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RECENT ADVANCES
IN DOPING ANALYSIS
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M. Donike
H. Geyer
A. Gotzmann
U. Mareck-Engelke
(Editors)

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Identification and evaluation of unusual screening results in doping control

Institute of Doping Analysis and Sports Biochemistry Kreischa near Dresden (Germany)

Our screening procedures in doping control are targeted to detect the numerous substances relevant with respect to the I.O.C. doping definition. Nevertheless, we sometimes encounter primarily unknown compounds in addition.

If there are any pharmaceuticals declared on the sampling protocol as having been administered, the identification might not be difficult at all. In other cases, the detection and identification will turn out similar to the "general unknown" analysis in forensic toxicology.

At first, the identification begins from zero in such a case, and it nevertheless has to be completed beyond any reasonable doubt, but without an elaborated analytical approach.

At second, there is the problem of the final evaluation of the result, which has to be interpreted to the association requiring the analysis. Although representing no positive doping case, it might either reflect unethical behaviour of the athlete, or indicate upcoming trends in doping attempts.

We all remember the corresponding difficulties with clenbuterol a few years ago (AYOTTE 1992), whereas this agent became explicitly banned and analytically detectable in the meantime. Already in 1994, we came about an unusual finding in a gas chromatogram of screening procedure 1. A very large peak, obviously a xenobiotic (Fig. 1) turned soon out as the nootropic agent piracetam (Fig. 2).

Two urine samples of athletes of the same team showed this result, although the administration of a nootropic had not been declared on the sampling protocol (whereas the intake of vitamin C was stated).

The comparison of the (extremely high) urine concentrations with those of a control (self-administration) revealed, that the normal single dose of 800...1 200 mg or the daily dosage of 2 400 mg, respectively, had been superseded by far. (Table 1). No medical reason could be imagined for the administration of this drug - which is usually applied in geriatry - by young healthy men.

Considering the overdoses, the missing statement and the simultaneous intake by (at least) two members of the same team, we declared the results negative corresponding to the IOC doping definition, but made an alerting remark of the analytical result towards the requiring association.

This led at first to a disagreement with a consulting doping expert, who blamed us for reporting an analytically positive result, although the doping control was stated negative.

Nevertheless, we insisted in our right and felt an obligation to observe and report also such unusual findings, for to alert the responsible authorities. They should be enabled to recognize possible trends of misbehaviour in the sense of searches for substitutes of banned compounds (perhaps stimulants in this case). In this direction, we had recommended "further action" and contemplation, whether the result should be considered as unethical behaviour.

In the meantime, we have felt confirmed in our evaluation by several further cases of misuse of the same agent, which by the way also is recommended in the "underground" and open literature (GAERTNER 1994).

Similar considerations have arisen in a case, when the "multipurpose" pharmaceutical sulpiride (antidepressant, antiemetic, spasmolytic, used for the therapy of disturbed balance) had been detected and identified by LC/TS-MS (Fig. 4), also without medical indication and without declaration on the sampling protocol.

We have no knowledge about proven positive effects of nootropics in general, of piracetam in particular, or of sulpiride onto athletic performance. But the proof of any actual improvement of performance is never required by the doping definition: only the aim of enhancing the performance is essential. Whether overdoses of nootropics in young healthy athletes have to be considered as stimulants in a wider sense or not, or if the intake of not banned pharmaceuticals under special circumstances could perhaps be seen as unethical behaviour (like earlier the now expressively banned clenbuterol), has to be further observed and discussed.

If we find

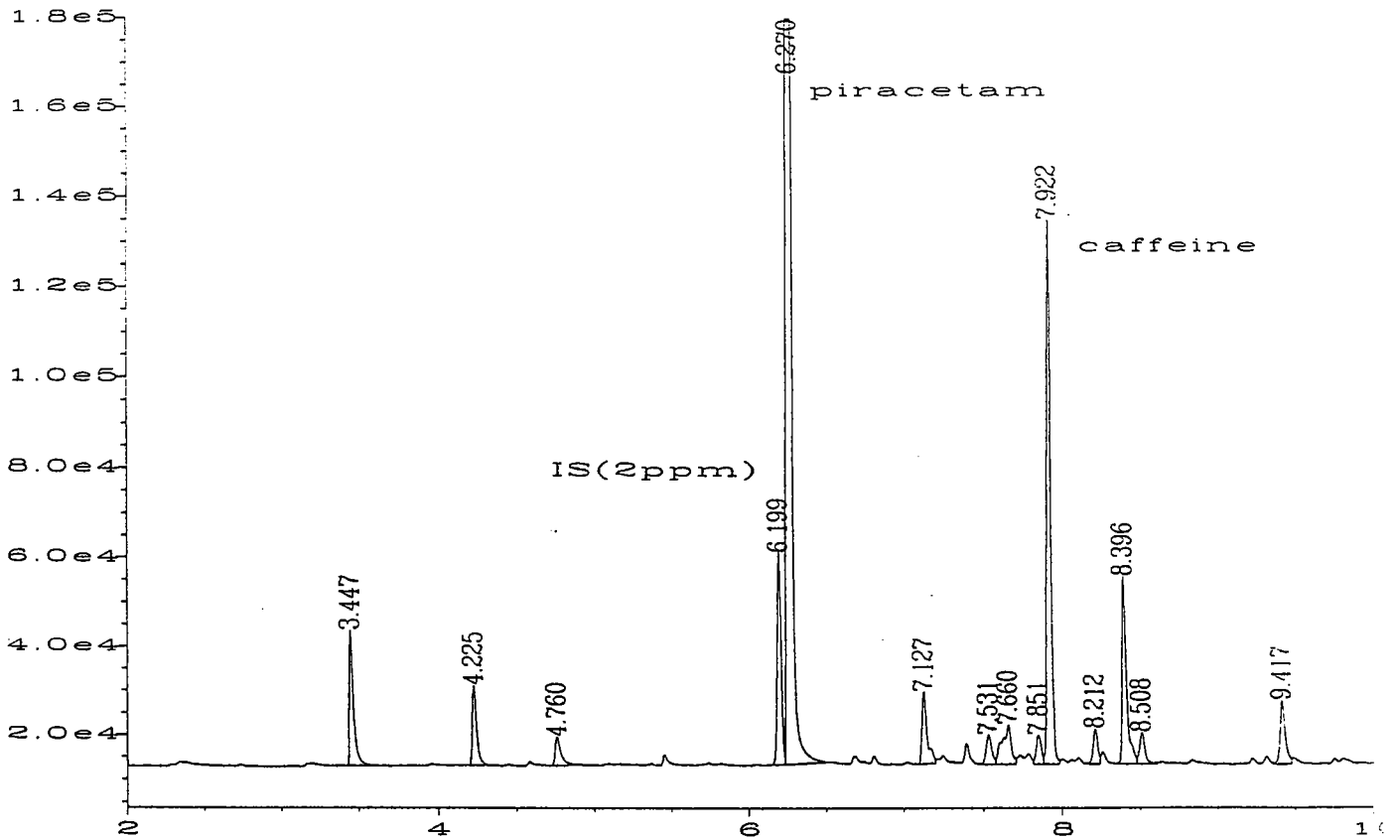
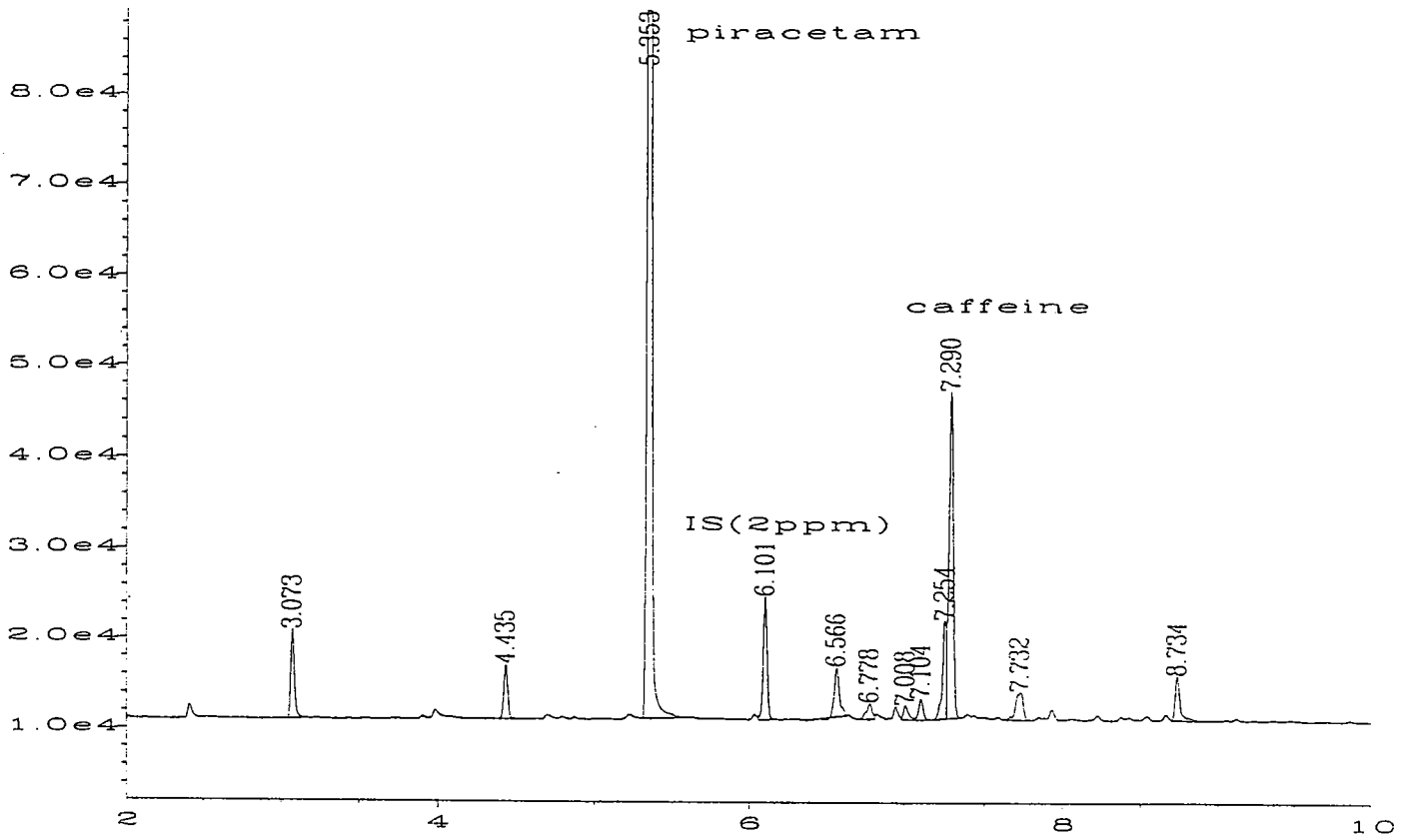
- missing indication or previous report of the administering physician
- missing declaration on the sampling protocol
possibly accompanied by overdosage,

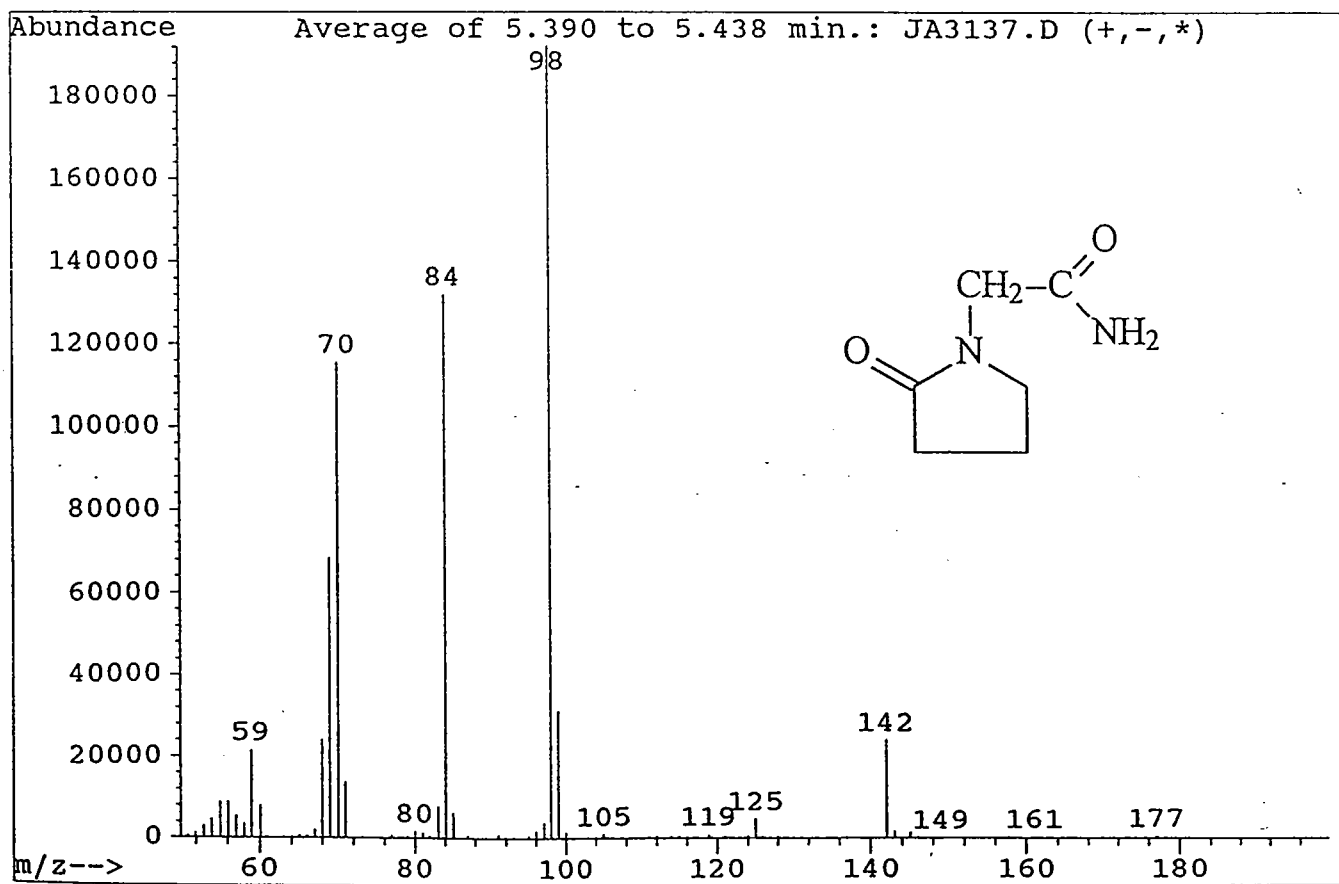
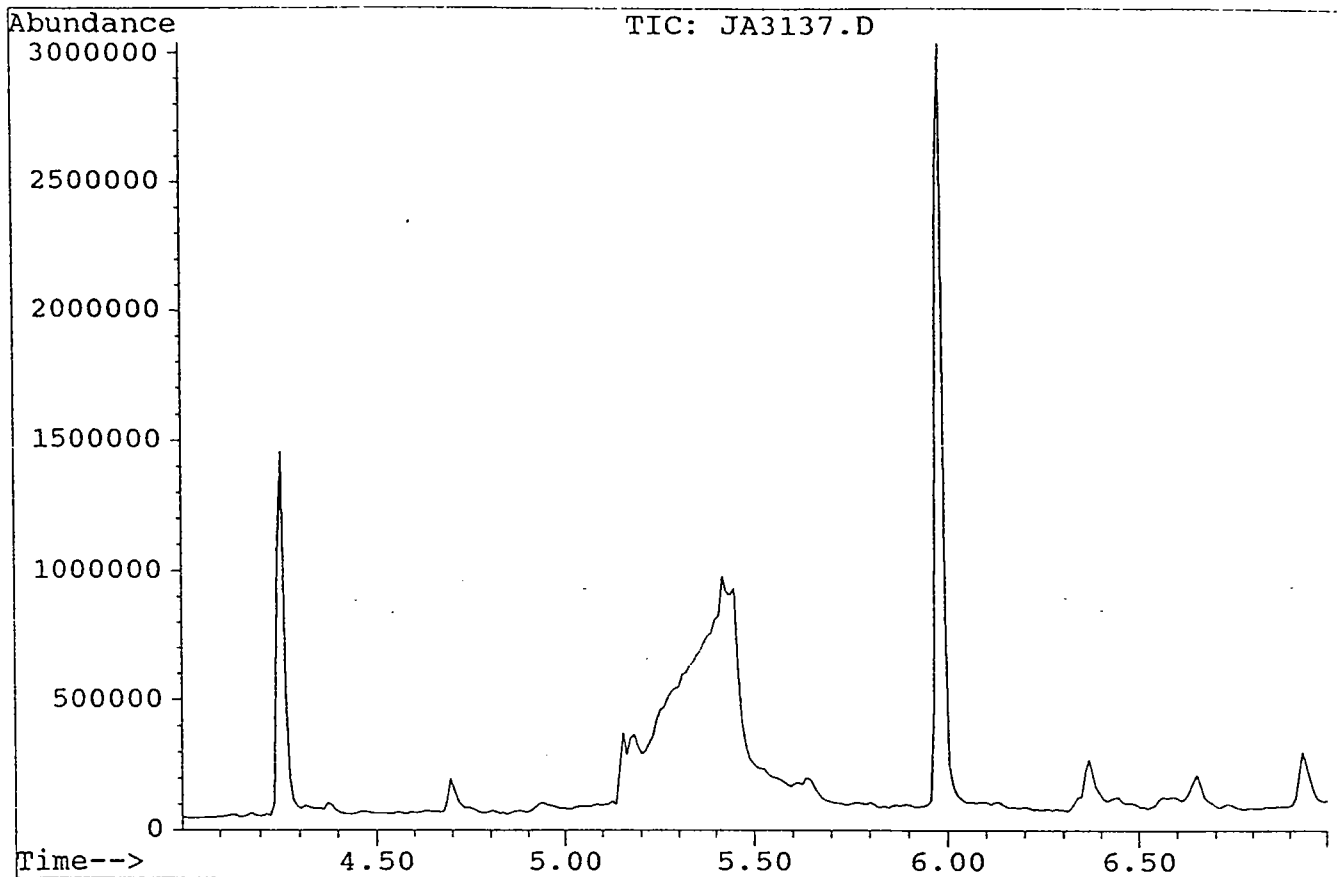
we feel obliged to

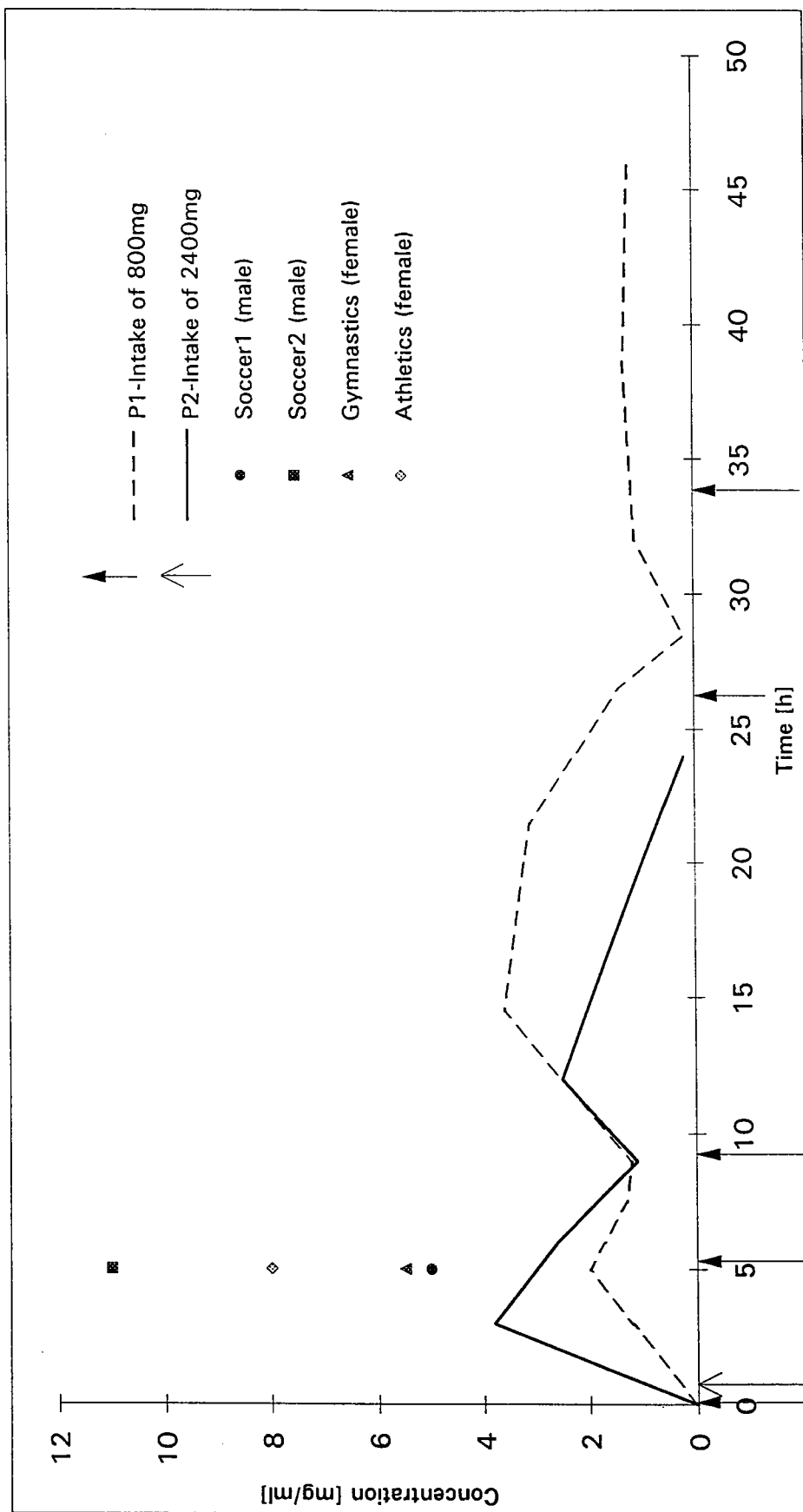
- report those findings as negative corresponding to the actual doping definition, but analytically positive,
- to explain the possible unethical "background" to the body requiring the analysis

Legends

- Fig. 1 NPD gas chromatogram of an alkaline ethereal extract of 5 ml urine with unknown (piracetam) peak (IS = diphenylamine) on two different columns (HP-5 above, OV-17 below)
- Fig. 2 TIC of an alkaline ethereal extract (IS diphenylamine at 6 min, column HP-1) with corresponding mass spectrum of the broad piracetam peak
- Fig. 3 Comparison of piracetam concentrations in urine after a single dose (2 400 mg, volunteer P 2) and after the recommended daily dosage (3 x 800 mg, volunteer P 1) with the concentrations determined in samples of controlled athletes
- Fig. 4 Extracted ion chromatogram (HPLC/TS-MS) of sulpiride from urine (ethylacetate isolation) with the corresponding thermospray mass spectrum







File : D:\TS\SULPIR45.D
Operator :
Acquired : 7 Feb 95 3:03 pm using AcqMethod SULPIRID
Instrument : Engine
Sample Name: Sulpirid_ku9-15h
Misc Info :
Vial Number: 45

