

Development of a new polarographic validated method for analysis of anabolic steroids in dietary supplements

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Background and Aims: Anabolic steroids are synthetically produced variants of the naturally occurring male hormone testosterone that are abused in an attempt to promote muscle growth, enhance athletic or other physical performance, and improve physical appearance. Testosterone, nandrolone, stanozolol, methandienone, and boldenone are some of the most frequently abused anabolic steroids. The problems of doping in sports come from a large number of supplements may contain substances that are banned in sport (such as anabolic steroids). Many supplements contain substances that are associated with significant health hazards. Athletes consuming such supplement products may jeopardize their sporting status, and their health. The study describes development and subsequent validation of a polarography method for detection and determination of anabolic steroids in dietary supplements.

Methods: This method involves preliminary extraction of the sample followed by detection via differential pulse polarography (DPP) at a hanging mercury electrode. In this procedure different ratio of methanol-ethanol and effect of acidic condition examined for the best results. Usual interferences were examined for selectivity of the method.

Results: Various instrumental factors such as scan rate, pulse height, deposition potential, deposition time, N₂ purge time and equilibrium time were optimized. Effect of pH, percents of solvents, injection volume, and concentration of supported electrolyte was studied. Linearity was observed for anabolic steroids concentrations ranging from 2-80 ng/ml with a correlation coefficient of 0.997. LOD and LOQ were 0.3 ng/ml and 1 ng/ml respectively. Interference of Amino acids is not the issue and fat soluble vitamins(if exist)can be omitted using suitable SPE method.

Conclusions: The results indicated that the method is simple, sensitive, accurate, and reproducible and readily (confidently) can be used by authority bodies for controlling the imported sport supplements (especially which containing amino acids) to help athletes not to encounter any problem before competition.

Keywords: Anabolic steroids; Sport supplement; Doping, nandrolone