AORC SUGGESTED GUIDELINES FOR ANALYSES

2000

INTRODUCTION

In recognition of the forensic aspect of racing chemistry, the Association of Official Racing Chemists (AORC) recommends that the following procedures be used by racing chemists to accommodate a sensible broad-spectrum analysis of drugs and metabolites. These procedures allow hundreds of these substances to be extracted, separated, detected, and identified.

These guidelines may be revised from time to time as required. Because of the rapid changes and advances in the science of racing chemistry, flexibility is necessary to include new technologies, as they become available.

SAMPLE HANDLING

It is recommended that urine samples be frozen, refrigerated, or otherwise preserved immediately after collection. The samples should be maintained in this manner until delivered to the laboratory to reduce possible deterioration of any drugs present.

Blood samples should be drawn directly into vacuum tubes or syringes and refrigerated immediately after collection. It is advisable to use preservatives to prevent breakdown of drugs. Lithium citrate, sodium fluoride, boric acid, and sodium azide prevent blood esterase from causing ester deterioration. Whole blood samples should not be frozen. Refrigeration of sample tubes should be continued until time of analysis. Ideally, the use of either plasma separator or serum separator tubes for blood collection is the best way to ship blood samples when a centrifuge is available at the racetrack.

RECORDS

All samples should be accompanied by a suitable external chain of custody form. A suitable recording system (manual or computerized) in the laboratory should be used to record date of receipt, condition of samples, by whom received and from whom, types of samples, sample numbers, laboratory numbers, condition of seals, sample sizes, date analyzed. Analytical results, analyst, test methods, and other comments should also be recorded.
These data could be made available to the racing authority and they may be used to compile summary reports for the racing authority.

I. SAMPLING

A. Urine

A minimum of 50 milliliters from horses and 10 milliliters from greyhounds is recommended for screening drugs over a broad spectrum.

B. Blood

A minimum of 30 milliliters of whole blood should be collected from horses. A minimum of 7 milliliters of plasma is recommended for broad-spectrum drug screening.

C. Special Samples

1. When other samples such as sweat, spinal fluid, or feces are submitted for analysis, the quantity of specimen used for analysis depends on the equipment available, the expertise of the analyst, and pertinent information available.

2. When a post-mortem laboratory investigation is required, it is recommended that urine, blood (arterial, venous, and/or heart), stomach contents, and liver be submitted for examination.

II. ANALYTICAL PROCESS

The procedure selected by the racing chemist is influenced by the extent of drug coverage desired by the local racing authority or the requirements dictated by local rules and budgetary limitations.

A. Sample Pretreatment

Adjustment of pH for acidic, basic, and, optionally, neutral drug extractions. Urine hydrolysis should be carried out whenever necessary.

B. Extraction for drugs

One or more of these methods may be used:
1. Direct solvent extraction with suitable organic solvents.
2. Solid phase absorption followed by washing and elution with appropriate solvents.
3. Liquid/liquid extraction on a solid support.

C. Concentration of extracts

The solvent should be evaporated, preferably under nitrogen with low heat to reduce loss of volatile drugs. An acid should be added to reduce loss of basic volatile drugs.

D. Optional treatment of residues

1. Differential extraction at more than one pH may be conducted before subjecting residues to screening tests.
2. Chemical derivatization may be carried out before subjecting residues to screening or confirmation tests.

E. Detection and forensic identification of drugs in residues

1. Techniques for screening:
   a.) Thin layer chromatography (TLC)
   b.) Gas chromatography (GC)
   c.) Ultraviolet spectrophotometry (UV)
   d.) Mass spectrometry (MS)
   e.) Spectrofluorimetry
   f.) Infrared spectrophotometry (IR)
   g.) Liquid chromatography (LC)
   h.) Immunoassay

2. Most racing chemists use a combination of thin layer chromatography, liquid chromatography, gas chromatography, mass spectrometry, and immunoassay procedures.

   Special procedures for certain drugs, conjugated drugs, metabolites, and other organic materials are available for use depending upon the extent to which racing rules require them.

3. Tests used for proof of drug identity must be established as adequate by the racing chemist and must be acceptable in a court of law. They should include a combination of the tests mentioned and possess such high discrimination that a mismatch is beyond reasonable doubt. The use of mass spectrometry is recommended. In addition, the Association has been involved in development of a document entitled, "Guide for Establishing the Presence of Prohibited Substances," designed as a consultative aid for racing chemists.

III. QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance and quality control systems should be in place and operational in the laboratory. Critical elements include documented standard operating procedures, comprehensive chain of custody, documentation, and regular introduction of quality control samples of known content and concentration into the analytical system.

NOTE:

These procedure guides are designed for aid and should not be construed to preclude any other tests. No attempt has been made to cover completely the methodology available to the analyst.

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