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Preliminary studies on detection of corticosteroids in adulterated herbal drugs

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Introduction

The use of glucocorticosteroids is quite prevalent in India as magic drugs for treating various ailments. Athlete may opt for the use of herbal drugs over the allopathic drugs to recover from an injured muscle considering them to be safe. But the manufactures of herbal drugs sometimes spike their preparations with glucocorticosteroids for fast recovery of patients which may lead to a positive dope test. [(1-3)] The aim of this study was to screen unlabelled drug preparations for the contamination of banned glucocorticosteroids obtained from a hospital wherein, the patients were using them for cure of diseases like asthma, arthritis, eczema etc.

Materials and methods:

Sixty herbal drug preparations (twenty seven tablets and thirty three capsules) were obtained from Department of Pharmacology, All India Institute of Medical Sciences (AIIMS), New Delhi, India. These drugs were found to be negative by a qualitative chemical test method employed in AIIMS. These drugs were sent to our laboratory wherein, liquid chromatography tandem mass spectrometry (LC-MS/MS) was used for testing of sixteen banned corticosteroids. [(3)] The suspicious preparations were further confirmed for the presence of specific corticosteroid.

Result and Discussion:

Out of the sixty herbal drugs analyzed, three drugs showed the presence of banned glucocorticosteroid betamethasone/dexamethasone. The constituents of the three adulterated capsules declared on the label are listed in Table 1a-c. These suspicious herbal preparations

were then confirmed for betamethasone/dexamethasone on LC-MS/MS. The result shows that the herbal drugs are contaminated with Dexamethasone. (Figure 1a-c).The five point calibration curve drawn in the range from 15-200 ng/ml for certified reference material of dexamethasone was found to be linear. The quantitative value calculated for dexamethasone in these drugs was found to be 8840, 4220 and 634 ng/mg respectively. Further work is in progress to perform the excretion study of these adulterated drugs to study the excretion profile of dexamethasone which if consumed for longer duration may lead to an adverse analytical finding. As per WADA's strict liability rule, an athlete is responsible for substances found in his/her body fluids irrespective of their origin. Hence, it is necessary to enlighten the athletes that the adulterated herbal drugs may lead to a positive dope test. This work may advise the Indian athletes, coaches and doctors to use these drugs more judiciously than using them as a magic drug for fast recovery.

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Table-1a-c: Composition of positive herbal drugs as mentioned on the label

a) Capsule-1 (Health Sun)	
Embilica Officinals	Crocus Sativus
Terminallia Chebulla	Withania Somnifra
Terminallia Ballirica	Lpomoea Biaba
Withania Somnifera	Anacyclus Aromaticus
Myristica Fragrans	Embellia Ribes
Myristica Officinals	Terminalia Arjuna
Plaumbago Zeylanica	Orchis Latifolia
Zingeber Officinals	Moti Bhasm
Feeniculum Vulgare	Loh Bhasm
Solanaceae	Praval Pistti
Aspheltum Adsceodens	Shliajeet
Ecliptaprostat	Bang Bhasm
Andrographis Paniculate	Madhur Bhasm
Mucunna Pruiens	Abharak Bhasm
Tinosphora Cardifolia	Makardwaj

b) Capsule-2 (Swastha vardhak)	
Kasni	Amber
Kanti kari	Kesar
Arjun	Javitri
Jhaun	Jayphal
Mandur bhasm	Asgandh
Selajeet	Loh bhams
Saohed musli	Chiryta
Bhring raj	Trifla
Kal megh	Bidhara
Abrak bhams	Akara kara
Prabal Pisti	Bang bhasm
Majaeth	Jeera
Konch beej	Sonth
Salam	Sounf
Geloy sat	-

c) Capsule-3 (Paurush Jiwan)	
Eclipta alba Hassk	Asparagus racemosus
Terminalia- Arjuna	Lohbhasma
Glycyrrihiza glabra	Crocus sativus
Syzygium aromaticum	Emblica officinalis
Piper longum	Solanum-nnigrum
Zingiber officinalis	Tamarix trroupii hale
Shilajeet	Asparagus adscendens
Plumbago zeylanica	Mucuna prurita
Cuminum-cyminum	Bangbhasma
Terminalia chebula	Withania somnifera

Figure-1a Dexamethasone in Herbal Drug 1 (Health Sun)

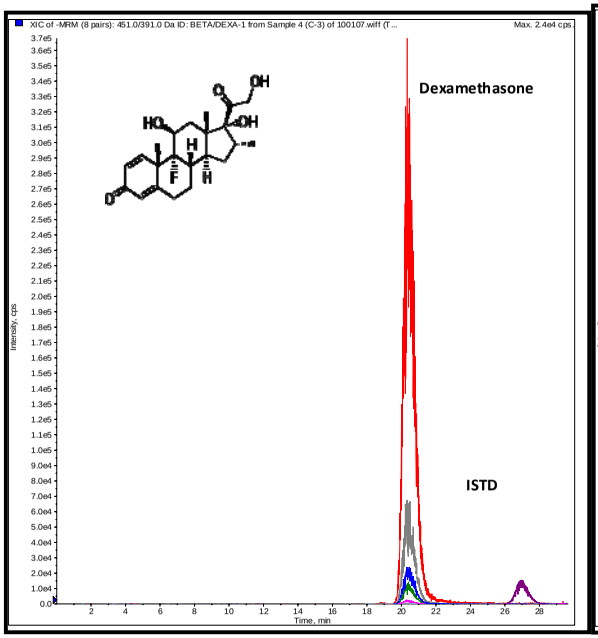

Figure-1b Dexamethasone in Herbal Drug 2(Swastha vardhak)

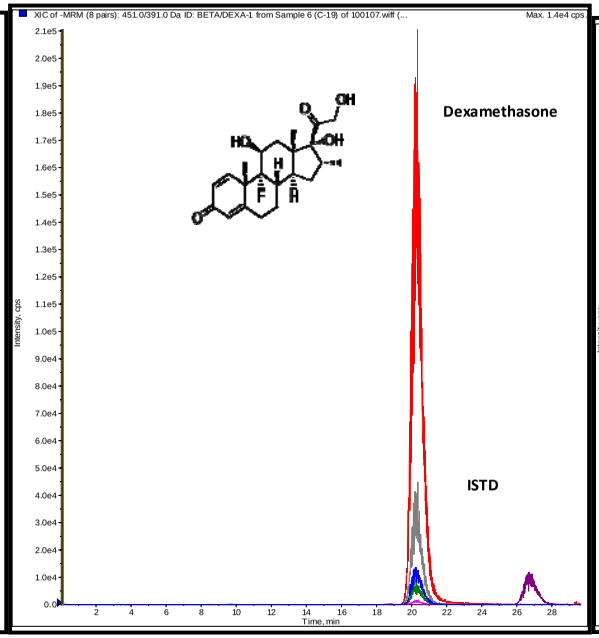

Figure-1b Dexamethasone in Herbal Drug 3 (Paurush Jiwan)