

Modern approaches to assessment toxicity of xenobiotics

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ABSTRACT

Consumers are exposed to a diversity of chemicals in all areas of life. Air, water, soil and food are all unavoidable components of the human environment. Each of those elements influences the quality of human life, and each of them may be contaminated. We are exposed to toxic or potentially toxic compounds in many ways in our daily lives and toxicology is clearly a subject of great importance for society. This becomes apparent when we look at the types of poisons and the ways in which we are exposed to them. Indeed, the categories cover virtually all the chemicals one might expect to encounter in the environment. After consideration of this, one might well ask “Are all chemicals toxic?” Phrase as an answer: “There are no safe chemicals, only their safe use”. Xenobiotics are defined here as those compounds, both organic and inorganic, produced by human beings and introduced into the environment, as well as into the food chain at concentrations that cause undesirable effects. Xenobiotics in the food chain are monitored in two forms: by testing – the objective of which is to discover unsuitable foodstuffs in the consumer’s network, and by monitoring – to obtain objective information about environmental components contamination and to harmless health of available foodstuffs.



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1. Introduction

Xenobiotics are chemicals foreign to life, which are usually derived synthetically or from an abiotic process. The term “xenobiotic” is a combination of the Greek words “xenos”, meaning strange or foreign, and “bios”, meaning life. Thus, xenobiotic chemicals are pollutants in the biosphere, although not all pollutants are xenobiotic chemicals. The synthetic xenobiotic chemicals are often of enormous value to human society, and are usually the majority of the chemicals in such important groups of substances as petrochemicals, pesticides and plastics. Increasingly, humans are subjected to exposure to various xenobiotics. The situation is well summarized in the following quotation from Rachel Carson: “As crude a weapon as the cave man’s club, the chemical barrage has been hurled against the fabric of life.” [17], [18] Since the very beginning of the chemicals industry there has been interest in producing more efficacious products. This has led to continuing research into the prediction of the likely properties of a chemical prior to its use. Concurrently, research has been in progress which will give a better understanding of the mode of

action of chemicals. One of the most important properties of a chemical, in situations involving a biological effect or application, is how well it is absorbed or bioaccumulated. Bioaccumulation usually means the accumulation of chemical in an organism to a higher concentration than is present in an external source [4]. When a foreign organism or the macromolecule enters the body, our immune system may produce antibodies that interact with and destroy it. However, some xenobiotics do not trigger an antibody response. Instead, the body's numerous enzymes metabolize such foreign molecules and toxins to less reactive water-soluble metabolites that can be readily excreted [25].

2. Conclusion

It is evident that no single classification is applicable to the entire spectrum of toxic agents and that a combination of classification systems, or a classification based on other factors, may be needed to provide the best rating system for the special purpose. Nevertheless, the classification system that takes into consideration both the chemical and biological properties of an agent and the exposure characteristics are most likely to be used for legislative or control purposes and toxicology in general.

3. References

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