

Abstract

Cytochromes P450 are enzymes involved in many physiological processes in the body, besides the metabolism of xenobiotics also in the biosynthesis and catabolism of endogenous substances such as hormones and steroids. Cytochromes P450 that are responsible for the transformation of endogenous compounds can be affected by xenobiotics, which interfere with the secretion, metabolism, transport or elimination of endogenous hormones by various mechanisms. These substances are also referred to as endocrine disruptors and include, for example, pesticides, insecticides, certain pharmaceuticals, or compounds contained in cosmetic products. One of their mechanisms of action is to interfere with steroid hormone biosynthesis through interactions with steroidogenic enzymes. One such enzyme is cytochrome P450 19, aromatase, which catalyses the conversion of testosterone to β -estradiol in the final step of steroid hormone biosynthesis. Modulation of the activity of this enzyme by endocrine disruptors results in an imbalance of estrogen levels in the body, which can lead to impaired reproduction, osteoporosis, atherosclerosis, dementia, and the development of certain types of cancer.

In this context, the effect of commercially available perfumes on the conversion of testosterone to β -estradiol, which is catalyzed by aromatase, has been investigated. The effects on the activity of this enzyme were determined by HPLC and HPLC coupled with mass spectrometry.

The experiments showed that all perfumes tested, in a total 300-fold dilution, had an inhibitory effect on this enzyme. The highest inhibition was observed for *Montale, Intense Roses Musk* perfume, an 88% reduction in the amount of β -estradiol produced compared to the control. Based on a comparison of perfume formulations, the compounds responsible for aromatase inhibition could be components of the essential oils contained in the perfumes, such as citronellol, limonene, geraniol, citral or linalool. However, it should be considered that the observed effects also depend on the concentration of individual components in the perfume as well as their synergistic action.

Key words: cytochrome P450, aromatase, endocrine disruptor, inhibition

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