III SIMPÓSIO INTERNACIONAL EM INVESTIGAÇÕES QUÍMICO-FARMACÊUTICAS
I ENCONTRO IBERO-AMERICANO DE PLANTAS MEDICINAIS DR. MAHABIR GUPTA
I CONGRESSO LUSO-BRASILEIRO DE CIÊNCIAS E TECNOLOGIAS EM SAÚDE

Área: FMG 05

A RAPID CHROMATOGRAPHIC ANALYSIS ALLOWS DETECTION OF ADULTERANTS IN HERBAL DIETARY SUPPLEMENTS FOR ERECTILE DYSFUNCTION

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INTRODUCTION

Recently, the use of herbal dietary supplements (HDS) has gained great popularity. There has also been a growing trend toward adulteration of HDS with active pharmaceutical ingredients (APIs) or falsification, where there is absence of the declared herbs. Our research team has previously detected the presence of APIs (phosphodiesterase type 5 enzyme inhibitors) as adulterants in HDS to treat erectile dysfunction (ED) (Ulloa et al 2015; Redko et al, 2018). The aim of this study is to develop analytical approaches that allow rapid detection of these fraudulent practices in HDS marketed in Argentina.

MATERIAL AND METHODS

Commercial samples (n=10) of HDS recommended for ED have been acquired from local pharmacies, health food stores and sex shops. TLC, both robust and simple, was selected as the initial analytical technique in the search of adulterants and falsification. To detect APIs as adulterants the chromatographic system consisted in silicagel 60 F_{254} as stationary phase (SP) and CH_2Cl_2:NH_4OH:MeOH (15:3:2) [lower layer] as mobile phase (MP). Approved drug products were used as reference standards. The identity of the adulterants was confirmed by HPLC-DAD with a RP_{18} column and a gradient as MP according to Ulloa et al. (2015). To verify the presence of ginkgo and ginseng preparations declared on the label chromatographic systems indicated in pharmacopoeial monographs were used (Farmacopea Nacional Argentina, 2003). Chromatographic profiles were compared to commercial or in-house preparations.

RESULTS

None of the 10 samples analyzed showed the characteristic chromatographic profiles of ginseng or ginkgo extracts in the TLC analysis. The presence of tadalafil as a synthetic adulterant was detected in two samples by TLC and its identity confirmed by HPLC-DAD (retention time and UV-spectrum). TLC analysis also allowed the detection of an unidentified compound, a possible adulterant, in a different sample.

CONCLUSIONS

The presence of ginkgo and ginseng preparations in the HDS samples was not detected in the TLC analysis. The adulteration of HDS with synthetic compounds was confirmed in 2 out of 10 samples. TLC allows a rapid detection of either adulteration or falsification, while the identity of the adulterants requires further HPLC analysis. The determination of the identity of the suspected API through HPLC-DAD and HPLC-MS/MS is in progress.

ACKNOWLEDGMENTS

UBACyT 20020190200212BA.

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