

THE ALKALOIDS: GENUS DAPHNIPHYLLAM (DAPHNIPHYLLACEAE)Kothiyal K Sudhir¹, Sati C Satish^{1*}, D. Sati Manisha¹, Rawat Bipin¹, Sharma Amita¹, Semwal Deepak Kumar², Badoni Ruchi¹, Rawat MSM¹¹Department of Chemistry, H.N.B. Garhwal University, Srinagar-246174, Uttarakhand, India²Department of Chemistry, Punjab University, Sector-14, Chandigarh-160014, Punjab, India* E-mail: sati_2009@rediffmail.com

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ABSTRACT

The genus *Daphniphyllum* comprised of about 30 species, distributed over Southeast Asia. Many plants of the genus used traditionally as folk medicine for the treatment of asthma, cough, rheumatism, inflammation, fever and snakebites. Over two hundred *Daphniphyllum* alkaloids have been isolated from the genus and many of these evaluated for their different biological activities. The aim of comprehensive review is to summarize all isolated alkaloids and their structure together with traditional and biological importance. In addition, the recent developments and the scope for future research in this field, is also discussed.

KEYWORDS: Vasorelaxant, fever, snakebites, rheumatism, pharmacology**INTRODUCTION**

The genus *Daphniphyllum* belongs to family *Daphniphyllaceae* comprised of about 30 species, distributed over south-east Asia, out of 30, about 10 species are growing in southern China¹. The plants of genus are dioecious evergreen trees and shrubs. Some of which have been traditionally used as folk medicine for the treatment of asthma, cough, rheumatism, inflammation, fever, fracture and snakebites. Recently number of members of the genus becomes popular due to their anti-tumor, Antioxidant, Anti platelet aggregation, vasorelaxant and insecticidal activities². Heathcock and co-workers have proposed a biogenetic pathway for *Daphniphyllum* alkaloids and demonstrated a biomimetic total synthesis of several *Daphniphyllum* alkaloids^{3,4}. *Daphniphyllum* alkaloids are biosynthesized from six molecules of mevalonic acid via a squalene-like intermediate⁵. The structures of these alkaloids are classified based on six *Daphniphyllum* alkaloids (Daphniphylline, Decodaphniphylline, Yuzurimine, Daphnilactone A, Daphnilactone B and Yuzurine⁶. *Daphniphyllum* alkaloids are neurotoxic and target directly to the central nervous system resulting in depression of voluntary movements as well as respiratory function⁷.

Objectives of the review

Daphniphyllum is one of the most important genus of the family having potential medicinal values. The decoction, extract and constituents have been found active against various biological and pharmacological ailments. Therefore, the objectives of this review is to summarize the recent advances in chemistry and pharmacology of the genus. The review also focused on various traditional uses of some common species of the genus. This type of compilation may provide a platform as well as the guidance for researchers and herbologists for further investigations in the field.

FUTURE PROSPECTIVES AND CONCLUSION

The *Daphniphyllum* is one of the most important genus of plant kingdom widespread over Southeast Asia. Many species of the genus have been used as traditional medicines for the treatment of various ailments. The plants of the genus were traditionally applied for asthma, cough, rheumatism, inflammation, fever, and snakebites etc. More than thirteen species of this genus have been investigated chemically as well as pharmacologically. Despite the huge researches on the plants of this genus, a number of plants are chemically and pharmacologically yet unknown.

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Table 1: Chemical Constituents

S.No	Species	Chemical Constituents	Referecneces
1	D.calycinum Benth	Calycinumines A, B ;	(7)
		Calyciphyllines A, B;	(8)
		Daphcalycine, daphnicyclidin D;	(9)
		17-hydroxyhomodaphniphylic acid,	(10)
		daphcalycinosidine C (a new iridoid alkaloid), yuzurimine E, yuzurimic acid B ;	
		Caldaphnidines G-R;	(11)
		5,6,7,4-tetrahydroxyflavonol 3-O-	(12)
		rutinoside, kaempferol 3-O-	
		neohesperidoside;	
		Calycilactone A;	(13)
Calyciphylline C;	(14)		
Calyciphylline G;	(15)		
Calyciphyllines N-P;	(16)		

		Caldaphnidines A–F, deoxycalyciphylline B, deoxyisocalyciphylline B, bukittigine, calycicine A, methyl homosecodaphniphyllate, daphnilactone B, daphnezomines L–M;	(17)
		Daphcalycinosidines A; B, daphcalycic acid;	(18)
		9,10-epoxycalycinine A, homodaphniphyllate);	(19)
		Caldaphnidine H, daphnioldhanin G, methyl homosecodaphniphyllate, daphnezomine M, daphniyunine A, calyciphylline A, deoxycalyciphylline B, deoxyisocalyciphylline B, calyciphylline B;	(20)
		Calydaphninone ;	(21)
		Calyciphylline D	(22)
		Calyciphyllines E; F	(23)
		Calyciphyllines H–M	(24)
	<i>D. humile</i> Maxim. ex	Daphnezomines P–S;	(25)

	Franch. & Sav.	<p>Daphnezomines A;B; (26)</p> <p>Daphnezomines F;G; (27)</p> <p>Daphnicyclidins G-H; (28)</p> <p>Daphnicyclidins J;K; (29)</p> <p>Daphnezomines H- K; (30)</p> <p>Daphnezomines L-O ; (31)</p> <p>Daphnezomines T-V (32)</p> <p>Deoxyyuzurimie, Isodaphnilactone-B; (33)</p> <p>Daphnezomines C-E (34)</p>	
	<i>D. yunnanense</i> C.C. Huang ex J.X.Wang	<p>Yunnandaphnines A-E, (35)</p> <p>Macrodaphniphyllamine, Calycinine A;</p> <p>Daphniyunnines A-E, Daphniyunnines B-E (36)</p>	
	<i>D. longistylum</i> S.S. Chien	<p>Longistylumphyllines A-C, (37)</p> <p>deoxycalyciphyllin B,</p> <p>deoxyisocalyciphylline B,Methyl</p> <p>homosecodaphniphyllate, daphnicyclidin A,</p>	

		daphnicyclidin B, Daphnicyclidin F	
	<i>D. gracile</i> Gage	Daphnigracine, Oxodaphnigracine, Epi-Oxodaphnigraciline	Daphnigraciline, Oxodaphnigraciline, (38)





