Asian Journal of Chemistry; Vol. 23, No. 4 (2011), 1873-1874

ASIAN JOURNAL OF CHEMISTRY

www.asianjournalofchemistry.co.in

NOTE

Alkaloids of *Aconitum nasutum* Fisch. ex Reichb.

AYHAN ALTINTAS[1,*], NESE KIRIMER[1], BAHADIR SALIMOV[2] and KEMAL HUSNU CAN BASER[1]

[1]Department of Pharmacognosy, Faculty of Pharmacy, Anadolu University, 26470 Eskisehir, Turkey
[2]Yunus Yunusov Institute of Chemistry of Plant Substances, Uzbekistan Academy of Sciences, Tashkent, Uzbekistan

*Corresponding author: Tel: +90 222 3350580-ext. 3710; Fax: +90 222 3306809; E-mail: aaltinta@anadolu.edu.tr

(*Received*: 19 June 2010; *Accepted*: 29 December 2010) AJC-9440

Alkaloid extracts from aerial parts and roots of *Aconitum nasutum* were investigated by mass spectrometry using metastable defocusing system. Two alkaloids (talatisamine and 14-acetyl-talatisamine) were isolated by column chromatography. Talatisamine was found to be the major compound both in the aerial parts and the roots of the plant.

Key Words: *Aconitum nasutum*, Diterpenoid alkaloid, Talatisamine, 14-Acetyltalatisamine.

Tubera Aconiti (Ranunculaceae) has been used in therapy since ancient times. Alkaloids isolated from *Aconitum* species are also used in modern pharmaceuticals. Four *Aconitum* species are known to exist in Turkey, namely, *A. orientale* Miller, *A. nasutum* Fisch. ex Reichb., *A. cochleare* Woroschin and *A. anthora* L.[1]. In previous studies, a number of alkaloids have been reported from *Aconitum* species growing in Turkey[2-9]. Alkaloids of *A. nasutum* of Uzbek origin have also been reported previously[10-12]. Here, we report on the alkaloids of *A. nasutum* of Turkish origin.

The ^{1}H and ^{13}C NMR spectra were recorded on a BC567A Tesla and Jeol JNM-EX90A, FT spectrometer in $CDCl_3$. IR spectra were measured using a Shimadzu IR-435 spectrophotometer. Mass spectra were measured with a MX 1310 double focusing, forward geometry mass spectrometer (secondary ion mass spectrometry-SIMS).

Plant material was collected from Trabzon: Surmene, Koprubasi, Vizara Yaylasi in July 1994 at an altitude of 1300-1700 m. Voucher specimens are kept at the Herbarium of the Faculty of Pharmacy, Anadolu University in Eskisehir, Turkey (ESSE 11290).

Extraction

Extraction of alkaloids from underground parts: Powdered underground parts (700 g) were macerated with 80 % ethanol for 10 days. After removal of ethanol *in vacuo* the aqueous part was basified with 15 % sodium carbonate and extracted with chloroform. The chloroform extract was evaporated *in vacuo* and dissolved in 5 % H_2SO_4. The aqueous solution was basified with 5 % sodium carbonate and then extracted with diethyl ether and chloroform, successively. These two fractions were combined (7.78 g) and chromatographed using column chromatography.

Extraction of alkaloids from aerial parts: Powdered aerial parts (750 g) were basified with 15 % sodium carbonate and macerated with chloroform for 10 days. The chloroform extract was evaporated *in vacuo* and the residue was dissolved in 5 % H_2SO_4. The acidic solution was basified with 5 % sodium carbonate and then extracted with diethyl ether and chloroform, respectively. These two fractions were combined (2.17 g) and chromatographed using column chromatography.

Isolation of the alkaloids

Alkaloid extracts from underground parts: The combined ether and chloroform soluble alkaloid extracts were separated by column chromatography on alumina (250 g) with benzene by gradually increasing the polarity with ethanol. The results were checked by TLC. The following alkaloids were isolated:14-acetyltalatisamine (430 mg), talatisamine (2010 mg).

Alkaloid extracts from aerial parts: The combined ether and chloroform soluble alkaloid extracts were separated by column chromatography on alumina (65 g) with benzene by gradually increasing the polarity with ethanol. The results were checked by TLC. The following alkaloids were isolated: 14-acetyltalatisamine (100 mg), talatisamine (460 mg).

Identification of components: The alkaloids were characterized using IR, NMR and MS techniques and compared with samples. Other alkaloids were identified by mass spectrometry using a metastable defocusing system. Aconitine, aconosine,

columbianine, dolaconine (14-acetylaconosine), isotalatisidine, cammaconine and karacoline were identified by comparison of their identical mass spectral characteristics.

Alkaloids of *A. nasutum* which have previously been reported and characterized in present studies are shown in Table-1. We have isolated 14-acetyltalatisamine and talatisamine from the underground and aerial parts of *Aconitum nasutum*. In previous study on the alkaloids from underground parts of *A. nasutum* of Turkish origin, except for talatisamine and 14-acetyltalatisamine, the other alkaloids were not reported.

TABLE-1
ALKALOIDS OF *Aconitum nasutum*

Alkaloid	Parts	Reference
Talatisamine	Underground	*
	Aerial	8, 12
14-acetyltalatisamine	Underground	*
	Aerial	8
Aconitine	Underground	*
	Aerial	12
Aconosine	Underground	10-12
	Aerial	10-12
Dolaconine (14-acetylaconosine)	Underground	12
	Aerial	*
Isotalatisidine	Underground	*
	Aerial	12
Cammaconine	Underground	*
	Aerial	12
Karakoline	Underground	*
	Aerial	12
Columbianine	Underground	*
	Aerial	12

*Reported for the first time in this paper.

During our studies, we failed to detect those alkaloids. It was also interesting to note that the authors were not able to detect the alkaloids which had previously been found in *A. nasutum*[7-9]. This discrepancy is puzzling. It may be due to the fact that their material was 10 years old when analyzed, therefore, their results should be read with caution, since our results agree with the previously reported composition of *A. nasutum* from Uzbekistan[10-12].

REFERENCES

1. P.H. Davis, Flora of Turkey and the East Aegean Islands, Edinburgh University Press, Edinburgh, Vol. 1 (1965).
2. E.G. Milgrom, V.N. Plugar, U.A. Abdullaev, N. Kirimer, K.H.C. Baser and B.T. Salimov, *Chem. Nat. Comp.*, **30**, 774 (1994).
3. B.T. Salimov, E.G. Milgrom, N. Kirimer, U.A. Abdullaev and K.H.C. Baser, *Chem. Nat. Comp*., **30**, 776 (1994).
4. A. Ulubelen, A.H. Mericli, F. Mericli and F. Yilmaz, *Phytochemistry*, **41**, 957 (1995).
5. T. Baytop and M. Tanker, *J. Faculty Med. Istanbul Univ*., **25**, 157 (1962).
6. N. Noyanalpan, Ph.D. Thesis, Studies on the Alkaloids of *Aconitum cochleare* Woroschin, Ankara University, Turkey (1971).
7. A.H. Mericli, F. Mericli, H. Becker and A. Ulubelen, *Turk. J. Chem*., **20**, 164 (1996).
8. A.H. Mericli, F. Mericli, H. Becker and R. Ilarslan and A. Ulubelen, *Phytochemistry*, **42**, 909 (1996).
9. A.H. Mericli, F. Mericli, H.K. Desai, B.S. Joshi, Q. Teng, K. Bhattacharyya, G. Melikoglu, M. Kucukislamoglu, A. Ulubelen and S.W. Pelletier, *Heterocycles*, **53**, 1987 (2000).
10. D.A. Muraveva, T.I. Plekhanova and M.S. Yunusov, *Khim. Prirod. Soed.*, **8**, 128 (1972).
11. T.I. Plekhanova and D.A. Muraveva, *Aktual. Voprosy Farm.*, **2**, 49 (1974).
12. A.N. Manukov, I.A. Bessonova, Z.M. Vaisov and V.A. Chelombitko, *Chem. Nat. Comp*., **29**, 770 (1993).