

STROID PROFILE BY ISOTOPE RATIO MASS SPECTROMETRY**Damian Gorczyca,^a D. Kwiatkowska,^a E. Turek-Lepa,^a Ewa Bulska^b**

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Precise detection and determination of forbidden substances in sportsmen's organisms is an essential element of today's system of doping prevention in sports. In order to fulfil the high expectations in respect of the sensitivity of the analytical methods as well as accuracy of the results a lot of effort is focused on the development of new analytical procedure. The need for constant improvements of the methods used for the detection and determination of forbidden doping substances is a driving force for the recent development of the isotope ratio mass spectrometry (IRMS).

The aim of this presentation is to evaluate the possibilities and feature of the gas chromatography (GC) followed by combustions (C) with IRMS detection for the determination of carbon isotopic ratio. With the aid of GC-C-IRMS it is possible to distinguish endogenous androgens (e.g. testosterone, dehydrotestosterone or dehydroepiandrosterone) from their synthetic equivalents used in doping. Thus the use of GC-C-IRMS became a breakthrough in respect of the exogenous substance in urine, which was not possible with the use of routinely used analytical procedures.

It should be therefore highlighted that the implementation of the GC-C-IRMS in anti-doping laboratories is essential in order to define the origin of anabolic-androgenic steroids. This method enables e.g. creating the individual isotopic profile of steroid for each sportsmen, which is characteristic and stable (as epidermal ridges identified in criminal investigations).