
Chemistry And Forensic Investigations

Forensic sciences and criminalistics have existed since ancient times, but until recently it was unknown. Throughout history, crimes have occurred in which there has always been an attempt to find the person responsible for applying justice. Many have been the crimes that have gone unpunished due to the absence of a science that was dedicated to solving them. It is when the need arises to create forensic sciences, which helps to find the culprits and provides them with the corresponding punishment. The purpose of this work is to make known the existing relationship between chemistry and forensic sciences.

The forensic chemistry is the branch of chemistry that is responsible for classifying and dosing all signs related to an alleged criminal act. Forensic chemistry is based on the premise that when two objects come into contact, there will be an exchange between the two, in other words, 'each contact leaves a trace' (Danylla, 2011). The forensic chemistry is in charge of applying the chemical principles to solve cases of judicial interest. It currently mainly focuses on chemical analysis as a fundamental tool for track processing. There are several areas where forensic chemistry plays an important role. Toxicology is the one that covers the most popular applications. The most abundant cases are related to the consumption of alcohol and narcotics by drivers.

The legislation of several countries establishes a limit for the content of alcohol in the blood of a driver in order to reduce the probability of traffic accidents, so when an accident of this nature exists, it is necessary to verify the conditions in which they found the driver (s) to determine the existence of the infraction and execute the corresponding sanctions. In addition, the consumption of alcohol is an aggravating circumstance when there are deaths in between. Other cases of toxicological interest are those related to poisonings and intoxications. There are several substances that are considered in a toxicological analysis: drugs of abuse, analgesics, beta-blockers, antidepressants, among others, whose presence and level of concentration can give indications of illicit use of controlled substances, overdose or poisoning. Additionally, within this area, there is a type of toxicological analysis applied to the field of sports, called anti-doping control. On the other hand, forensic chemistry also intervenes in the analysis of non-biological matrices. In investigations involving firearms, waste is usually analyzed on the skin or clothing after a shot is fired for the purpose of relating them to the device from which it originated.

This type of analysis is especially helpful in cases of homicides. The residue of a shot is mainly composed of certain metals (lead, arsenic, and antimony) commonly used in bullets. Thanks to the instruments currently available, an analysis can be carried out that meets these requirements; however, the results are subject to the skill and experience of the forensic chemist since the mere presence of these substances does not necessarily indicate that a firearm has been fired, but that supplementary information and a critical analysis of the results are required to arrive at a conclusive observation. Sometimes fires are caused in homes or warehouses through the use of flammable substances that accelerate the combustion process. By means of an adequate chemical-forensic analysis, the accidental or provoked nature of the fire could be determined. When an event of this nature has been provoked, a portion of the flammable substances used, usually gasoline and petroleum derivatives, is absorbed in certain materials present in the scene and remains unburned, thus allowing its detection. Petroleum

derivatives have appreciable differences at the time of analysis and even, under certain conditions, it is possible to distinguish between gasoline of different qualities and provenances. Finding an accelerant or flammable substance in the place of the accident helps to establish the place of origin of the event and, therefore, to the reconstruction of the facts.

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