

Prevalence of Drugs in Addition to Alcohol at BAC Levels Above the Legal Limit

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California Vehicle Code (V.C.) 23152(a) states, "It is unlawful for any person who is under the influence of any alcoholic beverage or drug, or under the combined influence of any alcoholic beverage and drug, to drive a vehicle." At the Los Angeles Police Department Scientific Investigation Division, blood samples from individuals arrested in violation of a variety of laws, including V.C. 23152, and measuring at or below 0.08% BAC are subjected to a routine ELISA blood screen using Immunalysis kits for PCP, cocaine, opiates, amphetamine, methamphetamines, THC, barbiturates, and benzodiazepines. We have chosen to conduct a study to expand the window to include 0.15% BAC and below in order to ascertain what drugs, if any, are found in addition to higher alcohol levels.

The data collected included 431 cases over a 7-month period from October 2007 to April 2008. This information comprised a majority of all samples analyzed in the Blood Alcohol Section of the Toxicology Unit that met the above criteria. Of the 431 samples, 40% of cases with an alcohol level of 0.09-0.15% BAC screened positive for at least one of the eight drugs included in the screen. The most prevalent drugs detected at these levels were THC, cocaine, and benzodiazepines with percentages of 62%, 24.5%, and 17.5%, respectively.

Information regarding drug-positive cases can be useful not only in a court of law as an addition to driving under the influence of alcohol, but also as an explanation of symptoms inconsistent with ethanol impairment at the time of arrest. From these results, the number drivers under the influence of drugs is significantly underestimated in the city of Los Angeles due to the policy of drug testing only those samples that lie at or below the statutory alcohol limit. These data are important as law-makers consider the necessity of expanding legislation with respect to the drug impaired driver. The data presented here may also be an underestimation of drug impairment because of the limitations of the ELISA panel. Toxicology laboratories commonly restrict the cases that undergo drug analysis because of limited resources; however, in this era of increased prescription drug abuse this topic deserves greater attention.

In Search of a Replacement for the Centricon 100 Centrifugal Filter: A Comparison With Eight Post DNA Digest Purification and Concentration Devices

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The Centricon 100 centrifugal filtration device has been used in forensic science to help purify and concentrate DNA for over 20 years. With the discontinuation of these devices new methods/apparatuses must be verified to meet the needs of the concentration and clean-up steps following phenol/chloroform/isoamyl alcohol (PCI) "organic" extraction. Pall Life Sciences corporation produces a product called "Microceps™" and Sartorius Stedim biotech produces a product called Vivacon 2 (in 30, 50 and 100K molecular weight cutoffs) that are very similar in design and function to the Centricon®

100 which were manufactured by Millipore. Furthermore, Millipore is now manufacturing a product called "Amicon® Ultra-4" as a replacement for their Centricon series and also has the Microcon 30 and Microcon 100 filtration devices for use in a micro centrifuge. Robotic post digest cleanup is also available through the use of the Qiagen Biorobot EZ1 using the Investigator Kit. This study is designed to define analysis parameters for the Microceps™, Vivacon 2 (30k, 50k and 100k), Ultra-4, Microcon 30 and Microcon 100 as a potential replacement for the Centricon® 100s and to determine if any of these devices are as good as or superior to the Centricon® 100 for recovery of DNA. The Qiagen EZ1 using the Investigator kit was also compared. The centrifuges available for this study included the IEC Centra MP 4R and IEC CL31R at Los Angeles Sheriff's Department, the IEC Centra CL2 at Los Angeles Police Department and the Beckman Allegra 6R, Beckman TJ-6 and the Thermo Scientific Megafuge 11R at the San Bernardino County Sheriff's Department. All of these centrifuges had fixed angle rotors. The study itself consisted of several smaller studies. The first was to determine the optimal RCF and times required to obtain a usable volume after concentration.

The second study involved the recovery of DNA from extracted samples. The third study estimated the efficacy of recovering

different sized DNA fragments and the final part of the verification measured the various devices in cleaning up known inhibitors. The Vivacon 100 by Sartorius is a suitable replacement for the Centricon 100. This device performs at an equal or better level in the recovery of DNA after a Phenol-Chloroform extraction and takes less time (three 15 minute spins compared with three 20 minute spins). For challenged samples (either low level or degraded samples) the Microcon 30s are recommended since they are superior to either the Centricon 100s or the Vivacon 100's in the recovery of total DNA and the recovery of smaller fragments of DNA. The Vivacon 30 and 50, the Microcon 100 and the EZ1 using the Investigator kit are also suitable replacements for the Centricon 100's although the EZ1 is not recommended for very low level and/or potentially degraded samples. Neither the Microcep 30 nor the Amicon Ultra-4 performed as well as the Centricon 100. Advantages and disadvantages of each device will be discussed.

Isomer Determination of Cathine in Khat

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In January 2009, the khat plant (Schedule II) and its active components, cathinone (Schedule II) and cathine (Schedule IV), were added to California Health and Safety Code as controlled Substances. Cathine (d Norpseudoephedrine) is an isomer of a non-controlled substance, l-norpseudoephedrine, thereby requiring the forensic analyst to perform testing to identify the isomer present. This presentation presents both sample preparation and instrumental techniques to identify cathine as well as the isomer. Sample preparation using acid-base extraction and/or dry-solvent extraction techniques are discussed. Four instrumental techniques to determine the isomer are presented: Gas chromatography with derivatization, chiral gas chromatography, liquid chromatography with circular dichroism detection, and capillary electrophoresis.