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APPLICATION OF BIOLOGICAL METHODS IN FORENSIC MEDICAL EXAMINATION

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ANNOTATION

The article discusses the features of the use of biological methods in forensic examination. In forensic examination, objects of biological nature include: tissues and secretions of humans, animals, birds, fish, insects, their traces, as well as fragments of plants and their metabolites.

KEYWORDS: *detector, microbiology, dendrochronology, method, microbial flora, substances/*

At present, fundamentally new biological research methods are increasingly being used in expert practice: the biosensor method using detector dogs, the DNA analysis method, as well as entomological, microbiological methods, and the dendrochronology method.

The development of new biological methods causes the study of new objects of forensic examination (microbial flora, insects, sweat and blood substances that determine the individual smell of a person), the study of which will lead to the development of new types of examinations.

The need for practice to improve and apply more effective methods for identifying a criminal also determines the relevance of developing methodological principles for the use of biological methods in forensic examination.

Objects of biological nature are examined within the framework of forensic medical and forensic biological examinations in connection with the investigation of especially serious crimes, such as murder, rape, as well as traffic accidents, theft, etc.

Traces of blood, semen, hair, sweat (odorous) and other traces of human tissues and secretions make it possible to establish the scene of the crime and reproduce the circumstances of the incident. Often only these traces carry individualizing information about the identity of the offender.

Considering biological methods, it should be noted that objects of a biological nature have not only biological properties, but also a number of other properties, which makes it possible to study them by physicochemical methods (chromatographic, spectral).

In forensic examination, objects of biological nature include: tissues and secretions of humans, animals, birds, fish, insects, their traces, as well as fragments of plants and their metabolites. The microbial flora, although not included in the list of objects of forensic examination, is also of interest, since the inherent (resident) and introduced microflora of the human skin plays an important role in the study of the individualizing characteristics of a person. The resident flora of human skin is represented by staphylococci, micrococci, aerobic and anaerobic corynenform organisms (*Propionibacterium acnes*) and gram-negative bacteria (*Acinetobacter*).

Their growth and development depend on many factors: temperature, humidity, body area, age, sex and chronic diseases. The spectrum of bacteria on the surface of human skin depends on a number of reasons: on diseases, hereditary factors, taking medications (for example, antibiotics), on the living environment, etc., that is, it carries information about



the individualizing and group properties of a person. Therefore, the microbial flora should also be considered as an object of forensic examination.

It is shown that methods for studying objects of biological nature can be classified as methods using biological systems to study their biological properties, as well as other methods (biochemical, biophysical, physicochemical, etc.)

Biological methods can be conditionally divided into two groups: methods for studying the biological properties of objects and biological methods proper, based on the use of biological systems as detectors. Biological properties are inherent only in objects of biological nature and their study is possible only with the help of biological systems. For example, smell is analyzed using olfactory receptors, taste is analyzed using taste receptors, etc.

At the same time, biological systems can be used as detectors to analyze substances of various nature: those that determine the individual smell of a person, drugs, oil, and others. Biological methods can detect some substances at extremely low concentrations, often with amazingly high selectivity.

The principle of biological methods of analysis is to control the reaction of a biological system (cells, bacteria, plants and animals) to the determined trace component.

Organoleptic methods of preliminary examination of forensic objects are biological methods in which human olfactory, gustatory, visual and tactile receptors are used as detectors. A very sensitive detector of odorous substances is the human nose. Along with the definition of color, smell is one of the differentiating features of many objects of forensic examination (for example, petroleum products and fuels and lubricants).

The organoleptic determination of the taste of objects of forensic examination, although it is of great importance for their differentiation (for example, alcoholic beverages), is not used in the study in order to avoid possible accidental poisoning.

The data obtained with the help of organoleptic research are quite subjective and are used only for a preliminary assessment or detection of objects of expertise.

Currently, in various fields of science and technology, the sensory abilities of animals are used to study the molecular amounts of substances.

In expert studies, specially developed techniques are used that allow using biological methods to solve identification and diagnostic expert problems.

Proper biological methods, based on the study of the biological properties of objects using biological systems, are immunological methods, methods of molecular genetic or DNA analysis, and biological biosensor methods, which are increasingly used in science and forensic examination.

Thus, the methods of DNA analysis and the biosensor olfactory method are currently the only ones that allow identifying a person by his traces of biological nature: DNA analysis of cellular structures, olfactory method for studying traces of blood and sweat.

LITERATURE

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