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NOTE

Chemical Composition of *Euphorbia macroclada* Boiss Growing in Nigde, Turkey

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In this work, examining the chemical characterization of *Macroclada* boiss., which belong to *Euphorbia* family and grow in Nigde. The samples of plant were gathered in May and June and they were prepared for analysis after they got dry. To that end, firstly plants were extracted and then column chromatography was applied to them. Thin-layer chromatography was applied to those fractions obtained, then their chemical structures were characterized by using methods of FT/IR and ^1H NMR and mass spectroscopy. When the analysis results of *Macroclada* boiss were examined, two different substances which were of diterpenoid (horminon) and aliphatic alcohol (1-octacosanol) were detected.

Keywords: *Euphorbia macroclada* Boiss, 1-Octacosanol, Horminon.

Euphorbiaceae is a large family of flowering plants with 300 genera and around 7,500 species. This family occurs mainly in the tropics, with the majority of the species in the Indo-Malayan region and tropical America a good second. There is a large variety in tropical Africa, but it is not as abundant or varied as in these two other tropical regions. However, *Euphorbia* also has many species in non-tropical areas such as the Mediterranean Basin, the Middle East, South Africa and southern USA. The leaves are alternate, seldom opposite, with stipules. They are mainly simple, but where compound, are always palmate, never pinnate. Stipules may be reduced to hairs, glands, or spines, or in succulent species are sometimes absent. The radially symmetrical flowers are unisexual, with the male and the female flowers usually occurring on the same plant. As can be expected from such a large family, there is a wide variety in the structure of the flowers. They can be monoecious or dioecious. The stamens (the male organs) can number from 1 to 10 (or even more). The female flowers are hypogynous, that is, with a superior ovary [1-3]. The genera in tribe *Euphorbieae*, subtribe *Euphorbiinae* (*Euphorbia* and close relatives) show a highly specialized form of pseudanthium ("false flower" made up of several true flowers) called a cyathium. This is usually a small cup-like involucre consisting of fused together bracts and peripheral nectary glands, surrounding a ring of male flowers, each a single stamen. In the middle of the cyathium stands a female flower: a single pistil with branched stigmas. This whole arrangement resembles a single flower [4-8].

Euphorbia spp. have been the source of a large number of biologically active compounds, including skin irritant, tumor promoting and proinflammatory [9,10]. Some species of *Euphorbia* have been used as medicinal plants for the treatment of skin diseases, gonorrhea, migraine and intestinal parasites and as wart cures. *Euphorbia* spp. have been used in Turkish folk medicine for rheumatism, swelling and especially as a wart remover; however, they cause inflammation and diarrhea [11,12].

Macroclada boiss: *Euphorbia macroclada* Boiss. is a member of the *Euphorbiaceae* family and it grows abundantly in arid and semi-arid-land regions in Anatolia, Turkey. This family of plants includes roughly 2000 species, ranging from small herbs to large trees. Most of them can produce milky latex which yields wide range of chemical such as rubber, oils, terpenes, waxes, hydrocarbons, starch, resins, tannins and balsams of interest to various industries but not use for food production. In the last 25 years, *Euphorbia* species have become attractive as petro-crops due to their hydrocarbon potential [13-17].

Euphorbia macroclada Boiss had been gathered between the years 2004 and 2006 in Maden Village of Ulukisla City, Nigde, Turkey and in its neighborhood. Identification of the gathered plants was conducted in the herbarium of Department of Biology, Science and Art Faculty, Nigde University, Nigde, Turkey. After identification procedures, the top of the plants that stay above the ground were dried in the shade, were ground and then were exposed to maceration by being stirred with methanol in room temperature for a week. The same procedure

was applied to both plants. Column chromatography method was used to fraction the plant extracts. Column chromatography was applied to the extracts obtained through dissolving in chloroform. In addition, another extract was also dissolved in chloroform and acetone, then silica gel 60 G (Merck 935) size of which is (0.040-0.060 mesh) was added on it. The extract and the silica gel were mixed and the extract was dried completely. Some cotton was placed under the extract and the selected silica gel appropriate for the amount was placed on top of the column that is filled with adsorbent. Ablution process was started with petroleum ether and proceeded with chloroform, acetone and methanol. Similarly, chromatographic analyses were conducted through combining other fractions. Fractions were analyzed through thin layer chromatography under UV light and on silica gel plates that were conducted in appropriate solution systems. By using various reagents they were dried in drying-oven. Their colour changes were observed and those who have similar R_f values were combined. Each was examined separately. The chemical structures were identified by FT/IR, ^1H NMR and MS methods.

Compounds obtained from *Euphorbia macroclada* Boiss.

1-Octacosanol: The dried material of *Euphorbia macroclada* was extracted with oil ether as a result of methanol extraction and the obtained extract was taken into column and applied column chromatographic. After the column was filled, petroleum ether was added on absorbent again and the absorbent had been made to settle during a day. Elution was started with petroleum ether and carried on with petroleum ether-benzene, benzene-methanol and methanol. The obtained fractions were taken and condensed in an evaporator and analyzed through thin layer chromatography.

IR (KBr, ν_{max} , cm^{-1}): 3418 (OH), 2850 (CH), 1460-1475 (CH deformation), 1062 (CO); ^1H NMR (300 MHz, CDCl_3) δ : 0.86 (3H, t, $-\text{CH}_3$), 1.22 ($-\text{CH}_2$), 1.57 (1H, $-\text{OH}$), 3.61 (2H, t, CH_2OH); MS (m/z %): 410 $[M]^+$ (0.5), 392, 364, 308, 266, 251, 181, 167, 153, 139, 97, 83, m.p. 84-85 $^\circ\text{C}$.

According to this result, the isolated compound is 1-octacosanol [$\text{CH}_3(\text{CH}_2)_{27}-\text{OH}$].

Horminon: When another fraction was examined it was thought that this was a new compound and the structure of the compound was analyzed through spectroscopic methods. As the findings were examined accordingly, the results below were obtained: IR (KBr, ν_{max} , cm^{-1}): 3458 (OH), 1650 (CH), 1612 (CO) ^1H NMR (300 MHz, CDCl_3) δ : 0.98 (3H, s), 0.92 (3H, s), 1.24 (3H, s, $-\text{OH}$), 1.23 (6H, d, MS (m/z %): 410 $[M]^+$ (0.5), 348, 330, 315, 287, 259, 235, 231, 167, 119, 86, 84, m.p. 176-178 $^\circ\text{C}$.

According to these results, it has been concluded that there is a diterpene in the quinonoid structure of the compound. Mass spectroscopy method was also wanted to be applied in

order to support these findings. However, as the amount of obtained material was so little, this method couldn't be applied. When the findings were compared with the thin layer chromatography, it was concluded that this compound could be horminon (Fig. 1).

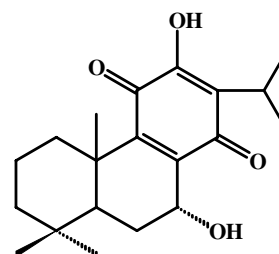


Fig. 1. Horminon

In this research, chemical characterization of *Macroclada boiss* plant that belongs to *Euphorbia* family and grows in Nigde region of Turkey was examined and two different compounds viz., diterpenoid (horminon) and aliphatic alcohol (1-octacosanol) were found.

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