The Peerian Journal
Open Access | Peer Reviewed
Volume 18, May, 2023.
Website: www.peerianjournal.com
ISSN (E): 2788-0303
Email: editor@peerianjournal.com

Chemical Structure of Lagochilin Diterpenoid (3,15,16,18-Tetrahydroxy 9-13 Epoxylab) From Lagochilus Inebrians Plant, Monohdrate AND Anhydrate Forms

[1] ToJiboeva D.Sh., [1] Kurbanova A.J. , [1] Komilov K.U., [2] Islomov A.Kh.,
1. Chirchik State Pedagogical University
2. Institute of bioorganic chemistry named after Academician O.S. Sodikov of the Academy of Sciences of the Republic of Uzbekistan

Annotation: In this article Lagochilin diterpenoid (3,15,16,18-tetrahydroxy 9-13 epoxylab) isolated from the plant Lagochilus inebrians Bge in the process of recrystallization in different solvents, lagoxilin crystals can be obtained in 2 different forms: the first form is monohydrate and the second form is non-hydrated, and lagoxilin mainly precipitates as monohydrate. The precipitated crystal has a monohydrate form and is completely insoluble in water information about the study of conditions is presented.

Key words: lagochilus inebrians, tetrahydroxy, 3,15,16,18-tetrahydroxy 9-13 epoxylabdan, water, extract, substance, inebrine, lagochiline diterpenoid.

Introduction

O.Sadikov and S.Yu.Yunusov created a unique scientific school in obtaining natural medicines from medicinal plants. In 1956, the Scientific Research Institute of Chemistry of Plant Substances was established in Uzbekistan and it was headed by S.Yu.Yunusov. In 1946, the Department of Chemistry of Natural Compounds was founded at the Faculty of Chemistry of Tosh State University (now UzMU) and headed by O.Sadikov. In 1956, a problem laboratory was established under this department. Large scientific research works on the study of medicinal plants were carried out in the department and laboratory. As a result, several medicines were created and introduced into medicine and agriculture, dozens of doctors of science and many candidates of science in this field were born.

O.S.Sadikhov , S.Yu.Yunusov, N.Q.Abubakirov, I.P. Tsukervanik, Sh.I.Salikhov, B.T.Ibragimov, A.S. Turaev, doctors of science, professors Kha.A. Aslanov., A.I. Ismoilov., P.Yu. Yuldashev., Kha.A. Abduazimov., M.I. Ikramov., I.E. Akopov., Kh. A. Aslanov., U.N. Zaynutdinov., D.N. Dalimov., Z.I. Mavlankulova., S.I. Muhamedkhanova., V.B. Leontev., Islamov R., A. Saidkhodjaev., V .Malikov., I.K. Komilov., M.I. Sultonov., U.B. Zokirov., S.S. Sahobiddinov., Kh.K. Kholmatov., R.L. Khazanovich and others' services are incomparable.

Lagochilus has long been known for its healing properties, i.e. as a hemostatic agent, and it is one of the most popular, effective hemostatic medicinal plants of the East. Decoctions and tinctures based on the Lagochilus plant have been used in practice to stop various bleedings. Chemical studies of plants of the genus Lagoxilus were conducted under the leadership of Professor

The Peerian Journal
Open Access | Peer Reviewed
Volume 18, May, 2023.
ISSN (E): 2788-0303
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

U.N. Zaynutdinov, Doctor of Chemical Sciences, Professor U.N. Zainutdinov, Doctor of Chemical Sciences, Professor M.I. Ikramov, Doctor of Biological Sciences, Professor M.I. Ikramov, Doctor of Physiological Sciences, Professor I.E. It was studied by the staff of pharmacology departments of Samarkand, Andijan and Kuban medical institutes under the leadership of Akopov. Of these, aqueous and alcoholic decoctions of Lagochilus inebrians have been identified as having physiologically active properties such as sedative, hypotensive, sedative, anti-shock, anti-radiation and anti-allergic (anti-allergic) in addition to hemostatic properties[1-2].

Theoretical Part

The Lagochilus inebrians plant grows in the Nurota district of the Navoi region of Uzbekistan and in the village of Navandak, Mirdosh Langar, Akmal Ikromov collective farm of the Khatirchi district, on the banks of the river and in the rocky areas. It is also found in Bukhara and Kashkadarya regions. It was grown in the village of Darmana in the former Frunze state farm of Shymkent province. It grows wild in the villages of Ko'shrabot, Gujumsoy, Bozorjoy, Jush, Samarkand region.

Lagochilus inebrians is a perennial herb growing to 20-60 cm tall. the stem is branched, ascending, woody at the base, four-sided, covered with hard glandular hairs. The leaf is simple, cut into three to five parts, oppositely located on the stem and branches. The flowers are pink, arranged in the form of semicircles on the stems and branches. The fruit is 4 nuts and blooms in June-September. Harvest time for Lagochilus inebrians is July-August. Lagochilus inebrians Bge plant and its flower and seeds are shown in Figure 1.[3-4]

Figure 1. The plant Lagochilus inebrians Bge.

The chemical composition of Lagochilus inebrians plant contains vitamin K1, 0.6-1.97% lagoxilin, 0.67% flavonoid glycosides, 44-77 mg% ascorbic acid, 6-7% organic acids, 5-10 mg% carotene, 9.66 - 12.42% tar, 2.58-2.78% additives and other substances, as well as calcium and iron salts. Lagochilus inebrians leaves contain lagoxilin, 0.03% essential oil, 11-14% flavoring agents, organic acids, 7-10 mg% carotene and 77-100 mg% vitamin C. [3-4].

The Peerian Journal
Open Access | Peer Reviewed
Volume 18, May, 2023.
ISSN (E): 2788-0303
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

From plants removable preparations : tincture, decoction , tincture , extract, extract-concentrate, tablet and hakazos enters _ Extracts as , a plant from raw materials biological active substances water , alcohol, ether or head _ separators using separate received and separator partly , sometimes completely evaporated to allocation it is said . Extracts liquid , thick and to the dry ones is divided . Of these the most many p used is a dry extract . Dry extracts are _ medicine plant from raw materials removable concentrated allocation and contains up to 5% humidity which keeps scattered powder is considered Dry extracts work release : deduction get , lie down of substances cleaning , steaming or drying , grinding , sifting , evaluation and packing like technological from stages consists of [5-7].

Results Of The Discussion

Lagochilus inebrians in the plant lagoxiline mainly various acetyl derivatives _ in the form of that it was due to , in lagochilin four hydroxyl of groups reactionary activity (acylation reaction) _ degree to determine for one group scientists Mavlankulova Z.I., Zaynutdinov U.N., Muhamedkhanova S.I., Leontev V.B., Aslanov X.A. row studies take they went This reactionary activity **C** $_{15}$ **> C** $_{16}$ **> C** $_{18}$ **> C** $_{3}$ sequence in the form of YaMR method to be based on shown , but they are individual substance as separate not received [8].

The structure of Lagoxilin remained undetermined for a long time. In 1970, O.S. Chizhov and his staff conducted research on natural compounds using modern physico-chemical methods. was able to determine the structure and relative configuration of lagoxilin Figure 2 [9].

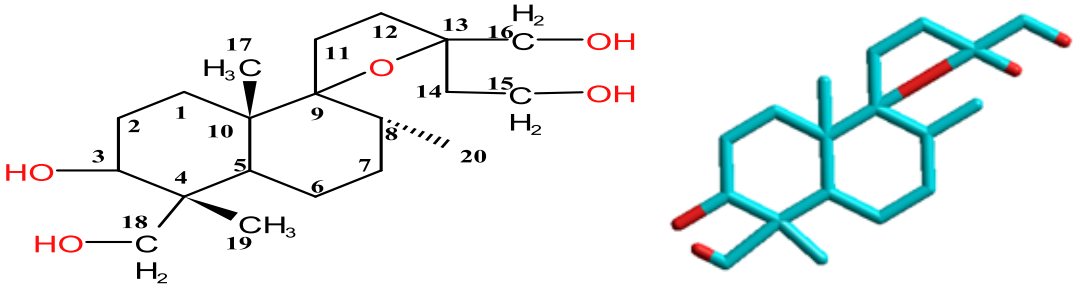

Figure 1. Chemical and conformational structure of Lagoxiline diterpenoid (3,15,16,18-tetrahydroxy 9-13 epoxylab)

According to the results of mass spectrometric analysis, the molecular weight of lagoxilin is equal to 356, and its gross formula is S $_{20}$ N $_{36}$ O $_{5}$. By taking the tetraacetate and tetrabenzoate derivatives of lagoxiline and analyzing their IR spectra, it was determined that lagoxiline has hydroxyl groups and the IR spectrum of its derivatives has fluctuations related to hydroxyl groups, and the fifth oxygen atom is in the epoxy group [10-11].

According to the analysis of the PMR-spectra of Lagoxilin and its tetraacetate, it can be seen that there are 3 methyl groups in its molecule, and two of them are connected to the quaternary carbon atom, and the third is connected to the tertiary carbon atom. The spectrum also revealed the presence of protons belonging to primary and secondary alcohol groups. To confirm the above data, the ^{13}S NMR-spectrum of lagoxiline was studied. Through the researches of V.B. Leontev and others, it was determined that two of the three methyl groups - S $_{10}$, S $_{4}$ axial and one - S $_{8}$ - are equatorial, A/V ring has a trans-conformation. However, while the methyl group at S $_{8\ was}$ initially

The Peerian Journal
Open Access | Peer Reviewed
Volume 18, May, 2023.
ISSN (E): 2788-0303
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

shown to be axially located, the results of X-ray analysis of lagoxiline showed that it is located in an equatorial position [8,12].

Lagoxilin molecule UzR FA on studying with the help of x-rays A number of studies were also carried out by the staff of the Institute of Bioorganic Chemistry named after academician O.S. Sodikov . In the process of recrystallization in different solvents, Lagoxilin crystals can be obtained in 2 different forms: the first form is monohydrate (Fig. 3) and the second form is non-hydrated (Fig. 4) , Lagoxilin mainly precipitates as monohydrate. The precipitated crystal has a monohydrate form and does not dissolve in water at all [13].

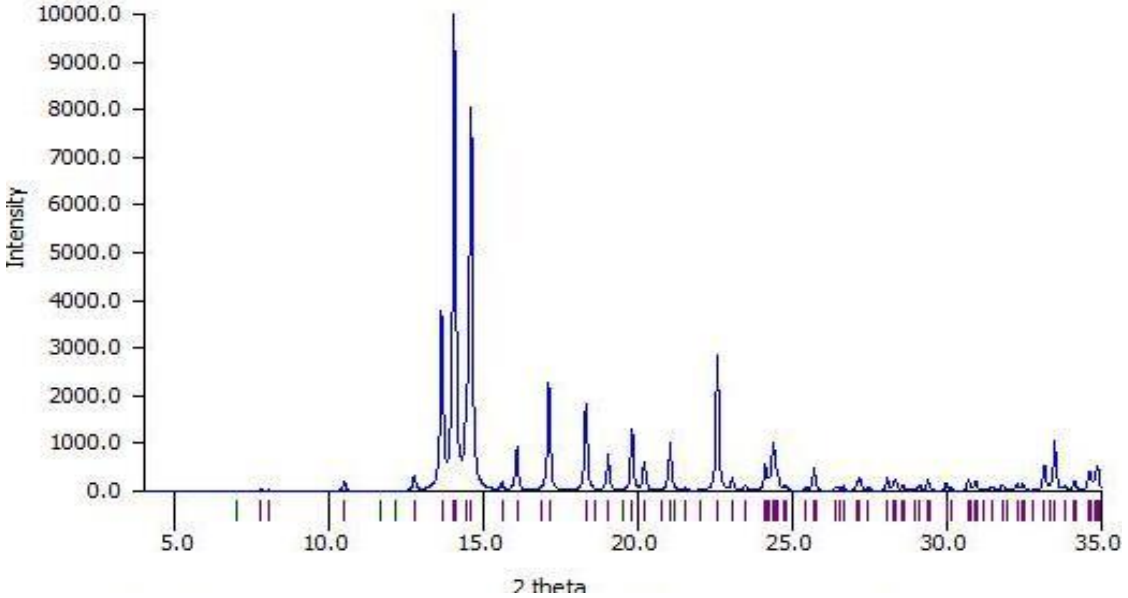

Figure 3. diffractogram of monohydrate lagoxylin crystals

The second form is in the anhydrous (anhydrous) form , and three methods for obtaining lagoxiline hydrate are shown: Figure 2 .

1. Reduction from absolute solvents to crystals;
2. Crystallization from butylacetate solution at 120 ^{o}C
3. Dehydration [13].

anhydrous lagochilin crystals is presented in Fig. 4

The Peerian Journal
Open Access | Peer Reviewed
Volume 18, May, 2023.
ISSN (E): 2788-0303
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

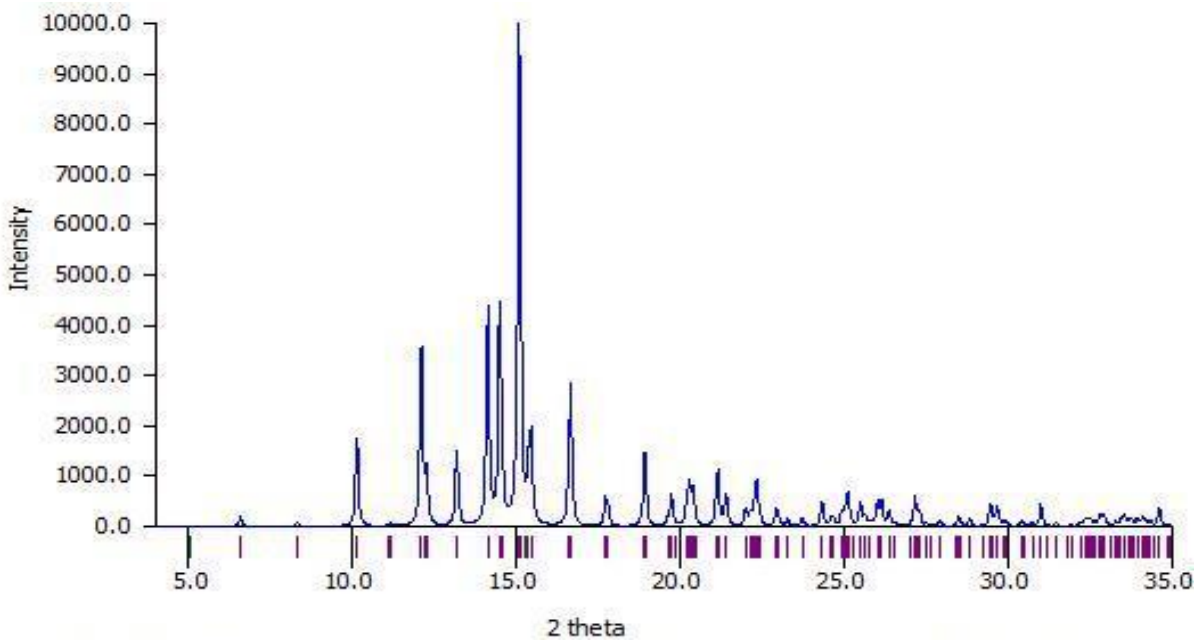

Figure 4. diffractogram of anhydrous lagoquiline crystals

According to the results of X-ray analysis, the following phase structure (Fig. 5) was suggested for the lagochilin molecule [12-16].

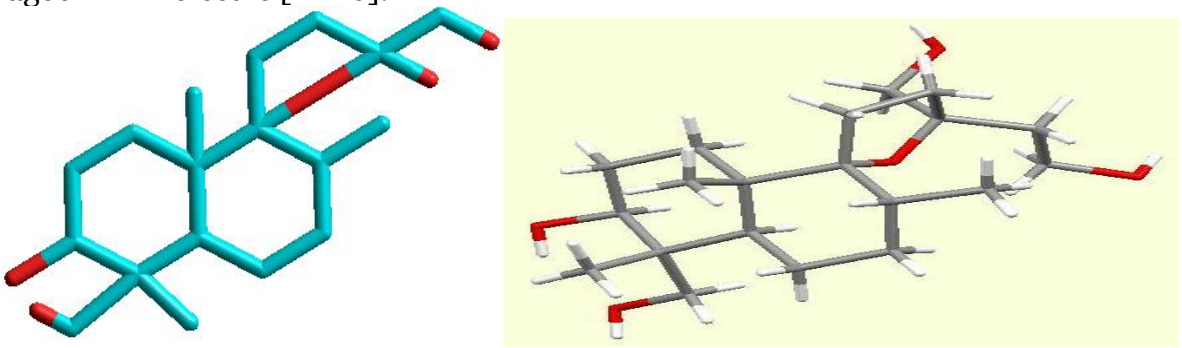

Figure 5. Lagohilin diterpenoid phase , conformation formations

The problem of the structure of Lagoxilin and its stereochemical configuration has been solved in several scientific works [12-16]. According to the analysis of the ^{13}C NMR spectrum, 93.13; 86.37; 45.15 and 42.53 m.u. four signals belong to S_9, S_{13}, S_{10}, S_4 atoms, which indicate that this molecule contains oxygen and 93.13 m.u and 86.37 m.u. signals indicate that carbon atoms 9 and 13 in the molecule are connected through oxygen, respectively. 45.15 m.u. and 42.53 m.u. indicates that the signals belong to the S_{10} and S_4 carbons , which do not have oxygen atoms in the α-state . In diterpenes with the labdan structure, the chemical shift of C_4 carbon is 45 m.u. from 32 m.u. to, and in S_{10}, from 42 m.u to 33 m.u. exchange The chemical shift of these atoms shows a significant effect on the conformation of A/V-rings due to the introduction of secondary bond S=O and hydroxyl groups. The chemical structure of lagoxilin was determined by these physicochemical analysis methods [12-16].

The Peerian Journal
Open Access | Peer Reviewed
Volume 18, May, 2023.
ISSN (E): 2788-0303
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

Conclusion

Lagochilin molecule UzR FA on studying with the help of x-rays Academician O. S. Sodikov Institute of Bioorganic Chemistry found that during recrystallization in different solvents, lagochilin crystals are obtained in two different forms, the first monohydrate form and the second non-hydrated form. Lagochilin is mainly precipitated as monohydrate. The precipitated crystal has a monohydrate form and does not dissolve in water at all

Literature

1. Akopov I.E. Hemostatic plants. Tashkent "Medicine", 296,1981.
2. Akopov I.E. On the hemostatic efficacy of lagokhilin and lagokhilin acetate. In book : Problems of hemocoagulation in experimental and treatment-and-prophylactic work. Under . r units Akopova I.E. Krasnodar, 12, 1976.
3. Farmakognoziya (H.Xolmatov, O'.Ahmedov) Abu Ali ibn Sino Toshkent 1997.
4. Kh.Kh.Kholmatov, O.A.Ahmedov, Pharmacognosy: darslik, Tashkent, Ibn Sino nomidagi NMB, 1995.
5. 5.Islamov R. Dissertation... on the degree of the candidate of chemical sciences, Tashkent, 142 p., 1988
6. Pulatova T.P., Pharmacognostic study of representatives of the Lamiaceae family in order to obtain medicinal preparations. Abstract Diss c . Dr. Pharm. Sciences. -Moscow.1991.S.42.
7. Zainutdinov U.N. Diterpenoids of plants of the genus Lagochilus // Diss . doc . chem. Sciences. T.1993 . S. 253.
8. 8 . Mavlankulova Z.I., Zainutdinov U.N., Mukhamedkhanova S.I., Leontiev V.B., Aslanov Kh.A. ^{13C} NMR Spectra of Lagochiline and Its Derivatives // Chemistry of Nature . with one _ 1979. No. 1. pp.41-43 .
9. 9 . Chizhov O.S., Kessenikh A.V., Yakovlev I.P., Zolotarev B.M., Petukhov V.A. Lagochilin structure // Izv . An USSR . from ep. chem. 1970. No. 9. S.1983-1991 .
10. 10 . Abramov M. M. On the question of the chemistry of lagochiline // Dokl . An UzSSR . 1958. No. 3. pp.41-44 .
11. Chizhov O.S., Ryabobylko Yu.S., Kessenikh A.V. NMR spectra of lagokhilin // Izv. An USSR. ser. chem. 1979. No. 7. S.1603-1606.
12. Aziz Ibragimov., Davron Dalimov., Samat Talipov., Lidiya Izatova and Zainytdinov. redetermnation of Lagochiline monohydrate // Acta Crict . 2010, E 66, P. 1392-1401.
13. Izotova L.Yu., Beketov K.M., Talipov S.A., Ibragimov Б.T. The Anhydrous Lagochiline: Three Ways of Preparation and Crystal Structure // Polish. J. Chem. 71, 1997. Z. 1037-1044.
14. 14 . Izotova L.Yu., Talipov S.A., Ibragimov B.T., Bekbulatova B.B., Islamov R., Zainutdinov U.N. X-ray structural study of triacetyl and tetraformiata lagochilina // Chemistry of natural compounds. 2000. No. 2. P.142-144.
15. Izotova L.Yu., Talipov S.A., Ibragimov B.T., Bekbulatova B.B., Islamov R., Zainutdinov U.N. Roentgenostructural research Lagohirzina // Chemistry nature. connect _ 2004. No. 5. P. 398-399.

The Peerian Journal
Open Access | Peer Reviewed
Volume 18, May, 2023.
ISSN (E): 2788-0303
Website: www.peerianjournal.com
Email: editor@peerianjournal.com

16. Islamov A.Kh. "Obtaining hemostatic products based on the plant Lagochilus inebrians and using them in folk medicine" //Diss. Doctor of Chemical Sciences (DSc).T.23.02.2023. B.195.