Chapter Seven

BIOLOGICALLY ACTIVE COMPOUNDS FROM CHILEAN MEDICINAL PLANTS

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INTRODUCTION

The geographical isolation of Chile provided by the Andean range, the Pacific Ocean, and the Atacama desert, has produced a unique flora of ca. 5000 species, with a high degree of endemism (ca. 50%). The land has been inhabited for over 20,000 years by peoples who have developed rich traditions in the medicinal use of native plants, continuing to a large extent up to the present.

The extant traditional pharmacopoeia consists of nearly 300 native species, of which only some 90 have been studied chemically. These chemical studies have been, for the most part, limited in scope and have neither been guided by
pharmacological bioassays, nor have isolated compounds been tested in pharma­
cologically relevant systems. As a consequence, in most cases the traditional use
of the plant cannot be associated with the presence of any given compound.

This paper presents the diversity of Chilean medicinal plants and reviews
the present status of their chemistry and bioactivity.

THE MEDICINAL FLORA OF CHILE

The Flora of Chile

The continental territory of the Republic of Chile is a long and thin strip of
land set between the Andes and the Pacific Ocean stretching over 38° of latitude (18°
to 56°S). Within this area, ten different vegetational zones may be distinguished,1
ranging from one of the driest deserts on earth, the Atacama desert, to the cool
temperate rain forests in the South of the country with average annual rainfalls in
excess of 4.5 m. The geographical isolation of the country as well as the variety of
vegetational zones it contains has allowed the development of a land flora compris­
ing 184 families (18 Pteridophyta, 4 Gymnospermae, 132 Dicotyledoneae and 30
Monocotyledoneae) with a total of 5082 species, including 5012 native species of
which 2561 are endemic.2 The degree of endemism (51%) is higher than that
expected from surface area.3 The diversity of the Chilean flora is also exceptional,
with 496 monotypic genera (Fig. 1). Major families and genera represented are
shown in Fig. 1, together with their respective degrees of endemism.

The Peoples of Chile

When the Spanish “Adelantado” Diego de Almagro set foot on Chile in
1536 to start the conquest of the land in the name of the King of Spain, he found
a mosaic of peoples inhabiting the territory, from the high Andean plateau, through
the narrow valleys of the semi-arid northern region to the long central valley of
Central Chile. Many of these peoples had originally come into the area more than
20,000 years before.4 The region north of parallel 24°S was inhabited by Aymara
who adopted the traditions of the late Tiwanaku empire centered around Lake
Titicaca, and subsequently incorporated the culture of the Inca invaders of the late
fifteenth century.5 They occupied areas mainly in the high plateau in the north­
eastern corner of Chile contiguous to the Titicaca periphery and short valleys
descending from it to the Pacific Ocean. They maintained active communications
with other, largely Aymara people, inhabiting areas in the high plateau which are
now part of Argentina, Bolivia and Perú.

South of this area, from the Salado river (27°S) to the Choapa valley
(32°S), the territory, consisting of rich valleys separated by arid mountain ranges,
was occupied by Diaguita. Their culture was derived from the Animas complex,6
with elements common to Diaguita and other peoples from the eastern side of the