



A REVIEW ON PHARMACOLOGICAL ACTIVITIES OF  
*ARISTOLOCHIA* SPECIES

S. Latha\*, P. Selvamani, P. S. Dhivya and R. Benaseer Begam

Department of Pharmaceutical Technology, Anna University, BIT Campus, Tiruchirappalli–  
24, Tamil Nadu, India.

Article Received on 27/07/2015

Article Revised on 18/08/2015

Article Accepted on 09/09/2015

\*Correspondence for

Author

S. Latha

Department of  
Pharmaceutical Technology,  
Anna University, BIT  
Campus, Tiruchirappalli–24,  
Tamil Nadu, India.

ABSTRACT

*Aristolochia* is a significant genus in the family of *Aristolochiaceae*. The genus *Aristolochia* includes about 400 species of herbaceous perennials, under shrubs or shrubs bearing essential oils and is extensive across Tropical Asia, Africa and South America. *Aristolochia* species has been used widely in the traditional Chinese medicine. Its miscellaneous biological functions include hypertension relief, leukocyte enhancement, rheumatism relief, edema therapy, as

well as analgesic and diuretic effects. Various *Aristolochia* species have been used in herbal medicines since ancient times for treatment of snakebite, festering wounds, and tumors, and they remain in use particularly in Chinese herbal medicine.

**KEYWORDS:** *Aristolochia*, Pharmacological activities, Traditional medicine, Herbal medicine.

1. INTRODUCTION

*Aristolochia* belongs to the family *Aristolochiaceae*. In the indigenous system of medicine, the plant was used for the treatment of skin diseases, inflammation and purgative. Root extract was accounted to have anti bacterial activity. A perennial climber shrub with woody base stocks. Leaves simple, alternate, entire, with undulate margins, acute; flowers greenish white, in auxiliary cymes; fruits rounded oblong, 6 chambered contain numerous winged compressed seeds.<sup>[1]</sup>

The Aristolochiaceae are magnoliids, which belongs to the category of angiosperms and it doesn't belong to the large categories of monocots or eudicots. As per the classification of the Angiosperm Phylogeny Group, family Aristolochiaceae is placed in the order piperales.

Aristolochia species (Aristolochiaceae) plants are used in all parts of the world for various ailments based on their anecdotal reports. In this review our main objective is to systematically access the widespread local and traditional uses of Aristolochia species.

Species of *Aristolochia* are used medicinally in many regions of the world based on ethnopharmacological information and which also poses some risk based on public health perspective. A systematic assessment of the content of aristolochic acids in the most widely used species is needed to evaluate whether their uses pose a potential health risk. *Aristolochia* species have been associated with nephropathy mainly in china and European countries, and it is important to examine whether nephropathy occurs in other parts of the world also. The use of species of *Aristolochia* is reported to be commonly used in traditional medicine in India and Central America.

## 2. PHARMACOLOGICAL ACTIVITIES

S.NO	BOTONICAL NAME	PHARMACOLOGICAL ACTIVITY TESTED	AUTHORS	Ref.
1	<i>Aristolochia albida</i>	Antiplasmodial activity	M. E. Khan, et al., 2012	[2]
		Antifeedant activities		
		Prophylactic activity		
		Anti-malaria activity		
2	<i>Aristolochia bracteolate</i>	Anti pyretic activity	Payal chawla. Et al., 2013 P.Bharathajothi and T. Bhaaskaran, 2014	[3] [4]
		Anti allergic activity	Payal chawla. Et al.,2013	[3]
		Anti-inflammatory activity	Payal chawla. Et al.,2013. P. Bharathajothi and T. Bhaaskaran, 2014	[3] [4]
		Anti-arthritis activity	Thirumal.M, et al.,2012	[5]
		Antiulcer activity		
		Antibacterial activity	Mokhtar Mohamed Elamin and Abdalla Abdelrahim Satti, 2012. P.S. Negi, e al.,2003	[6] [7]
		Antioxidant properties	Mokhtar Mohamed Elamin and Abdalla Abdelrahim Satti, 2012	[6]
		Antifungal activity		
		Antiplasmodial activity		
		Antimicrobial activity		
Wound healing activity				

		Anti angiogenetic activity		
		Trypanocidal effect		
		Anti implantation		
		Abortifaciant activity		
3	<i>Aristolochia brevipes</i>	Antibacterial activity	Víctor manuel navarro-garcía et.al,2011	[8]
4	<i>aristolochia clematitis</i>	Anti-fungal activity	Elvira nacsá-farkas, et al,2013	[9]
		Anti-inflammatory activity		
5	<i>Aristolochia cucurbitifolia</i>	Antiplatelet activity	Tian-shung wu et al.,2000	[10]
6	<i>Aristolochia elegans</i>	Antiprotozoal	Adelina jiménez-arellanes, 2011	[11]
		Antimycobacterial activities		
		Neurotropic activity	Zamilpa A et.al.,2014	[12]
		Antagonist activity		
7	<i>Aristolochiae fructus</i>	Nephro toxicity	Ting zhou et.,al 2011	[13]
8	<i>Aristolochia gigantean</i>	Nephrotoxic activity	Juliana C et al.,2010	[14]
9	<i>Aristolochia indica</i>	Antimicrobial activity	Hemlata Sati1 et al., 2011	[15]
		Abortifaciant activity		
		Anti-implantation activity		
		Interceptive activity		
		Anti-inflammatory,	Jessy Elizabeth Mathew et al.,2011	[16]
		anti-antipruritic	Dattatraya C et al.,2014	[17]
		Mast cell stabilizing activity	Rakesh Das et al.,2010	[18]
		Antidiarrheal activity	Suji Arivazhagan J.J.And Vimalastalin R., 2014	[19]
		Nephroprotective activity	Abidemi James Akindele et al., 2014	[20]
		Antivenom activity	S. Meenatchisundaram et al.,2009	[21]
		Lethal toxicity		
		Edema- forming activity		
		Haemorrhagic activity		
		Defibrinogenating activity		
		Procoagulant activity		
		Fibrinolytic activity		
		Phospholipase activity		
		Anti-inflammatory activity	Y. K. Gupta, S. S. Peshin	[22]
		Anti-hemorrhagic activity		
		anticoagulant activity	Murugan M and Mohan V R., 2012	[23]
Enzyme inhibitory activity				
Antibacteria				
Antiparasitic activity				
Antimyotoxic activity				
Antivenin activity	Marina G et al.,2010 Mini et al., 2013	[24] [25]		
Anthelmintic activity				
Antitumer activity	Masud rana and Khanam., 2002	[26]		
Antimicrobial activity	M. Surendra Kumar, et al.,2011	[27]		
Antidiabetic activity	J. Marlin Cynthia et al.,2012	[28]		

		Anti Hyperglycemic		
10	<i>Aristolochia longa</i> ,	Antitumor activity	Ghita benzakour1, et al.,2012	[29]
		Antifungal activity	Bachir benarba, boumedienne meddah 2014	[30]
11	<i>Aristolochia malmeana</i>	Insecticidal activity	Gisele B et al.,2008	[31]
12	<i>Aristolochia melastoma</i>	Antitumor	Cláudio et al.,2012	[32]
		Insecticidal		
		Nephrotoxic activities		
13	<i>Aristolochia pubescens</i>	Insecticidal activity	Isabele r nascimento et al.,2003	[33]
14	<i>Aristolochia repens</i>	Anti-microbial,	Onawumi et al.,2014	[34]
15	<i>Aristolochia ringens</i>	Anticancer activity	Abidemi james akindele et al.,2014	[20]
		Antiinflammatory activity	Aigbe flora ruth et al.,2014	[35]
16	<i>Aristolochia tagala</i>	Antiproliferative Activity	Abhijit and jitendra nath.,2012	[36]
		Cytotoxic activity		
		Analgesic activity		
		Antimicrobial activity		
		Antifertility activity		
		Anti-infective anti-bacterial	Kalaiarasi v,et al.,2013	[37]
		Anti-microbial activity	Sundari, S.K.K.et al.,1976	[38]
		Analgesic and antimicrobial activity		
		Antifungal activity		

### 3. CONCLUSION

Species of *Aristolochia* were widely distributed in all parts of the world and were utilized traditionally for their various medicinal uses. This review of literature including pharmacological investigations on *Aristolochia* species has covered 16 plants *Aristolochiaceae*. Which were reported to contain aristolochic acids and esters, aristolactams, aporphines, protoberberines, isoquinolines, benzyloquinolines, amides, flavonoids, lignans, biphenyl ethers, coumarins, tetralones, terpenoids, benzenoids, steroids, and others with extensive physiological activities. Currently the research are under the nephrotoxic properties of *Aristolochia* species. Aristolochic acids are responsible for a dreadful disease of Chinese herb nephropathy recognized in 1992. This review will help researchers and scientists in locating the detailed information on *Aristolochia* species and address the Clinical significance of these plants that can be evolved by studying their active phytoconstituents, toxicity studies and further mechanistic studies are to be assessed and explored.

### 4. CONFLICT OF INTEREST STATEMENT

We declare that we have no conflict of interest

## 5. REFERENCES

1. Sawarkar HA, Singh MK, Pandey AK, Biswas D. In vitro anthelmintic activity of ficus bengalensis, ficus caria and ficus religiosa a comparative anthelmintic activity, International Journal of Pharma Tech Research 2011; 3(1): 152-153.
2. M. E. Khan, I. Toma, D. Y. Shingu and C.H. Wazis. Antiplasmodial activity of the methanol extract of the roots of Aristolochia albida in albino swiss mice. Journal of biological science and bioconservation 2012; 4.
3. Payal chawla, Amit Chawla, Gagan Shah, Baghel US, Dhawan RK. A review on pharmacognosy and biological activities of Aristolochia. Asian journal of research in biological and pharmaceutical sciences 2013; 1(2): 97 – 106.
4. P. Bharathajothi and Bhaaskaran CT, Phytochemical and pharmacological evaluations of Aristolochia bracteolata lam. Asian journal of plant science and research, 2014; 4(6): 15-19.
5. Thirumal.M, Vadivelan.R, Kishore.G, Brahmaji.V.S, Aristolochia bracteolata: An Overview on Pharmacognostical, Phytochemical and Pharmacological Properties. Critical Review In Pharmaceutical Sciences 2012; 1(1): 70-82.
6. Mokhtar Mohamed Elamin and Abdalla Abdelrahim Satti, Insecticidal and repellent effects of aristolochia bracteolata lam. Against Trogoderma granarium everts. International Journal of science innovations and discoveries. 2012; 2(6): 559-566.
7. P.S. Negi, C. Anandharamkrishnan, and G.K. Jayaprakasha. Antibacterial activity of Aristolochia bracteata root extracts journal of medicinal food. Journal of medicinal food 2003; 6(4): 401–403.
8. Víctor Manuel Navarro-García , Julieta luna-herrera , Ma. Gabriela Rojas-Bribiesca , Patricia Álvarez-fitz and María Yolanda ríos . Antibacterial activity of Aristolochia brevipes against multidrug-resistant Mycobacterium Tuberculosis Molecules. 2011; 16: 7357-7364.
9. Elvira Nacsá-Farkas, Ivan Pauliuc, Judit Krisch, Csaba Vágvölgyi, Anticandidal effect of the extracts from Melilotus officinalis and Aristolochia clematitis. Review On Agriculture And Rural Development 2013; 2 (1).
10. Tian-Shung WU, Yu-Yi Chan, and Yann-Lii Leu. The Constituents of the Root and Stem of Aristolochia cucurbitifolia Hayata and Their Biological Activity. Chemical and Pharmaceutical bulletin 2000; 48(7): 1006—1009.

11. Adelina jiménez-arellanes, Rosalba león-díaz, Marianameckes, Amparo Tapia, Gloriamar íamolina-salinas, Julieta luna-herrera, and lili ´an y´Epez-Mulia. Antiprotozoal and antimycobacterial activities of pure compounds from aristolochia elegans rhizomes evidence-based complementary and alternative medicine 2012;1-7.
12. Zamilpa A, Abarca-Vargas R, Ventura-Zapata E, Osuna-Torres L, Zavala MA, Herrera-Ruiz M, Jiménez-Ferrer E, González-Cortazar M. Neolignans from Aristolochia elegans as antagonists of the neurotropic effect of scorpion venom. Journal of Ethnopharmacology. 2014; 18(157):156-160.
13. Ting zhou, Xiao-Hua xiao, Jia-Yue Wang, Jin-Ling Chen, Xian-Fang Xu, Zhi-Feng He and Gong-ke li. Evaluation of microwave-assisted extraction for aristolochic acid from Aristolochiae fructus by chromatographic analysis coupled with nephrotoxicity studies biomedical chromatography. 2012; 26: 166–171.
14. Juliana C. Holzbach and Lucia MX. Lopes. Aristolactams and alkamides of aristolochia gigantean, Molecules 2010; 15: 9462-9472.
15. Hemlata Sati, Bhawana Sati, Dr Sarla Saklani, Prakash Chandra Bhatt, Abhay Prakash Mishra. Phytochemical and Pharmacological Potential of Aristolochia indica: A review Research Journal of Pharmaceutical, Biological and Chemical Sciences, 2011; (2)4: 648.
16. Jessy Elizabeth Mathew, Srinivasan Keloth Kaitheri, Seekarajapuram Dinakaranvachala, Magi Jose. Anti-inflammatory, antipruritic and mast cell stabilizing activity of Aristolochia indica. 2011; 14(5): 422-427.
17. Dattatraya C. Desai, Jeenu Jacob, Asha Almeida, Rajendra Kshirsagar and S Manjund Isolation, structural elucidation and anti-inflammatory activity of astragalin, (2) hinokinin, aristolactam i and aristolochic acids (i & ii) from Aristolochia indica natural product research: formerly natural product letters natural product research, 2014; 28(17): 1413–1417.
18. Rakesh Das, Atul Kausik and TK Pall. Anti-inflammatory activity study of antidote Aristolochia indica to the venom of Heteropneustes fossilis in rats. Indian journal of science and technology. Journal of chemical and pharmaceutical research 2010; 2(2): 554-562.
19. Suji Arivazhagan j.J. and Vimalastalin R. Nephroprotective activity of Aristolochia indica leaf extract against gentamicin induced renal dysfunction, 2014; 4(2): 13-18.
20. Abidemi James Akindele, Zahoor Wani, Girish Mahajan, Sadhana Sharma, Flora Ruth Aigbe, Naresh Satti et al. Anticancer activity of Aristolochia ringens vahl. (Aristolochiaceae) Journal of traditional and complementary medicine 2015; 5(1): 35–41.

21. Meenatchisundaram S, Parameswari G and Michael A. Studies on antivenom activity of *Andrographis paniculata* and *Aristolochia indica* plant extracts against *Daboia russelli* venom by in vivo and in vitro methods. *Indian journal of science and technology*. 2009; 2(4): 76-79.
22. Yogendra Kumar Gupta and Sharda Shah Peshin. Snake Bite in India: Current Scenario of an Old Problem. *Journal of clinical toxicology* 2014; 4(1).
23. Murugan m and Mohan VR, Efficacy of different solvent extracts of *vitex trifolia* l. and *aristolochia indica* l. for potential antibacterial activity, *Science research reporter* 2012; 2(1): 110-114.
24. Marina G. D'souza, Eswarappa Bheemappa , Vasantakumar K. Pai, Vivek V. Byahatti & Chandramouli Tule . In Vitro Study on Anthelmintic Activity of *Aristolochia indica* and *A. tagala* Roots. *Latin American Journal of Pharmacy* 2011; 30 (6): 1208-1210.
25. Mini KP, Venkateswaran KV, Gomathinayagam S, Selvasubramanian S and Bijargi s. In vitro anthelmintic effect of aqueous and ethanol extract of *Aristolochia indica* against *Haemonchus contortus*. *Journal of physiology and pharmacology advances* 2013; 3(6): 148-158.
26. AYKM Masud rana and JA khanam , *Aristolochia indica* whole plant extract as an antineoplastic agent. *Journal of medical science* 2002; 2(4): 202-205.
27. Surendra kumar, Rajeswari and N. Astalakshmi, Evaluation of antimicrobial activities of *Aristolochia indica* (linn). *International journal of pharmacy and pharmaceutical sciences*, 2011; 3(4).
28. J. Marlin Cynthia and K. T. Rajeshkumar. Effect of aqueous root extract of *Aristolochia indica* (Linn) on diabetes induced rats. *Asian Journal of Plant Science and Research*, 2012; 2 (4): 464-467.
29. Ghita Benzakour, Mariam Amrani, Mounia Oudghiri, A histopathological analyses of in vivo anti-tumor effect of an aqueous extract of *aristolochia longa* used in cancer treatment in traditional medicine in morocco. *International journal of plant research* 2012; 2(2): 31-35.
30. Bachir Benarba, Boumedienne Meddah, Ethnobotanical study, antifungal activity, phytochemical screening and total phenolic content of Algerian *Aristolochia longa* 2014; 3(4): 150-154.
31. Gisele B. Messiano, leandro Vieira, marcos. machado, Lucia MX lopes, Sergio de bortoli, and Julio Zukerman-Schpector. Evaluation of insecticidal activity of diterpenes

- and lignans from *Aristolochia malmeana* against *Anticarsia gemmatalis*. *Journal of agricultural food chemistry*, 2008; 56: 2655–2659.
32. Cláudio R. Nogueira; Lucia M. X. Lopes. Nitro derivatives and other constituents of *Aristolochia melastoma*. *Quím. Nova* 2012; 35(4):780-782.
  33. Isabele R Nascimento, Afonso T Murata, Sergio Bortoli and Lucia MX Lopes. Insecticidal activity of chemical constituents from *Aristolochia pubescens* against *Anticarsia gemmatalis* larvae. *Pest Management science* 2004; 60:413–416.
  34. Onawumi OOE, Oladoye SO, Oladipo MA and Abidakun KT. Phytochemical and antimicrobial screening of crude ethanolic extract of *aristolochia repens* *Journal of natural sciences research* 2014; 4(17):149-152.
  35. Ruth Aigbe, Naresh Satti, Olufunmilayo Olaide Adeyemi, Dilip Manikrao Mondhe, Anticancer activity of *Aristolochia ringens* vahl. (*Aristolochiaceae*) *Journal of traditional and complementary medicine* 2015; 5(1): 35-41.
  36. Abhijit dey and Jitendra nath De. *Pharmacology and Medicobotany of Aristolochia tagala cham: A Review* 2012; 3(1).
  37. Kalaiarasi V, Johnson M, Sivaraman, Janakiraman N, Babu, Narayani M. Phytochemical and antibacterial studies on *aristolochia tagala cham*. *World journal of pharmaceutical research*.2012; 3(2): 2172-2178.
  38. Sundari SKK, Valarmathi R, Akilandeswari S and Ruckmani K. Analgesic and antimicrobial activity of the dried leaves extracts of *Aristolochia tagala Cham*. *Hamdard Medicus* 2001; 44(3): 17-19.