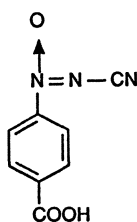


### 32.1 Introduction

Mabo, *Lasiosphaera* seu *Calvatia*, is the dry fruiting body of *Calvatia gigantea* (Batsch ex Pers.) Lloyd, *C. lilacina* (Mont. et Berk.) Lloyd (Lycoperdaceae) or of *Lasiosphaera fenzlii* Reich., from the same family, collected in summer or fall. It is listed officially in the Chinese Pharmacopoeia and is used in treatment of laryngitis, cough and hoarseness and as a local hemostatic.

### 32.2 Chemical Constituents

From the culture broth of *C. lilacina* calvatic acid (32-1), an antibacterial and antifungal principle was isolated. Its structure was determined by spectroscopic methods as 4-(cyanoazoxy)-benzoic acid [1].



Calvatic acid (32-1)

From 15.9 liters of culture filtrate 30 mg calvatic acid was isolated [2]. The total synthesis of calvatic acid, carried out in four steps starting from *p*-hydrazinobenzoic acid and with a total yield of approximately 30%, is illustrated in Fig. 32-1 [2].

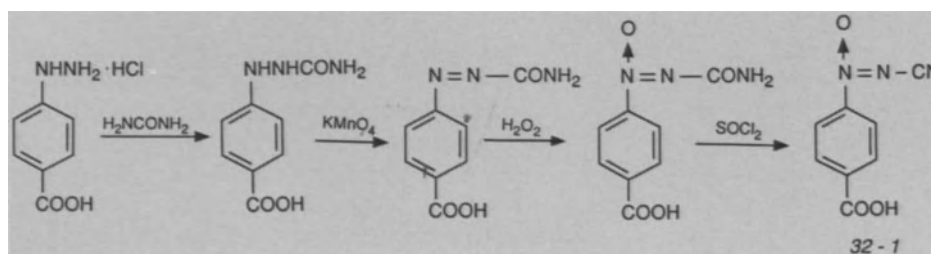


Fig. 32.1. Total synthesis of calvatic acid