that alcohol has an effect on employees' work output and quality of work. About 49% of the respondents "strongly agree" that alcohol leads to reduced work rate and poor quality of work in the workforce. The research recommends that there is a need to enact policies and measures that can control alcoholism in the workforce. It recommends the use of workplace alcohol policies such as, a zero tolerance to alcohol staff code of discipline in regulating alcoholism. The research also recommends use of employee assistance programs, counseling, and drug use control and sensitization workshops to curb alcoholism. The research indicates that there is a direct relationship between alcoholism and unproductivity, stress, hangovers, diseases and financial problems. It explains that there is a need to redress the problem of alcoholism in the workforce because it hampers organizational efficiency, employees' health and safety, work relationships and increases social and financial costs.

Key Words: Alcoholism, workforce, negative impact

OA18 - 28

Fronto-Parietal Cortical Activation in Cannabis Users

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Cannabis is a commonly abused psychoactive substance. Cannabinoid receptors are widespread in the brain. Cannabis consumption is a risk factor for psychosis. Many accounts of psychosis see it as a dysfunction of fronto-parietal cortices that are important for control and organization of thought and behavior during various kinds of goal pursuit. It is possible that extended cannabis use affects these brain regions, culminating in psychosis in a fraction of users.

A set of regions within these frontal and parietal cortices shows increased activation in response to a wide variety of task demands. Thus, whether the task requires greater focusing, or manipulating larger amounts of information, recall more memories, inhibiting habitual modes of thought and behavior – the same set of brain regions seem to activate, despite the seemingly varied nature of these diverse task demands.

In this ongoing study we are investigating if the activation of these regions is different in cannabis users compared to age-matched controls. Both cannabis users and age-matched controls do a task that requires them to remember and recall different kinds of information for its different subtasks. We characterize activation of these regions in response to increased task difficulty when different parts of the task require greater amounts of mutually interfering information

While the study is still ongoing, pilot analyses suggest that cannabis users may indeed show poorer activation of these fronto-parietal regions compared to age-matched controls.

OA19 - 29

Evaluation of the Effects of Pregabalin and the Concomitant Use of Pregabalin and Morphine in Rats

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Introduction and Aims: Pregabalin (PGB) is an abused and controlled prescription drug and has a high probability of co-prescription with morphine (MOR)-derived drugs. The aim of this study is to examine the effects (behavioral, biochemical) of PGB and the combined use of PGB and MOR in rats and to evaluate with a toxicological aspect.

Method: "Wistar Albino" rats(n=28) were divided into 4 groups as control(C), morphine(M), pregabalin(P) and pregabalin+morphine (P+M). PGB was administered at a dose of 10 mg/kg peroral, MOR was at 1 mg/kg intraperitoneally for 3 weeks. Open Field and Elevated Plus Maze tests were performed to evaluate behavior after 0, 1st, 2nd, 3rd weeks and the last drug doses were given urine and blood samples were taken. Biochemically; LDH-1, CK-MB (cardiac marker), BNP (cardiac and renal marker), ACTH and cortisol (behavioral marker) levels were tested. PGB and MOR levels were measured by LC-MS/MS in the urine.

Findings: No significant difference was found in the groups in behavioral tests, but there is a significant difference within itself on a weekly basis. There was significant weight loss between weeks in the M group. LDH levels were elevated in all groups except the C group. Administration of PGB or MOR alone or in combination did not affect CK-MB and cortisol values. Although BNP levels were observed to increase with the use of MOR, no significant difference was found. Urinary MOR value at 2nd week was significantly lower than M group 3rd week, P+M group 1st and 3rd week. P+M 1st week urinary PGB level was significantly higher than P group 1st, 2nd, 3rd week and P+M 3rd week levels.

Conclusion: Cardiac and behavioral effects of the use of PGB in combination with MOR were concretely demonstrated. Due to the abuse of PGB, it is necessary to be careful especially when prescribing because of these properties.

OA20 - 31

Effects of Genistein and Daidzein Isoflavones on Thyroid Function in Female Adult Rats Exposed to Chlorpyrifos

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Aim: The chief aim of the current research was to determine the effects of a mixture of either DZ or GS or their combination with CF on the thyroid gland function in female rats. Furthermore, to investigate whether soy isoflavones such as GN and DZ might have protective effect against pesticide induced thyroid toxicity.

Method: Healthy adult female albino rats divided into five groups of six rats each. The first group was control received corn oil, second group treated with CF 6.7 mg/kg, third group treated with CF 6.7mg/kg + GS 21.7mg/kg, forth group treated with CF 6.7mg/kg + DZ 17.4mg/kg and the last group given 6.7mg/kg CF + 21.7mg/kg GS + 17.4mg/kg DZ, all are oral daily doses for six weeks. At the end, rats sacrificed and the blood samples collected for biochemical analysis and thyroid tissues collected for histopathology analysis.

Results: No deaths or change in the appearance of animals reported throughout the study period. There was a significant body weights increase in all groups except for CF group. Exposure to 6.7mg/kg body weight CF alone or with either GS (21.7mg/kg bw) or DZ (17.4mg/kg bw) 42days results in significant reduction of serum triiodothyronine (T3) and serum thyroxine (T4) in female rats. While, co-administration of CF with both of GS and DZ results in significant rise in the serum triiodothyronine (T 3) and serum level of thyroxine (T4) in female rats. Furthermore, all treatment groups show no significant change in serum thyroid stimulating hormone (TSH) in female rats. Histopathology results of rat thyroid glands consistent with the biochemical tests.

Conclusion: no protective effect exerted by GS or DZ against oxidative stress induced by CF. However, GS and DZ provides a synergistic effect together producing reduction of serum T3 and T4 in female rats. Further studies required to confirm this synergistic effect and thyroid toxicity in female rats.

Key words: Chlorpyrifos, genistein, daidzein, thyroid histopathology

OA21 - 32

Evaluation of for Workplace Drug Testing Data Between 2017-2022 Years in Izmir

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Introduction: The Workplace Drug Testing (WDT) is a worldwide practice. Differences in legislation and methodology across cultures in WDT programs can create difficulties in comparing prevalence rates across countries. In our country, workplace drug testing practices, some air/road and maritime transport companies carry out this practice within the framework of international regulations.

Aim: It was aimed to evaluate the toxicological analysis results of employees who were take a workplace drug test between the years 2017- 2022. Method: WDT analysis was performed on 60 employees at the Addiction Toxicology Department laboratory between 2017-2022 years. Analyzes were performed on urine and hair samples. Samples were collected in accordance with the safety chain of custody, and screening and confirmation analyzes were carried out in accordance with the guidelines.

Results: 73.3% (n=44) of the 60 cases were male, 26.7% (n=16) were female. The mean age of the cases was calculated as 32.5 ± 10. Examining the sectors in which the employees whose WDT was applied are working or will start a new job, 41.7% (n=25) of the cases are in the transportation, 36.7% (n=22) in the energy, and 3.3% (n=2) in the security sector, 18.3% (n=11) of them are mining, restaurant, internship abroad, etc. grouped as other has been determined. After the screening and confirmation analysis, 8.3% (n=5) of the cases were found to be positive. THC-COOH, opiate, pregabalin and amphetamine use were determined.

Conclusion: In this field, it is very important to make an evaluation using sampling, analysis and published cut-off values in accordance with the guidelines published by The European Workplace Drug Testing Society. In our country, although there are regulations on the use of alcohol and illegal substances in the labor law and occupational medicine regulations, the highway traffic law.

Keywords: Workplace drug testing, screening, confirmation, urine drug test

OA22 - 33

The impact of alcohol and drugs on road safety

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Research into the effects of alcohol on driving has a long history and has led to legislation, policies and prevention programmes being produced worldwide, with the aim of preventing and reducing alcohol-impaired driving. Despite their implementation and success, drunk driving continues on an unacceptable scale. However drinking and driving contributes to one-quarter to one-third of motor vehicle fatalities worldwide, resulting in an estimated 273,000 deaths annually.

At the same time the awareness of drug-impaired driving and its prevalence has emerged in the past decade. Robertson, Hing, Pashley, Brown and Vanlaar (2017) agree that "despite a growing body of research on drugged driving, it can be argued that our understanding of how drugs affect driving behaviors is limited compared to what we know about alcohol". Moreover, the combined effects of alcohol and various drugs, particularly marijuana, is a growing concern.

Today we have a strong scientific and specialized community of experts and profit and non-profit organizations that add value in finding solutions, which is in line with the Safe Systems approach to roadway safety that encourages a model that anticipates and mitigates human error.

It is also important to emphasize that the Global Action Plan for Road Safety (Second Decade of Action (2021-2030) stresses the importance of increasingly sharing knowledge and creating multidisciplinary cooperation networks. It also emphasizes the importance of promoting and valuing safe road use, taking into account the road users' behaviour. Road fatalities are much more than just numbers. They are people with families that are devastated forever. In this way and valuing this plan, it becomes imperative to work quickly in order that new technologies may contribute to a vision zero without crashes on the roads.

In-vehicle technologies to prevent drunk driving are being developed and tested. One such technology is the Driver Alcohol Detection System for Safety (DADSS) which is expected to be available for widespread deployment in passenger vehicles by 2025

This communication aims to address this issue and present the Driver Alcohol Detection System for Safety (DADSS), referenced as one of the technologies that strongly believes in the vision: Towards a world without drunk drivers

Poster Abstracts

PA1 -05

Development and Validation of a Technique for the Analysis of Lead and Cadmium in Food Supplements

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Objectives: The objective of this work is the development and validation of an analytical method for determining the levels of contamination of certain dietary supplements (multivitamins, herbal mixtures, nutritional supplements, etc.) by two heavy metals: lead and cadmium.

Materials and Methods: The method adopted for this work is an experimental study. Analyses is done by use of atomic absorption spectroscopy as a method of determination and quantification, atomic mineralization of the product by microwave for pretreatment of samples.

Results: The technique is linear in concentrations ranging from 5 to 80 ppb, the method is accurate for lead and cadmium with a relative bias < 20% for the 3 levels of validation standards, The method has good repeatability with a coefficient of variation < 15%, the detection limit is 2.6 ppb and the limit of quantification is 3.7 ppb, the study of the matrix effect concluded that it is absent.

Conclusion: Dietary supplements can be a source of exposure to heavy metals, the accumulation of which in the body causes serious health consequences, the development of a technique of analysis of heavy metals (lead and cadmium) by atomic absorption in food supplements of wide consumption allowed the control of the latter to guarantee the protection of the consumer.

PA2 -06

Preliminary Investigation of Local Lead Exposure

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Introduction: The National Toxicology Centre represents a sentinel of the Ministry of Health and Population of Algeria, whose mission is to assess the toxic risk at the national level. The NTC may organize national surveys to assess the exposure of the Algerian population to toxic risks in order to protect the health of the population.

Objectives: The objective of this work is to evaluate the lead exposure of a population living in the south of Algiers in the municipality of Baraki.

Materials and Methods: 20 people participated in the study and live in the same area. Lead exposure was assessed using several tools: questionnaire (duration of exposure, seniority, socio-demographic, occupational characteristics, and items related to signs of lead poisoning), for bio-metrology: analysis of Lead in Blood and Urine has been completed.

Results: We had 15 Inhabitants of the Beraki region who are contaminated and have high levels of lead (above 85 µg/l in men and 60 µg/l in women).

Conclusion: This study made it possible to put in place a questionnaire, a rich information sheet and a method of analysis of blood and urinary lead, thus allowing an assessment of the local exposure to lead of a population, while waiting to know the source of exposure

PA3 -09

Mycotoxins in Forensic Toxicology

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Introduction and Aim: Disease symptoms caused by mycotoxins are defined as "mushroom poisoning" or "mycetismus, mycetism". The severity of symptoms in poisoning cases varies according to the amount of mushroom consumed. Psychosomatic poisoning symptoms, which are described as "imaginary poisoning", can also be seen in those who fear of eating poisonous mushrooms. Fungal toxins are generally grouped as cyclopeptides (amatoxins, phallotoxins, rhrotoxins), orellanin, giromitrin, ibotenic acid and mucimol, muscarine, psilocybin, psilocin, coprin. Here, poisonous mushroom toxins as Agaricus xanthodermus and Amanita citrina, Amanita muscaria, Amanita pantherina, Amanita phalloides, Amanita virosa and Boletus satanas, as well as, poisoning symptoms and toxicities will be discussed.

Method: The information on hazardous mushrooms in literature was reviewed.

Findings: There are cases of serious toxicity from ingestion of poisonous wild mushrooms, while mushrooms/mycotoxins are involved in some murder cases. In such cases, especially Amanita species, which contain amatoxin, are often encountered. Hallucinogenic magic mushrooms, which also cause bad trips contain indole alkylamines or tryptamines (as psilocybin and psilocin), also some of them contain phenetylamines such as mescaline and methylenedioxymethamphetamine. From a forensic aspect; even for well-known toxins. Reports of complex methodologies for the analysis of mycotoxins are insufficient. With the global warming, an increase in the types of poisonous mushrooms and quantitative/qualitative changes in the mycotoxins bring a necessity to develop analytical methods for the identification of some poisonous mushrooms and their new toxins. Morphological identification alone is difficult for mushrooms, especially in samples taken after cooking or from stomach contents. In such cases, chemical analysis and identification of the toxin(s) after these structural changes, become mandatory.

Conclusion: Simple and reliable analytical methods are required to detect mycotoxins in chasllenging cases as defined above, using MS based techniques.

Keywords: Poisonous mushrooms, forensic pharmacy and botany, mycology, mycotoxins in pharmacognosy, analytical determination of mycotoxins.

PA4 - 10

Graphene Derivatives a Gift or a Material That Should be Monitored?

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Graphene and its derivatives attract attention due to their extraordinary multi-properties as high surface area, high electrical/thermal conductivity, excellent mechanical, electrochemical and piezoelectric properties, strength, bringing projections on their contribution in the fight against COVID-19. Graphene has a 2D single-layered or multi-layered structure of covalently bonded sp2-hybridized carbon atoms arranged in a hexagonal honeycomb network. Their use in biomedical applications are; gene therapy, drug delivery, tissue engineering, imaging biomaterials in techniques like Raman and TEM, biosensors (because of providing ultra sensitive response), swabs, disinfectants, masks and even in some vaccines. Graphene oxide is obtained through the oxidation of graphite. Silver ion graphene oxide-containing antibacterial and disinfectant protective cleaning solution. When chemically reduced, graphene oxide can create graphene which has been described as "the strongest, thinnest and most conductive material on earth". Modified graphene oxide derivatives are also used in DNA/RNA transfection. Graphene derivatives pass through the fetus, studies on the blood-brain barrier have found that reduced graphene oxide inserts itself into the interendothelial cleft over time and decreases the paracellular seal of the barrier. GO can penetrate through plasma membrane and accumulate in different organs such as the lungs, liver, spleen, and bone marrow after intravenous administration in mice and shows its toxicity. Pulmonary edema in mice's lungs was observed after intravenous injection of GO. The cytotoxicity and genotoxicity of graphene/graphene oxide/their derivatives are time and dose dependent. Their toxicities are demonstrated on reproductive organs, lungs, liver, DNA (causing mutation), mitochondria, dermal fibroblast cells, T-lymphocytes, esophageal epithelium, renal epithelial cells, intestines (with the loss of microvilli), neurons, human erythrocytes, etc. They elevate ROS and induce immunotoxicity. Toxicity of graphene derivatives is mainly dependent on their physicochemical properties (e.g.size, surface charge, shape, number of layers, surface functional groups, and particulate state).

Keywords: Graphene oxide, toxicity of graphene derivatives, distribution and elimination, membranes

PA5 - 12

A Micro-Segmental Method for the Determination of 42 Psychoactive Substances in a Single Hair Strand: Application in a Single Doer of Zolpidem

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Introduction: In recent years, drug-facilitated sexual assault (DFSA) has become a growing concern in the health community due to the increase in cases and the important criminal impacts.

Aim: In this study, an analytical procedure to identify trace amounts of 42 psychoactive substances in hair based on micro- segmental hair analysis was presented. The method also can be used to estimate the time of drug ingestion at daily precision by cutting a single hair into sub-millimeter segments which correspond to daily hair growth.

Method: The single hair was cut into 0.4 mm segment and extracted by dithiothreitol- extraction medium, after sonication and incubation, ten microliter were injected into the LC-MS/MS system for a chromatographic run of 16 min using an Allure PFPP column (100×2.1 mm, 5 mm i.d.) using multiple reaction monitoring (MRM) mode.

Findings: The LOD and LLOQ for all analytes ranged from 0.1 to 20 pg/mm and 0.5 to 20 pg/mm, intra and inter-day precisions were 1.5 % to 11.8 %, and 2.8 to 12.7 %, accuracy were ranged from 86.5 to 105.7 % and 89.5 to 109.2 %. Recoveries of all the analytes were within a range of 68.1– 98.2 % and matrix effect were 71.3 to 111.7%. The method was successfully applied to the hair samples collected at 28 d after a single dose of zolpidem, with zolpidem detected in S28 to S40 (proximal 1.08-1.60 cm) of hair (n=5).

Conclusions: The method was successfully applied to the hair samples after a single dose of zolpidem and micro-segmental analysis is feasible for investigation of DFSA cases. Individual hair growth rates need to be calculated to estimate the time of drug intake and the process was analyzed based on the micro-segmental analysis of at least five hairs.

Keywords: DFSA, psychoactive substances, micro-segmental hair analysis, LC/MS-MS

PA6 - 13

Chemical-Toxicological and Biopharmaceutical Properties of Tramadol

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Introduction: Tramadol belongs to the group of benzodiazepines and is widely used in medical practice in schizophrenia, tramadol-induced psychoses, anxiety, sleep disorders. Long-term and excessive use of the drug leads to fatigue, drowsiness, memory impairment, headache, dizziness, dry mouth, tachycardia, thirst, vomiting, fever. Tramadol is associated with the increased suicide risk in different age groups: in youth, adolescents and adults. In connection with this the study of tramadol in the biopharmaceutical and chemical and toxicological regard is the crucial task. The aim to develop methodological recommendations and proposals for the improvement of modern physicochemical methods for theoretically based criminalistic, forensic-chemical, chemical-toxicological and biopharmaceutical studies of tramadol.

Method: as a result of numerous experiments conducted to determine tramadol, GX-MS, UV-spectrophotometry and thermodesorption surface ionization spectrometry methods were proposed. These methods gave positive results in the analysis of tramadol extracted from the composition of biological objects.

Findings: GX-MS analysis was carried out on an Agilent Technologies 7890A GC system-5975C inert XLMSD gas chromato-mass spectrometer. Analysis of the obtained chromatogram and mass-spectrum showed the presence of the main peak with a retention time – 8.78 minutes and fragment ions with a mass - 58, 77, 91,107, 121, 135, 150, 218, 263 m/z, typical for coniine. When the UV-spectrophotometric parameters were studied, it was observed that the maximum species absorption was at 271 wavelengths. For the purpose of detection tramadol in biological substrat are used method surface - ionization spectroscopy. The thermodesorption range tramadol has characteristic peaks at 88±15°C and 205±15°C.

Conclusions: The investigations led to the conclusion about the suitability of these methods of isolation, identification and quantitative determination of tramadol in biological fluids. The results of the given investigation have been introduced into practice of all forensic-chemical and medical laboratories of the Republic of Uzbekistan.

PA7 - 14

Prevalence and Correlates of Illicit Drug Use Among Drivers of Motor Vehicles in Bulgaria From 2021

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Introduction: In Bulgaria, a zero-tolerance law for drugged drivers exists. The current practice in the country (since 2011) consists in oral fluid/saliva roadside testing (Dräger DrugTest 5000 or Dräger DrugCheck 3000) and laboratory confirmation of preliminary positive result in blood sample.

Purpose: This study aimed to examine the prevalence of illicit drug use among drugged drivers and to extract some correlates from the available data and information.

Method: The study was based on 1007 blood samples collected from drivers of motor vehicles, suspected in illicit drugs intake, during 2021 in Bulgaria. All samples were analyzed using GC-MS, and the obtained data were processed statistically using SPSS.

Findings: The median age of analyzed drivers was 30 years (range: 18-71). Among all, only 74 (<10%) were women. Of all cases during the study period, 746 (74.1%) had complete prior information (e.g., result from positive on-site test, traffic accident). In 562 cases (around 55.8%) negative laboratory result for drug use was obtained. The most commonly detected drug was tetrahydrocannabinol (21.7%), followed by amphetamine-type stimulant (19.9%), cocaine (5.9%), methadone (2.7%), benzodiazepines (2.1%) and opioids (1.5%). Trends demonstrated combined (two or more) drug use (153 cases), with the most common combination being between AMP + MET (61 cases) and THC + ATS (55 cases). It is important to note that some medicines (antipsychotics, antidepressants, antihistamines and anticholinergics, etc.) were also detected but these drugs are not listed as controlled substances so as their usage is not prohibited.

Conclusions: Current study clarified the prevalence of illicit drugs among drivers during last year in Bulgaria. It also evaluated some correlates. However, the study revealed several important problems such as possible cross-reactivity, different LOD, time of drug use, etc.

Keywords: Zero tolerance, drugged drivers, illicit drug use

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Development of a Thermodesorption Surface Ionization Spectroscopy Method for the Analysis of Clozapine and Olanzapine in Forensic Toxicology

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Introduction: The Aripov Institute of Electronics developed and made the indicator "Iskovich-1" for the detection and analysis of trace amounts of drugs and other abused medicinal preparations in users' urine, blood and cadaveric materials by means of the thermodesorption surface ionization spectroscopy method (TDSIS). In Uzbekistan, olanzapine and clozapine acquired extraordinary importance in the chemical-toxicological and forensic chemical examination. The reason for it is frequent incidents of acute and chronic poisoning by the representatives of this medicinal agents. In connection with this the study of clozapine and olanzapine in the biopharmaceutical and chemical and toxicological regard is the crucial task. The aim of this study is to develop the analytical procedure for clozapine and olanzapine by thermodesorption surface-ionizing spectroscopy method and the application in the study of biological objects.

Methods: For detection of energizers by a method of thermodesorption surface ionization spectroscopy the analysis has been carried out in the following conditions: the emitter oxidized the molybdenum, which has iridium in it; voltage of the emitter- 405 V; emitter temperature - 390-420 °C, temperature of evaporation from 20 to 505 °C; air stream - 50 L/hour (voltage of the compressor 12 V).

Findings: The thermodesorption range clozapine has characteristic peak at ~270±10 °C (sensitivity 1 mkg/mL) and olanzapine has characteristic peaks at ~145±15 °C and ~253±15 °C (sensitivity 0,5 mkg/mL). Also calibration curve for determination of the quantity of isolated from biological material was drawn. Clozapine in the case of a linear dynamic range of determination was 5-50 mkg/mL and olanzapine 2-20 mkg/mL.

Conclusions: The received spectra testify that by means of the TDSIS method of analysis it is possible to define authentically clozapine and olanzapine in medicinal products and biological objects.

PA9 - 23

New Methods for the Rapid and Sensitive Detection of Arsenic in Water Samples and Other Matrices

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Introduction: Arsenic toxicity is a global health problem affecting millions of people, and contamination of water resources with arsenic has become a worldwide issue. Although the World Health Organization has set the maximum level to be found in drinking water as 10 ppb, arsenic levels above this value are still being reported. Arsenic causes a number of serious toxic effects, and exposure has been shown to be related with cancer and death in humans, affecting more than 150 million people in the world. Therefore, rapid, sensitive, and selective determination of arsenic is critical. Although current analytical methods can detect arsenic with high sensitivity and selectivity, since they are costly and require a laboratory environment as well as trained personnel, development and practical use of new methods are warranted.

Aim: Current study sought to evaluate novel electrochemical and colorimetric detection methods that have been developed using precious/non- precious metal nanoparticles and various materials.

Conclusion: In this study, new electrochemical and colorimetric methods developed for the rapid and sensitive detection of arsenic were examined and summarized. These novel electrochemical and colorimetric detection methods utilized to detect arsenic have been shown to present a number of advantages such as high sensitivity, selectivity, rapid response, low cost and portability. The research progress of high- performance arsenic sensors based on diverse materials is expected to advance in line with the high demand in clean water resources and dedicated methodological studies especially offering on-site detection of water pollutants.

Keywords: Arsenic detection, electrochemical methods, colorimetric methods, nanoparticles.

PA10 - 30

An Overview of Abortifacient Plants in India and Their Forensic Significance

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Introduction: 'Abortion' is the act of terminating a pregnancy at an early stage. Illegal abortions are widespread, unsafe, and are very often performed with natural abortifacients to escape from the law and punishments. Many of the commonly occuring plant species have been used as abortifacients for centuries. In several countries worldwide, such plants are frequently used to induce illegal abortions. Such techniques are customarily employed in several tribal and rural communities. Such illegal and non-medical abortions also often cause death of the female due to reactions and unknown side-effects.

Aim: This poster presents an overview of the various Indian plants that are used as abortifacients.

Method: The information was culled from a variety of available research works in the field. An exhaustive list of such species was compiled and studied in order to gather information on various detection methods used to determine the presence of traces of such substances in the human body.

Findings: More than 15 ethnobotanical plant species from various genera with abortifacient, anti-implantation, antifertility, and contraceptive properties have been documented, along with their active principle responsible for any of the above properties, and their applications as documented in various research papers, along with their detection methods.

Conclusion: Since this work constitutes a list of plants used as abortifacients and their detection methods, it can be employed to lead an investigation involving the use of such indigenous methods for illegal abortions.