Ephedra spp.

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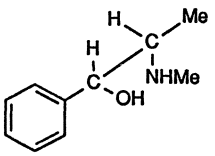
62.1 Introduction

Mahuang, Herba Ephedrae, is the dry haulms of *Ephedra sinica* Stapf, *E. intermedia* Schrenk et C.A. Mey. or *E. equisetina* Bge. (Ephedraceae). The green haulms are harvested in the fall and dried. The *Ephedra* herb is one of the oldest and most widely used traditional Chinese medicines and is used as a diaphoretic, antiasthmatic, and diuretic. It is officially listed in the Chinese Pharmacopoeia.

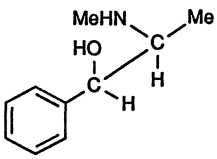
Mahuanggen, Radix Ephedrae, is the dry root of *E. sinica* Stapf or *E. intermedia* collected in the fall. It is also officially listed in the Chinese Pharmacopoeia and used as an antisudorific.

62.2 Chemical Constituents

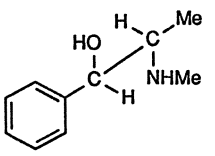
The major constituent in *Ephedra* species is the alkaloid ephedrine, which was isolated about 100 years ago [1] and was structurally determined as α-[1-(methylamino)-ethyl]-benzenemethanol [2–6]. Because this compound possesses two asymmetrical carbon atoms, two diastereomeric series are possible. One of them was designated as ephedrine, the other as pseudoephedrine. The configuration of ephedrine and pseudoephedrine were formerly the subject of a number of studies [7–9] which demonstrated the absolute configuration of (−)-ephedrine (*62-1*) and (+)-ephedrine (*62-2*) as well as of (+)-pseudoephedrine (*62-3*) and (−)-pseudoephedrine (*62-4*) [10–13]. Ephedrine shows a 1(R),2(S)(erythro) configuration, whereas pseudoephedrine has a 1(S),2(S)(threo) configuration.



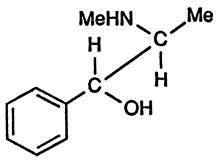
(−)-Ephedrine (*62-1*)



(+)-Ephedrine (*62-2*)



(+)-Pseudoephedrine (*62-3*)



(−)-Pseudoephedrine (*62-4*)