

## ABSTRACT

The acetylcholinesterase inhibitors are the most frequently drugs used in the treatment of Alzheimer's disease, an illness which affects more than ten million people in the world today. Finding a proper treatment is one of the most important challenges in the field of geriatrics, not only because of the increasing number of patients, but also due to the social and sanitary implications associated with this disease.

In this work, the acetylcholinesterase inhibitory activity was preliminary tested employing a bioautographic method. Biologic activity assays were performed on extracts of different polarity and essential oils obtained from 21 species belonging to Chenopodiaceae, Anacardiaceae, Asteraceae, Solanaceae, Brassicaceae, Frankeniaceae, Boraginaceae, Plumbaginaceae, Fabaceae, and Aizoaceae families growing in Bahía Blanca's region.

Considering the results obtained during the screening, we decided to study the species *Chuquiraga erinacea* D. Donn. subsp. *erinacea*, an endemic species belonging to Asteraceae family. A bioassay guided fractionation was performed on the extract in order to isolate the active components.

These compounds were finally identified as mono-, di- and tri-hydroxylated pentacyclic triterpenes by  $^1\text{H}$  and  $^{13}\text{C}$  Nuclear Magnetic Resonance, 1D and 2D, and Mass Spectrometry. The enzymatic inhibitory activity of the purified compounds was tested *in vitro* using a quantitative spectrophotometric method. In order to improve the pharmacologic characteristics of the natural compounds, sulfated and phosphated derivatives were

prepared from the isolated triterpenes. The sulfated derivatives were more soluble and active than the natural compounds.

The inhibitory activity of essential oils from *Schinus areira* L. (Anacardiaceae), *Schinus longifolia* (Lindl.) Speg. (Anacardiaceae) and *Diplotaxis tenuifolia* L. D.C. (Brassicaceae) was detected during the preliminary screening. The essential oil from *S. longifolia* showed inhibitory activity at lower concentrations than other oils tested. Comparing the chemical compositions of the oils, *S. longifolia* possesses a higher percentage of sesquiterpenes. Although several references of acetylcholinesterase inhibitory activity of monoterpenes have been previously reported, up to now the activities of only a few sesquiterpenes were studied. The results obtained from *D. tenuifolia* essential oil, which mainly consist of 5-methylthiopentanenitrile, are the first report on acetylcholinesterase inhibitory activity of this kind of compounds.