Ecuadorian Medicinal Plants

Subjects: Chemistry, Medicinal

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The use of plants as therapeutic agents is part of the traditional medicine that is practiced by many indigenous communities in Ecuador.

medicinal plants Ecuador traditional uses

1. Introduction

The geographic location of Ecuador, together with its geological features, makes the country's biodiversity one of the richest in the world. Ecuador is, indeed, considered among the 17 megadiverse countries, accounting for about 10% of the entire world plant species, and every year new plants are discovered and added to the long list of the species already known. This fact makes Ecuador an invaluable source of potentially new natural products of biological and pharmaceutical interest, such as carnosol, tiliroside [1], and dehydroleucodine (DL) [2]. Moreover, most plants are considered to be medicinal, where they are a fundamental part of the health systems of several Ecuadorian ethnic groups [3]. The knowledge of traditional healer practitioners has been maintained over hundreds or even thousands of years [4]. Therefore, herbal remedies have gained acceptance thanks to the apparent efficacy and safety of plants over the centuries [5]. As a result, several doctors, especially in government intercultural health districts, practice integrated forms of modern and traditional medicine nowadays.

Scientific evidence of the therapeutic efficacy and absence of toxicity in Ecuadorian medicinal plants and their products has started to be collected only in the last few decades by the researchers of several groups in different Ecuadorian Universities. This scientific activity has increased dramatically in recent years, thanks to the support of the Ecuadorian people and government authorities, who consider the sustainable use of biodiversity resources a possible source of economic wealth.

Many of the scientific articles mentioned in this review refer to studies that were carried out on plants and traditional preparations from southern Ecuador, especially from the province of Loja (**Figure 1**), which has a long tradition in exporting medicinal plants of great importance for human health, such as quina (*Cinchona* spp.) and condurango (*Marsdenia condurango* Rchb.f.).

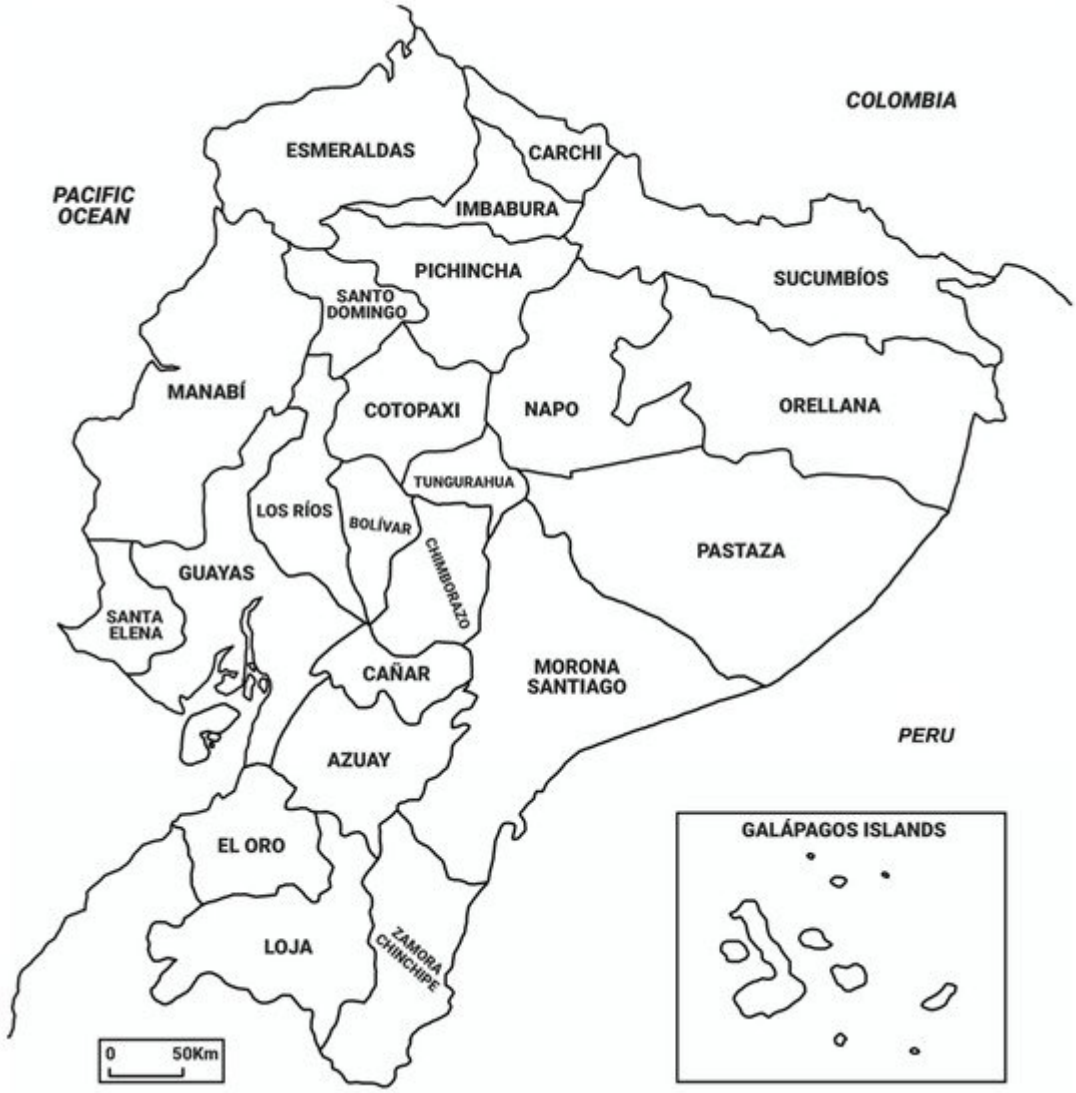

Figure 1. Provinces of Ecuador.

2. Phytochemical and Biological Activity Data

For each species, the vernacular name and some botanical information, when available, are indicated, together with the traditional use and the phytochemical and the biological activity data when available. The structures of some characteristic compounds are reported in **Figure 2**, **Figure 3**, **Figure 4**, **Figure 5**, **Figure 6**, **Figure 7**, **Figure 8**, **Figure 9**, **Figure 10**, **Figure 11**, **Figure 12** and **Figure 13**.

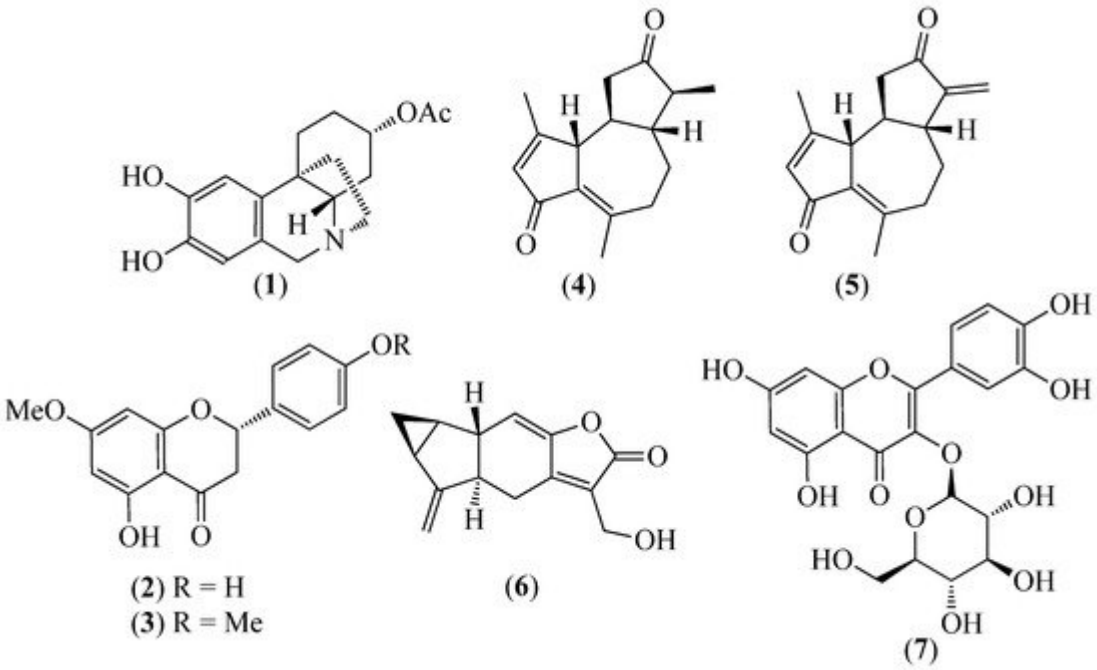

Figure 2. Structures of compounds **1** from *Pseudodranassa* spp., **2** and **3** from *Baccharis obtusifolia*, **4** and **5** from *Gynoxis verrucosa*, **6** from *Hedyosmum racemosum*, and **7** from *Clusia latipes*.

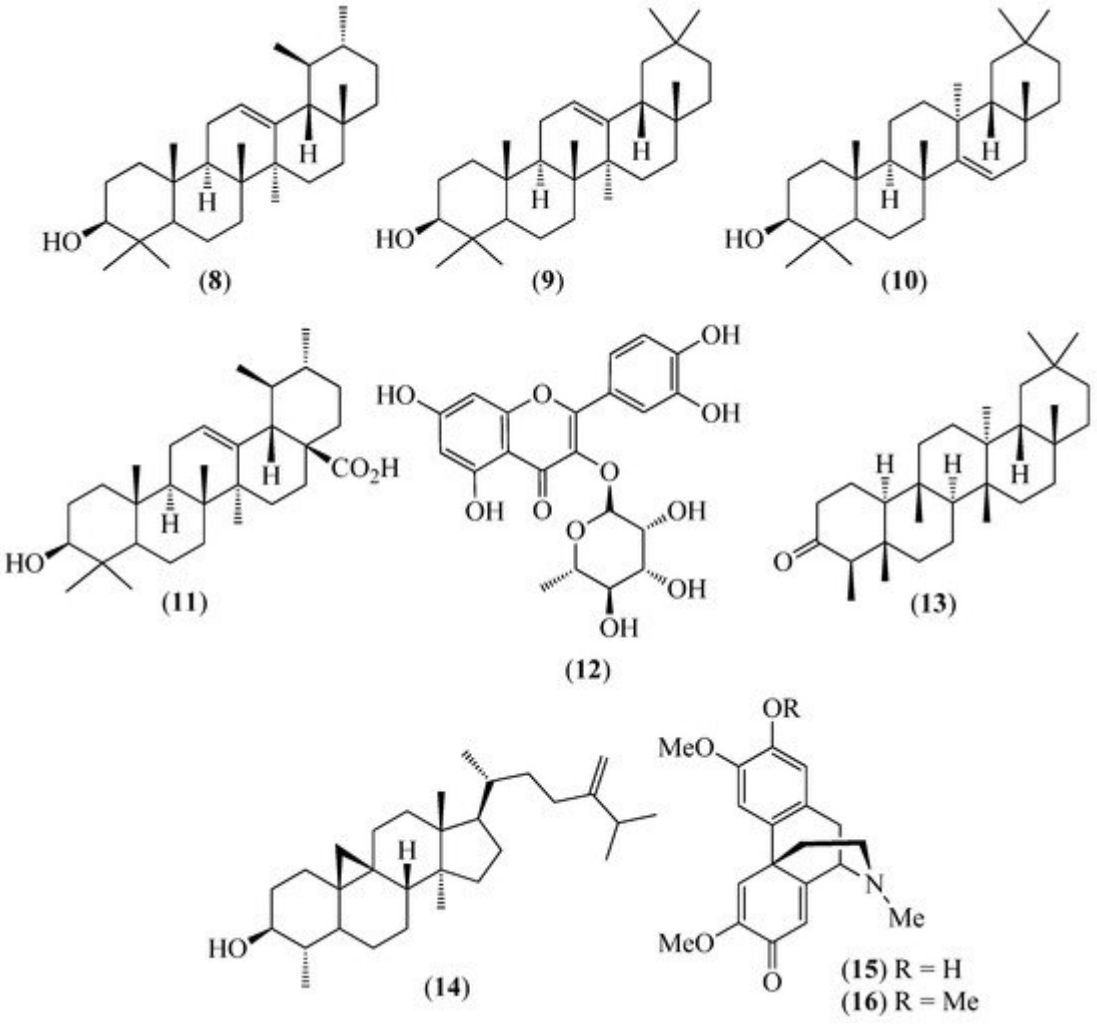

Figure 3. Structures of compounds **8**–**12** from *Bejaria resinosa* and **13**–**16** from *Croton ferrugineus*.

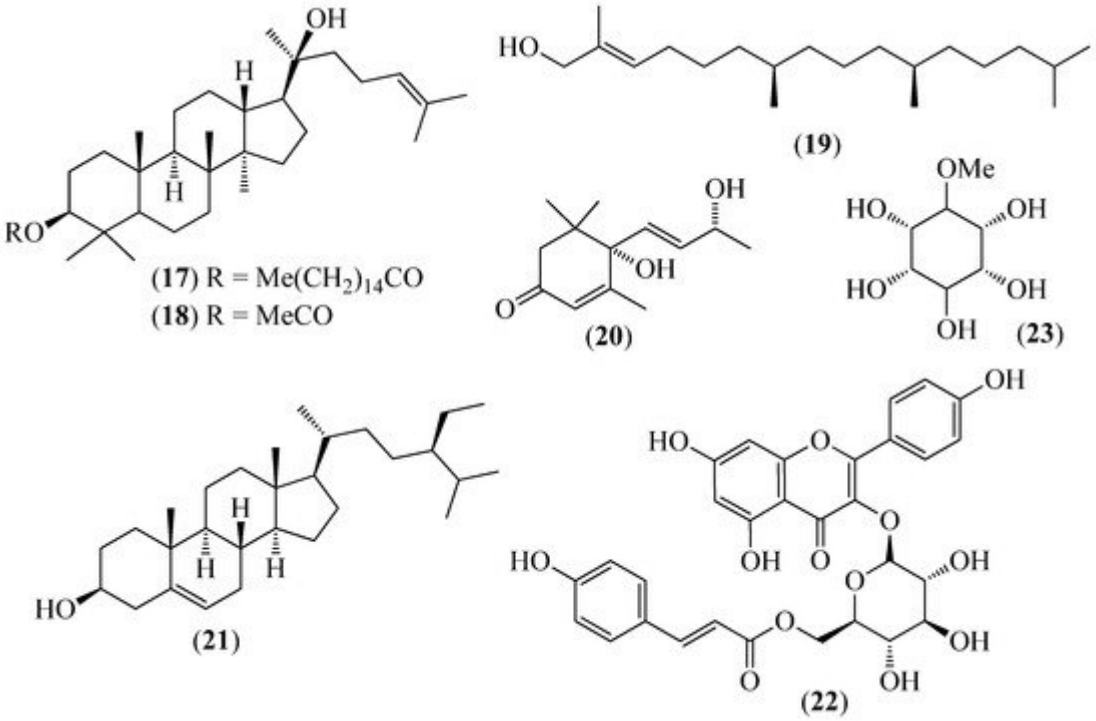

Figure 4. Structures of *compounds* **17**–**23** from *Croton thurifer*.

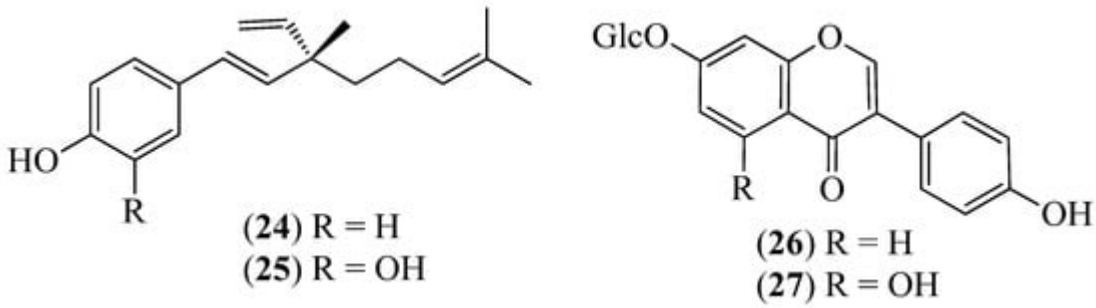

Figure 5. Structures of compounds **24**–**27** from *Otholobium mexicanum*.

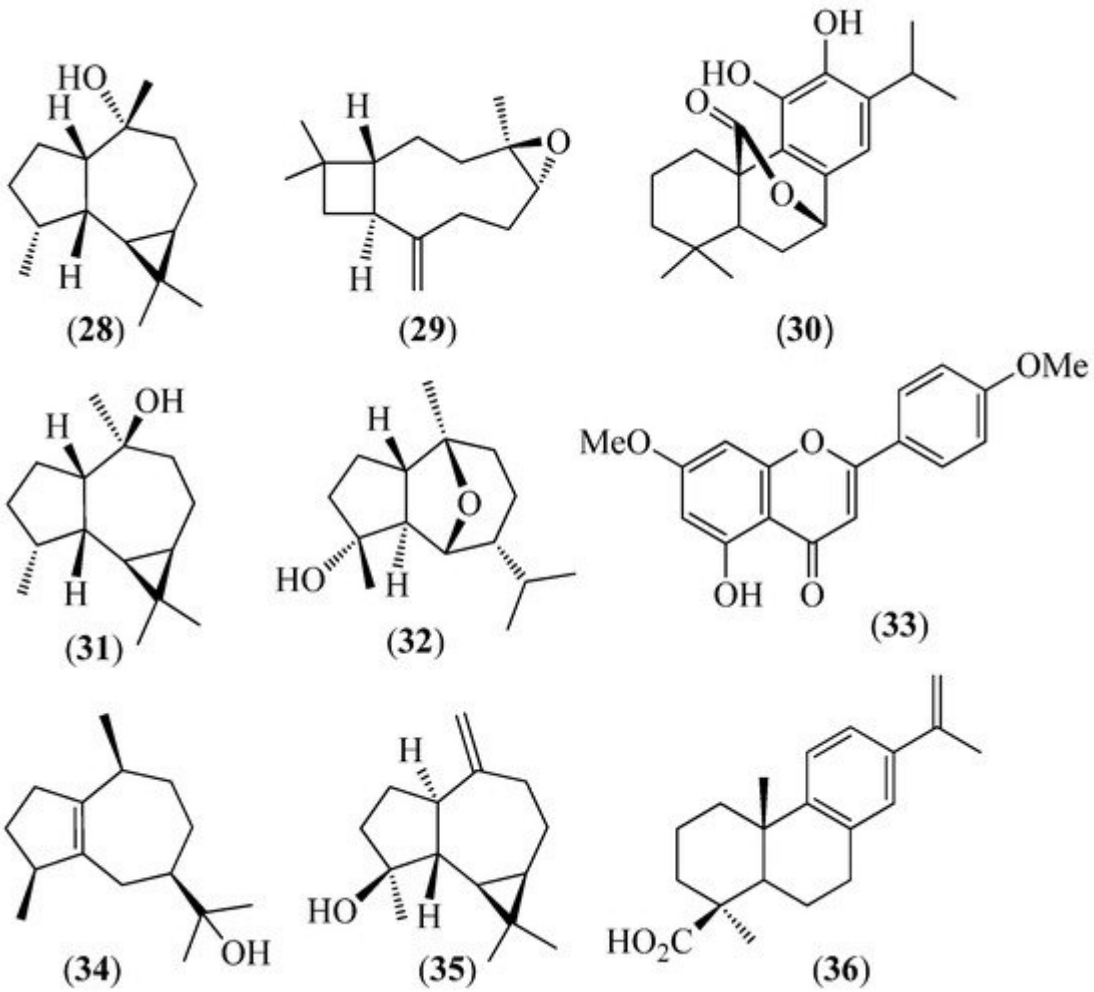

Figure 6. Structures of compounds **28** and **29** from *Lepechinia heteromorpha*; **30**–**33** from *L. mutica*; **28**–**30** and **34** from *L. paniculata*; and **33**, **35**, and **36** from *L. radula*.

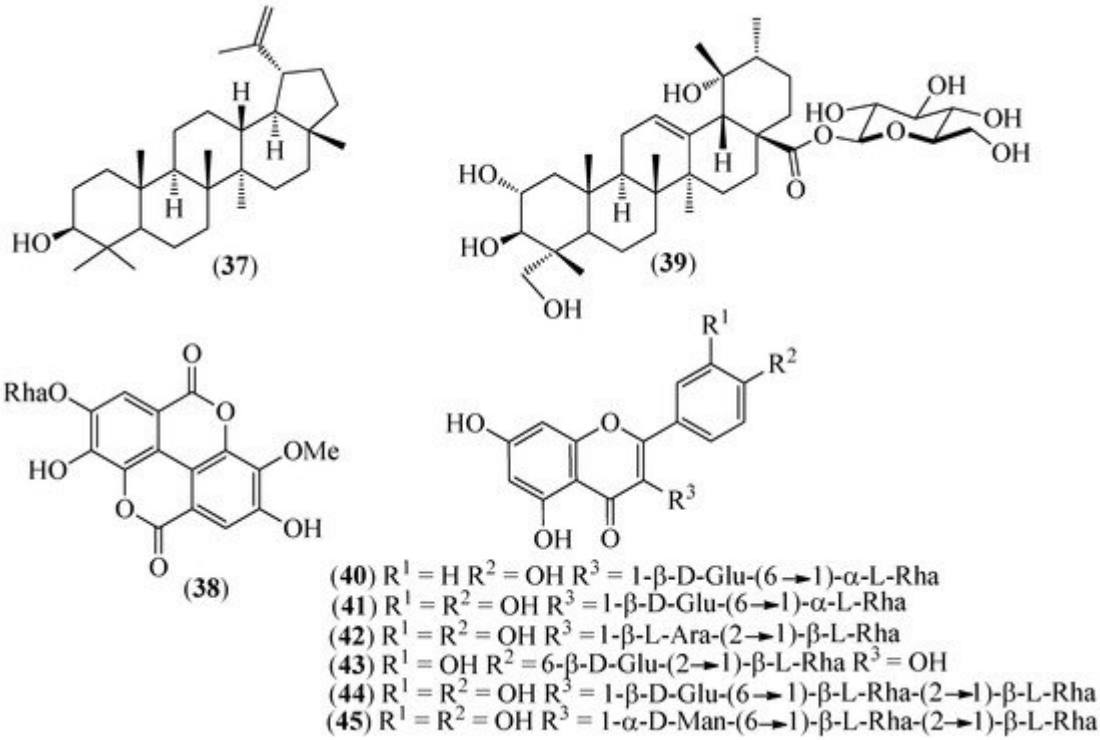

Figure 7. Structures of compounds **37**–**39** from *Grias neubertii* and **40**–**45** from *Gaiadendron punctatum*.

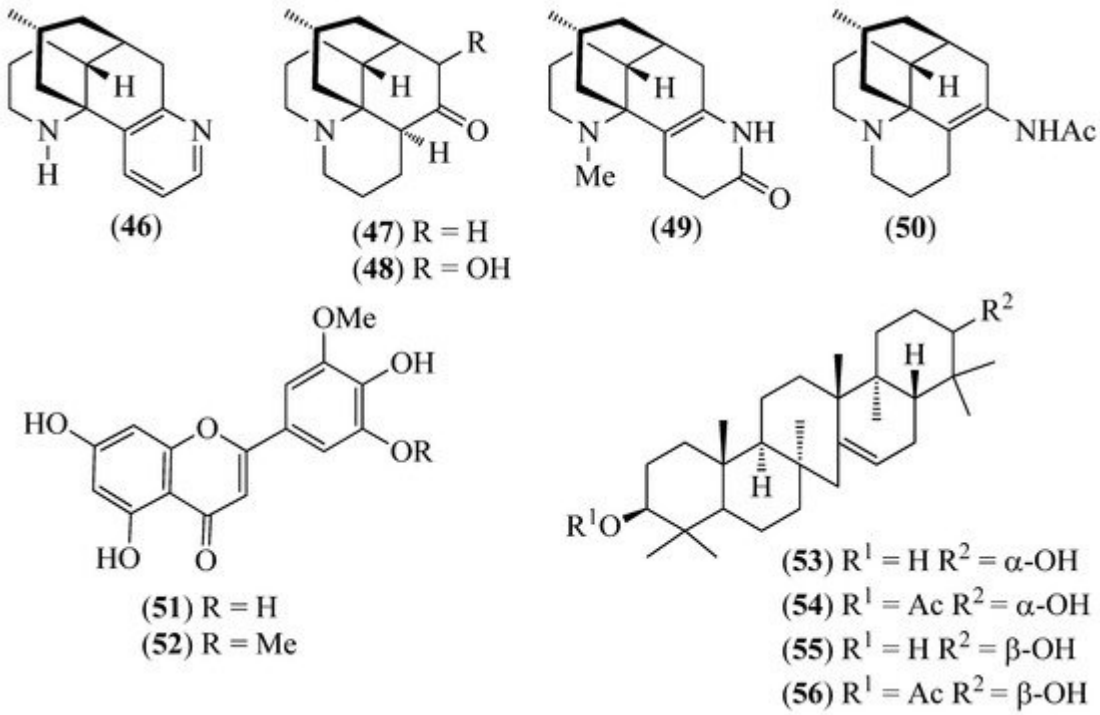

Figure 8. Structures of compounds **46**–**50** from *Huperzia compacta*, *H. columnaris*, and *H. tetragona*; **51** and **52** from *H. brevifolia* and *H. espinosana*; and **53**–**56** from *H. crassa*.

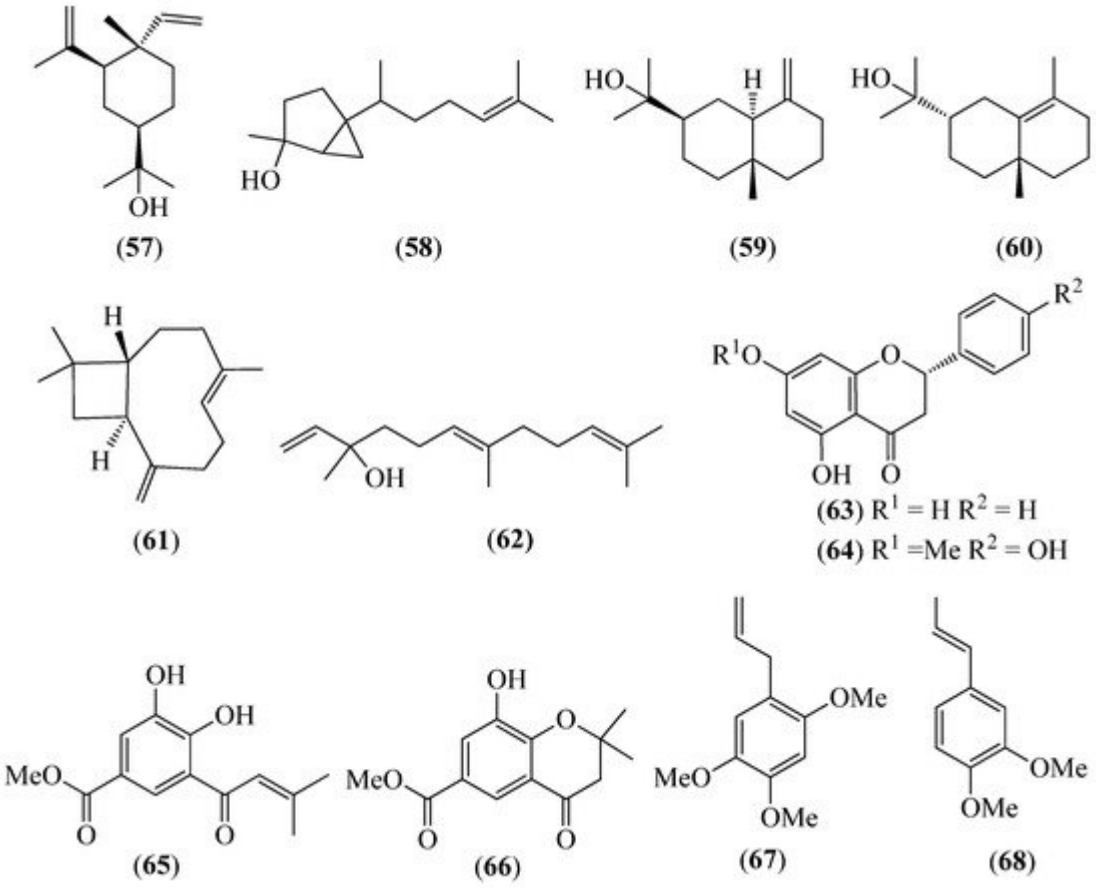

Figure 9. Structures of compounds **57**–**60** from *Piper barbatum*; **61** and **62** from *P. coruscans*; **62** and **63** from *P. ecuadorense*; **64**–**66** from *Piper lanceifolium*; and **61**, **62**, **67** and **68** from *P. pubinervulum*.

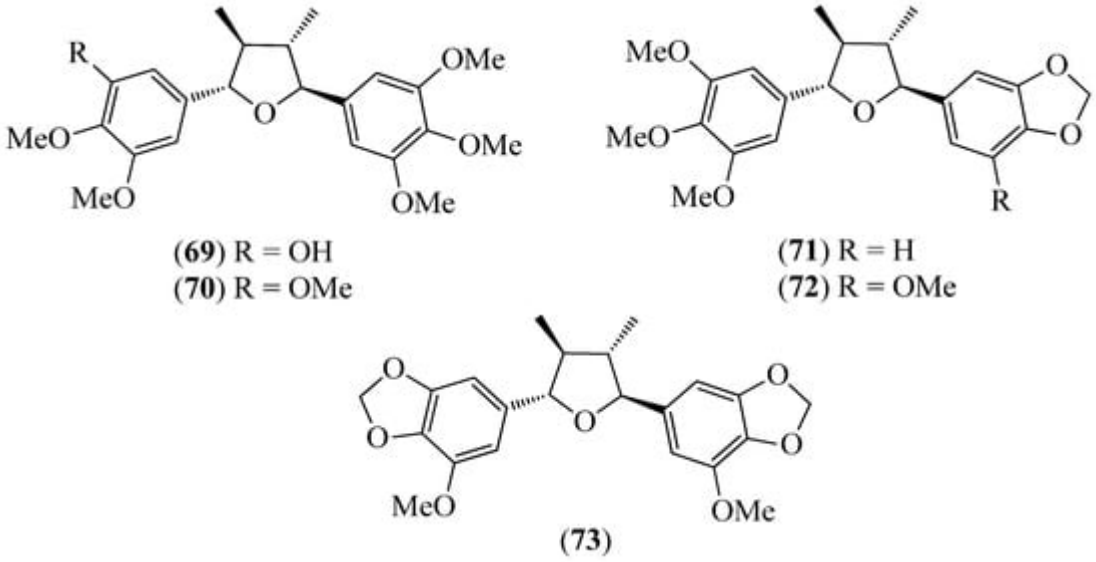

Figure 10. Structures of compounds **69**–**73** from *Piper subscutatum*.

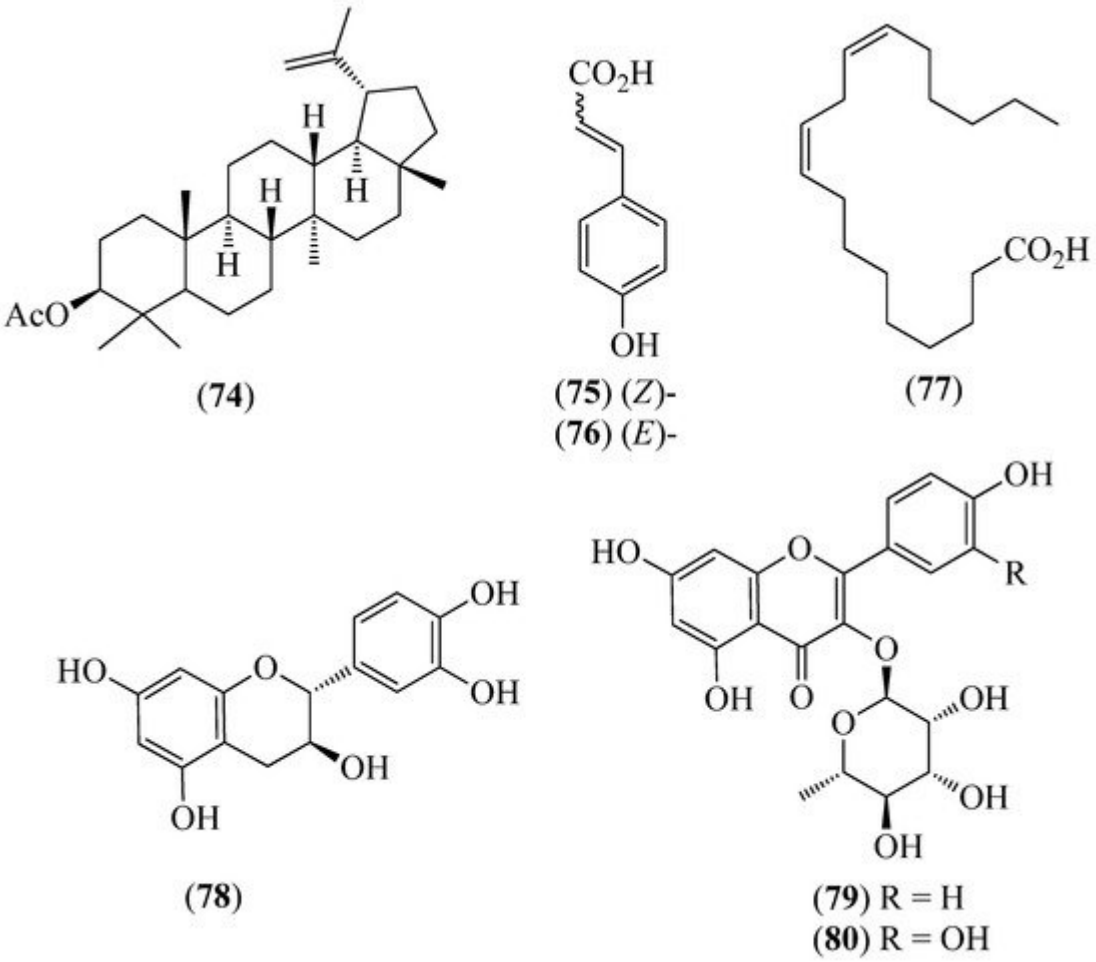

Figure 11. Structures of compounds **74**–**80** from *Muehlenbeckia tamnifolia*.

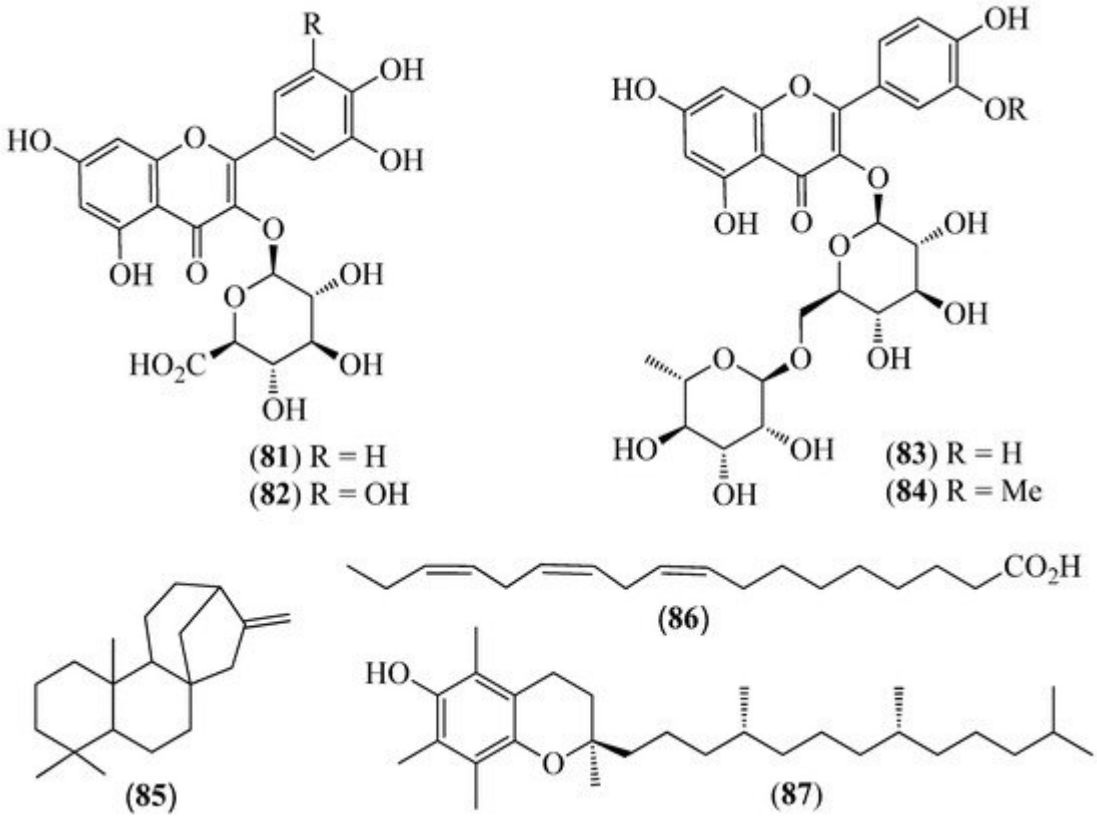

Figure 12. Structures of compounds **81**–**84** from *Oreocallis grandiflora* and **85**–**87** from *Roupala montana*.

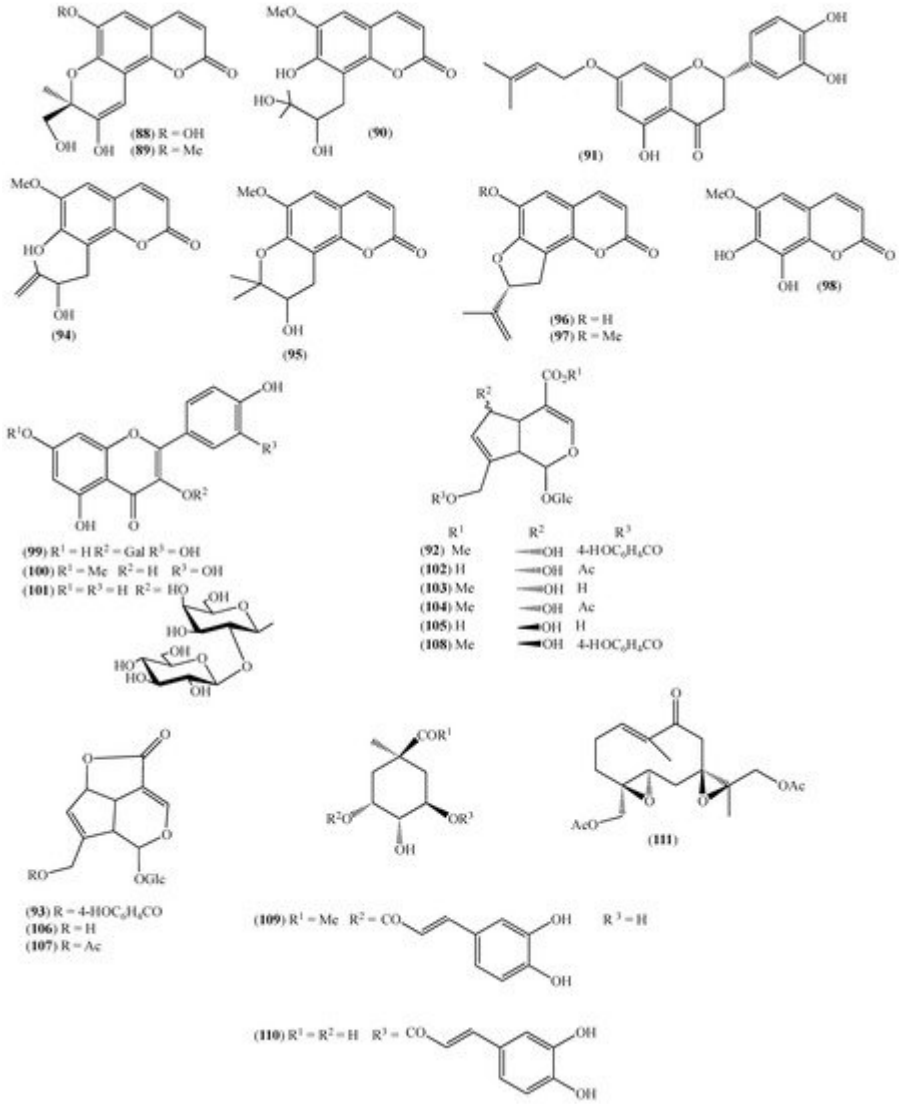

Figure 13. Structures of compounds **88**–**110** from *Arcytophyllum thymifolium* and **111** from *Siparuna echinata*.

References

1. Ramírez, J.; Suarez, A.I.; Bec, N.; Armijos, C.; Gilardoni, G.; Larroque, C.; Vidari, G. Carnosol from Lepechinia mutica and tiliroside from Vallea stipularis: Two promising inhibitors of BuChE. Rev. Bras. Farm. 2018, 28, 559–563.
2. Ordóñez, P.E.; Quave, C.L.; Reynolds, W.F.; Varughese, K.I.; Berry, B.; Breen, P.J.; Malagón, O.; Vidari, G.; Smeltzer, M.S.; Compadre, C.M. Corrigendum to Sesquiterpene lactones from Gynoxys verrucosa and their anti-MRSA activity. J. Ethnopharmacol. 2016, 186, 392.
3. Malagón, O.; Ramírez, J.; Andrade, J.M.; Morocho, V.; Armijos, C.; Gilardoni, G. Phytochemistry and ethnopharmacology of the ecuadorian flora. A review. Nat. Prod. Commun. 2016, 11, 297–314.

4. Armijos, C.; Gilardoni, G.; Amay, L.; Lozano, A.; Bracco, F.; Ramírez, J.; Bec, N.; Larroque, C.; Finzi, P.V.; Vidari, G. Phytochemical and ethnomedicinal study of Huperzia species used in the traditional medicine of Saraguros in Southern Ecuador; AChE and MAO inhibitory activity. J. Ethnopharmacol. 2016, 193, 546–554.
5. WHO. Traditional medicine. In Proceedings of the Fifty-Sixth World Health Assembly, Geneva, Switzerland, 31 March 2003.