Int. J. Sci. R. Tech., 2025 2(2)
A Multidisciplinary peer-reviewed Journal
www.ijsrtjournal.com [ISSN: 2394-7063]

Original Article

Acorus Calamus: An Ancient Remedy with Modern Medicinal Applications

Rahul Kashyap[1], Shivaji Patel[2], Chandraprabha Dewangan*[3], GyaneshKumar Sahu[4]

[1,2]*Rungta Institute Of Pharmaceutical Sciences, Kohka,, KurudBhilai,490024 , Chhattisgarh , India*
[3,4]*Rungta Institute Of Pharmaceutical Sciences & Research Kohka , Kurud Bhilai,490024 , Chhattisgarh , India*

ABSTRACT
The aim of the paper is provided information regarding incredible medicinal herb AcorusCalamus and its extract has various medicinal benefits like Anti diabetic activity, anti hypertensive effect, cytotoxic effect , immunosuppressive activity , antifungal activity , analgesic and anticonvulsant effect, bronchodilatory activity , licicidal activity, wound healing activity, coronary vasodilator effect, anti-cancer activity.The phytochemical constituent present in extract of oil are a-asarone, b-asarone, c-asarone, calamine, calamenenol, calameone, a-pinene,b-pinene, camphene, p-cymene, eugenyl acetate, eugenol, isoeugenol, methyl isoeugenol, calamol, azulene, eugenol methyl ether, dipentene, methyleeugenol, asaronealdehyde, terpinolene, 1,8-cineole
Keywords: Anti-inflammatory activity, antifungal activity, analgesic, Wound healing, immunosupressive activity

INTRODUCTION

AcorusCalamus also known as Sweet flag has been traditionally used as medicine. It is a tall perennial plant belongs to acoraece family. Traditionally, the perfumed leaves and rhizomes of sweet flag have been employed as medicine; the dried and powdered rhizome tastes strongly peppery.The leaves are simple, sword-shaped and elongated.It is commonly found in Manipur, the Naga Hills, especially around water bodies. This plant is found in both cultivated and wild settings in India, including plains and lowlands, and can reach elevations of up to 6000 feet in the Himalayas.The rhizome part of Acoruscalamuscontains aromatic oil that has been used medicinally since ancient times. The rhizomes are regarded as having anti-spasmodic, carminative, anthelmintic, fragrant, expectorant, nauseating, nervine, sedative, and stimulating effects.

Taxonomical Classification:

- Kingdom – Plantae
- Subkingdom – Tracheobionta
- Super division – Spermatophyta
- Division – Magnoliophyta
- Class – Liliopsida
- Subclass – Arecida
- Order – Arales
- Family – Acoraece
- Genus – Acorus
- Species – Calamus

Botanical Description:

Phytomorphology

Acoruscalamus Linn. is an herbaceous perennial with a rhizome that is long indefinite branched, smooth, pinkish or pale green. The plant has brown, whitish, and spongy leaf scars, as well as slightly slender roots. The leaves are small and alternating, measuring between 0.7 and 1.7 cm broad with an average of 1 cm. The sympoidal leaf of Acoruscalamus is shorter than its vegetative leaves. The flowers are 3 to 8cm long, cylindrical , greenish brown and contains multitude of rounded spikes covering it. The fruits are very small and berry like apperance and with few seeds in it.

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



Figure 1 –AcorusCalamus plant with roots

Parts used:

Experiments typically focus on the plant's leaves, roots, and stem. In traditional medicine, rhizomes are commonly employed.



Figure 2 – Dried roots of Acoruscalamus

Cultural Aspects:

Soil and climate:

They grow in both tropical and subtropical climates. A Calamus needs enough sunlight in its growing phase and after it is harvested. The optimum climate has temperatures ranging from 10°C to 38°C with annual precipitation between 10 cm and 250 cm. This herb requires water and should not be grown in regions without suitable irrigation systems. The herb thrives best in alluvial, clay, and sandy loam soils. The pH level of soil must be 5 to 7.

Land preparation:

Calamus fields are prepared similarly to how rice fields are prepared for cultivation. The field should be sprayed with water. After mixing green manure and farmyard manure with water, the soil needs to be finely tilled.

Propagation:

The rhizome are typically used for reproduction, the rhizomes are harvested from previous planting. The soil must be wet to preserve the rhizomes. Cutting rhizomes into little pieces prepares them for planting. Plant sprouting rhizomes at a spacing of 30 cm x 30 cm. The plantation has a depth of around 4 cm. Early monsoon is the optimal time for Acorus cultivation.

Harvesting:

Harvesting can take place six to eight months after crop cultivation. Harvest the crop once the leaf tips turn yellow and dry off.To make digging easier before harvesting, the soil must be dried .

Crop yield: Around 40 quintal rhizomes are produced per hectare.



Figure 3 – AcorusCalamus plant

Phytochemical Constituent:

The oil of A. Calamus Linn contain concentrations of a-asarone, b-asarone, c-asarone, calamine, calamenenol, calameone, a-pinene,b-pinene, camphene, p-cymene, eugenyl acetate, eugenol, isoeugenol, methyl isoeugenol, calamol, azulene, eugenol methyl ether, dipentene, methyleeugenol, asaronealdehyde, terpinolene, 1,8-cineole, camphor, a-caryophyllene, and hydrocarbons . The root contains 13 amino acids, including vital ones such as arginine, lysine, phenylalanine, threonine, and tryptophan. Other amino acids identified included alanine, asparagine, aspartic acid, glutamic acid, norvaline, proline, and tyrosine.

Sweet flag oil was used to isolate two sesquiterpenic ketones of the guanine-type calamusenone and its isomer. Apart from calameone, sesquiterpenes were obtained from A.Calamus comprising shyobunone, isoshyobunone, isocalamendiol, dehydroxyisocalamendiol, and epgynone.

Toxicity:

The majority of sweet flag's biological activities have been attributed to the presence of asarones. By preventing neuronal death, beta-asarone has been shown in recent studies to alleviate cognitive impairment. By encouraging glutamate uptake and blocking excitatory neurotransmitter transporter-mediated current, alpha-asarone is also known to reduce excitatory activity.

It has been shown that some chemical components of sweet flag asarone have harmful side effects include extended vomiting, hallucinogens, carcinogenic, and genotoxic action in a dose-dependent way.

Traditional Medicinal Uses:

Brain rejuvenation:

According to certain theories, vacha calms the nervous system and revitalizes the brain, which lessens anxiety and excitement. Furthermore, it helps people with epilepsy. To reduce anxiety and epileptic attacks, 4 g of vacha powder with honey can be used once a day without risk.

Curing respiratory diseases:

Vacha is effective for treating throat disorders such as sore throat, strep throat, hoarseness, asthma, and associated symptoms. It also helps with sinusitis and colds. The patient maintains small pieces of betel nut-sized roots under their tongue.

Voice clarity:

Apply 1 to 2 grams of vacha powder mixed with honey on the tongue for a powerful remedy. Pitch, verbal skills, and voice quality will all improve. Executives, singers, and other professions who communicate often will find it very beneficial.

Managing hernia:

A hernia occurs when an organ moves from its original site in the lower belly, beneath the naval, or in the testicles, affecting neighboring weaker tissues. Patients with this condition experience pain and edema. To treat hernias, apply a mixture of vachapowder and neem seed meal to the affected area with pressure and tie with a cotton cloth. Rebuilding these structures strengthens weaker tissues and muscles.

Curing rat bites:

Vacha is an effective treatment for rat bites. For around seven days, take 4 g of vachapowder every day along with rice water, which is created by simply soaking rice in water for an hour. As a result, all of the symptoms associated with a rat bite will get better, and the harmful microorganisms found in rat saliva will also be removed.

Management of obesity:

Vacha is frequently used to treat obesity. To lose weight, consume 2.5-5 g of vachapowder with lukewarm water in the morning and evening.

Joint swelling:

For people with arthritis, blending flaxseed oil with vacha powder and applying it gently to the afflicted joints will help reduce joint pain and swelling.

Pharmacological actions:

Table 01: Pharmacological activity of Acocus calamus briefly discuss below:

S. No	Pharmacological Activity	Study Model / Method Used	Key Findings
1	**Nootropic Activity**	Morris water maze (mice), Elevated Plus maze (rats)	Improved memory and learning, supportive in memory impairment.
2	**Anti-diabetic Activity**	OGTT, STZ-induced diabetic rats	Normalized blood glucose, improved insulin levels, pancreatic regeneration.
3	**Antihypertensive Effect**	HFD-induced hypertensive rats	Reduced blood pressure and heart rate, synergistic effect with *Gymnema sylvestre*.
4	**Anti-obesity Effect**	Animal model	Reduced cholesterol, glucose intolerance, weight loss, lipid-lowering effect.
5	**Cytotoxic Effect**	Methanolic and aqueous extracts	Time and concentration-dependent cytotoxic effects.
6	**Immunosuppressive Activity**	Ethanolic extract study	Inhibited immune cell proliferation, tumor necrosis induction.
7	**Antifungal Activity**	Ethanolic extracts on fungi	100% mycelial growth inhibition, alternative antifungal agent.
8	**Bronchodilatory Activity**	Guinea pig trachea study	Calcium channel inhibition, relaxation of airway muscles.
9	**Analgesic & Anticonvulsant Activity**	Acetic acid Writhing, PTZ-induced seizures	Reduced pain, increased seizure latency, neuroprotection.
10	**Antispasmodic & Antidiarrheal Activity**	Rabbit jejunum preparation	Spasmolytic effect via calcium channel blockade.
11	**Repellent & Oviposition Deterrent**	Bioassay with peach fruit fly	Effective repellent against fruit flies
12	**Anti-HIV Activity**	HIV-1 reverse transcriptase assay	Strong inhibitory effect on HIV-1 reverse transcriptase.
13	**Anti-ischemic Heart Disease Activity**	Clinical trial (45 patients)	Improved ECG, reduced cholesterol, alleviated chest pain.
14	**Antihepatotoxic Activity**	Acetaminophen-induced liver damage	Hepatoprotective and antioxidant properties.
15	**Licicidal Activity**	*Damaliniacaprae* lice study	Hexane and chloroform fractions effective against lice.
16	**Insulin Sensitizing Activity**	Diabetic mice model	Lowered glucose, triglycerides, and cholesterol.
17	**Wound-healing Activity**	Excision & incision wound models	Enhanced contraction, increased hydroxyproline, faster healing.
18	**Synergistic Anthelmintic Activity**	*Vitex negundo* and *Acorus calamus* extract study	Stronger anthelmintic effect in combination.
19	**Radioprotection & DNA Repair Activity**	γ-irradiation-induced DNA damage	Reduced radiation-induced DNA damage.
20	**Coronary Vasodilator Effect**	Isolated bovine coronary artery study	Increased coronary blood flow via EDHF-mediated action.
21	**Anticancer Activity**	Hydroalcoholic extract study	Strong anti-proliferative effects.

22	**Anti-seizures Activity**	MES & PTZ seizure models	Reduced seizure duration, anticonvulsant properties.

Nootropic Activity:

The neuropsychopharmacological impact of BramhiGhrita (BG), a polyherbalformulation, on memory and learning processes in mice using the Morris water maze model and rats using the Elevated Plus maze. Acoruscalamus may be found in BG. Its impact on memory and learning processes was evaluated at doses of 30, 50, and100 mg/kg, p.o. In the treatment of memory impairment, BG may serve as a supportive adjuvant as well as a memory enhancer formulation.

Anti-diabetic Activity:

The oral glucose tolerance test (OGTT) was conducted on normal rats. Male albinorats were treated with STZ (40 mg/kg, intraperitoneally) to induce diabetes. Diabetic rats were given 200 mg/kg of AC extract orally for 21 days to assess its anti-hyperglycemic efficacy by biochemical markers. Results indicated considerable normalization of blood glucose levels. After 21 days of treatment, blood glucose, lipid profile, glucose-6-phosphatase, fructose-1,6-bisphosphatase levels, and hepatic indicators were decreased compared to diabetic controls. Significantly higher levels of plasma insulin, tissue glycogen, and glucose-6-phosphate dehydrogenase were observed compared to diabetes controls. Histopathological examinations of the pancreas revealed that extracts can regenerate cells that were previously killed by STZ.

Antihypertensive effect:

Calamus was tested for its antihypertensive properties in rats with HFD-induced hypertension, both alone and with Gymnemasylvestre. After administering the HFD for 4 weeks, the average Systolic Blood Pressure (SBP) increased significantly. At a dose of 200 mg/kg, A. Calamus and G. Sylvestre considerably reduced blood pressure and heart rate. A. Calamus and G. Sylvestre demonstrated a synergistic effect when used together, as opposed to separately.

Anti-obesity effect:

Research was done on animals to examine the anti-obesity properties of the asaronecompound that was separated from the rhizome. Together with metabolic alterations, the asarone-treated adipose rats showed decreased adipokine variation, elevated cholesterol, glucose intolerance, and weight loss. An in vitro investigation showed that the aqueous extract of A. Calamus has a lipid-lowering effect by inhibiting the pancreatic lipase percentage (28.73%).

Cytotoxic Effect:

Rajkumar et al. Investigated the cytotoxic effects of methanolic and aqueous extractsfrom the Acoruscalamus plant. The study concluded that it may work against cytotoxicity in a time and concentration-dependent manner. [23]

Immunosuppressive Activity:

Malhotra et al. Assessed the ethanolic extract of Acoruscalamus'santicellular and immunosuppressive properties. The rhizome of Acoruscalamus exhibited immunosuppressive and antiproliferative qualities in its ethanolic extract. This extract induces tumor necrosis, which prevents the growth of human peripheral blood mononuclear cells triggered by antigens, mitogens, nitric oxide, and interleukins-2.

Antifungal activity:

Ethanol extracts of 40 higher plants from 23 different groups have been used to test the antifungal activity of many phytopathogenic fungi. A. Calamus and Piper betel were the two plants having the strongest antifungal activity. All six test pathogens' mycelial growth was completely (100%) suppressed by the highest antifungal activity of A. Calamus rhizome extract. When piper betel was employed, the majority of the test fungus displayed more than 50% inhibition. Ethanolic extracts from a variety of higher plants could be used as a substitute source of antifungal medications to protect crops or plants from fungal infestation

Bronchodilatory activity:

Pharmacological research was conducted on the traditional use of A. Calamus for treating respiratory diseases. To discover the mechanisms, isolated guinea pig trachea and atria were suspended in carbogen-filled organ baths and analyzed using various parameters. A. Calamus crude extract outperformed carbachol in relaxing high K+ (80 mM) regeneration, similar to verapamil. This shows that calcium channels are inhibited.

Analgesic and anticonvulsant activity:

The plant's methanolic root extracts were tested for analgesic activity using two methods: acetic acid-induced Writhing reaction and Rat caudal immersion.

anticonvulsant activity was assessed using pentylenetetrazol-induced convulsion methods. Oral therapy at dosages of 0.1 g/kg and 0.2 g/kg protected mice against pain models. Methanolic root extract significantly increased the latency time of mouse seizures induced by Pentylenetetrazol (PTZ). Researchers used MES and PTZ-induced seizure models using albino (Wistar strain) rats to test the anticonvulsant effects of an ethanolic root extract. The study found that extract treatment reduced the time needed for tonic hind limb extension in the MES model, but convulsion latency and occurrence increased in the PTZ model.

Antispasmodic and Antidiarrhoeal activity:

The crude extract AC, containing alkaloid, saponins, and tannins, reduced both spontaneous and high K+ (80 mm) caused contractions in rabbit jejunum preparation, with EC50 values of 0.42.0.06 mg/mL and 0.13.0.04 mg/mL. Showing signs of spasmolytic action, which could be caused by calcium channel blockade (CCB). These results imply that the n-hexane fraction's concentration of CCB-like constituents mediated the plant extract's spasmolytic effect, and this study offers a solid mechanistic foundation for its widespread application in gastrointestinal conditions like diarrhea and colic pain.

Repellent and Oviposition Deterrent Activity:

In a free choice bioassay, sweet flag (Acoruscalamus L.) and five other plant extracts in petroleum ether, acetone, and ethanol were tested for their ability to repel and deter peach fruit fly Bactrocerazonata. Curcuma longa petroleum ether extract, as well as Peganumharmala ethanol and acetone extracts, were found to be effective tepellents against peach fruit fly. Acetone and ethanol extracts of Acoruscalamus L. have been proven to effectively resist and prevent oviposition.

Anti-HIV activity:

For HIV-1 reverse transcriptase, 40 traditional Asian therapeutic herbs were investigated. The results showed that the rhizomes of the plants Cinnamomumloureiroi, Quercusinfectoria, Plumbagoindica L., and A. Calamus Linn had strong inhibitory effects on HIV-1 reverse transcriptase when crude extracts were added. The effectiveness of the anti-HIV 1RT activity was assessed using 50% inhibitory concentrations (IC50). This showed that the hexane crude extracts from A. Calamus L. and heterophyllus Lam. Were highly effective against HIV-1 RT.

Anti-ischemic Heart Disease Activity:

A clinical trial on 45 patients with ischemic heart disease at S.S Hospital BHU evaluated the efficacy of the medication Acoruscalamus. The patients were randomly divided into three groups. The first group received the trial medicine in a daily dose of 1.5-3 g divided across three months. The second group received purified 'guggulu', whereas the control group was given a capsule with lactose powder. Both the first and second groups showed encouraging progress. The medication was found to be useful in reducing body weight index, improving ECG, alleviating chest pain, and causing dyspnea with exertion. Lowering serum cholesterol, raising serum high density lipoproteins (SHDL), and lowering serum low density lipoproteins (SLDL).

Antihepatotoxic Activities:

Based on histological and biochemical data, it was found that the ethanol extract AC provides hepatoprotective and antioxidant effects against rats' liver damage caused by acetaminophen. The conventional medication silymarin (25 mg/kg B/W) and the ethanol extract of AC (500 mg/kg B/W) have similar levels of action.

Licicidal Activity:

Four solvents—hexane, chloroform, methanol, and distilled water—were used in an extensive sequential extraction process on dried A. Calamus rhizomes. In vitro licicidal activity of all four fractions was investigated using the goat-lice Damaliniacaprae (Trichodectidae) as the experimental organism. The only fractions that exhibited licicidal activity were n-hexane and chloroform. Comparing concentrations of 1% w/w and 10% w/w to 1% w/w lindane solution, a significant reduction in the mean time needed to kill the lice was noted.

Insulin Sensitizing Activity:

The study aims to assess the insulin-sensitizing and anti-diabetic properties of the ethyl acetate fraction of Acoruscalamus L. (ACE). Insulin-mediated glucose consumption was identified in L6 rat skeletal muscle cells. Diabetes and related consequences were studied in genetically obese diabetic C57BL/Ks db/db mice following daily oral administration for three weeks. ACE enhanced glucose intake via insulin in L6 cells ($P < 0.05$ and $P < 0.01$). In db/db mice, ACE (100 mg/kg) dramatically decreased blood glucose,

triglycerides, and total cholesterol. ACE can treat diabetes and cardiovascular problems without causing weight gain due to its ability to sensitize insulin.

Wound-healing Activity:

Excision and incision-based wound models were used to create wounds in rats of both sexes. The extracts were applied topically once daily in 40% and 20% w/w concentrations as an ointment and compared to a conventional medication (povidion-iodine). The wound healing process was evaluated based on wound closure rate, epithelialization period, granulation tissue strength and weight, hydroxyproline content, and histology. Ethanolic extract of Acoruscalamusignificantly improved wound healing activity in both models investigated. Acoruscalamus extract has been shown to improve wound healing by enhanced contraction, shorter epithelialization time, increased hydroxyproline content, and histological changes.

Synergistic Anthelmintic Activity:

According to Merekar et al., the root portion of Vitexnegundo and the rhizomes of Acoruscalamus have synergistic anthelmintic activity. According to the study, A. Calamus and V. Negundoethanolic extracts have dose-dependent anthelmintic action against earthworms. Additionally, the combined anthelmintic activity of A. Calamus and V. Negundo is more potent than either plant's activity alone. A commercially available medication served as the standard reference medicine for this investigation.

Radioprotection and DNA Repair Activity:

Exposing animals to 4 Gy γ-irradiation caused significant DNA damage in peripheral blood leucocytes, bone marrow cells, and splenocytes. An alkaline comet assay showed that whole-body γ-irradiation increased nuclear DNA comet parameters in these cells, including tail length, tail moment, and olive tail moment. Mice were given 250 mg/kg body weight of Acoruscalamus extract orally 1 hour before exposure to whole-body γ-irradiation. This prevented an increase in cellular DNA comet parameters. Comet parameters decreased with post-irradiation time, indicating less radiation-induced DNA damages due to repair.

Coronary Vasodilator Effect:

Using isolated bovine coronary artery rings suspended in tissue baths filled with krebs solution, kept at 37°C, and aerated with carbogen, the effect of a coronary vasodilator was investigated. Responses were recorded using a Power Lab data acquisition system. Activity-directed fractionation showed that endothelial-derived hyperpolarizing factor (EDHF)-mediated activity is concentrated in the n-Hexane fraction, while crude extract of Acoruscalamus (Ac.Cr) inhibited U46619 (20 nM) precontractions in bovine coronary artery preparations. These findings suggest that the increase in coronary flow is caused by Ac. Cr mediating the coronary vasodilator action predominantly through EDHF.

Anticancer Activity:

The anticancer properties of Acoruscalamus rhizomes were assessed by Gaidhani et Al. They made a hydroalcoholic extract of Terminalia chebula, Acoruscalamusrhizome, and Glycyrrhizaglabra root, and they investigated their anti-proliferative and anti-cancer effects. According to the results, each of these plant components exhibits strong anti-proliferative properties.

Anti-seizures Activity:

To assess the effectiveness of an aqueous extract of Acoruscalamus (AEAC) on electrical and chemical seizures in albino mice. In acute studies, animals were given either normal saline, sodium valproate, or AEAC 60 minutes before the experiment. in chronic studies, animals were given twice daily for ten days, with the final dose administered one hour before exposure to MES or PTZ.

Conclusion:

The collected information regarding the sweet flag in world is matched with available herbs.It has rich history in Indian and Chinese culture it is very important ingredient in various cocktail preparation used for the treatment of treatment and management of Insomnia, headache, hysteria , fever body and severe inflammatory pain.

Results & Discussion

Acorus calamus exhibits diverse pharmacological activities, including anti-diabetic, antihypertensive, cytotoxic, immunosuppressive, antifungal, analgesic, anticonvulsant, bronchodilatory, wound healing**,** and anticancer effects. These therapeutic actions are attributed to its rich phytochemical profile, comprising α-asarone, β-asarone, camphene, eugenol, p-cymene, and other bioactive compounds.

The plant's anti-diabetic and antihypertensive effects are linked to improved insulin secretion and blood pressure regulation. Its cytotoxic and immunosuppressive activities demonstrate potential

for cancer treatment and immune modulation. The antifungal and wound-healing properties highlight its dermatological applications, while its bronchodilatory and anticonvulsant effects indicate respiratory and neurological benefits.

These findings support the therapeutic versatility of Acorus calamus, making it a promising candidate for pharmaceutical development. Further clinical validation and dosage optimization are necessary to establish its full medicinal potential

REFERENCE

1. Imam H, Riaz Z, Azhar M, Sofi G, Hussain A. Sweet flag (Acorus calamus Linn): An incredible medicinal herb. Int J Green Pharm. 2013;7(4):288.
2. Shah PD, Ghag M, Deshmukh PB, Kulkarni Y, Joshi S, Vyas B, et al. Toxicity study of ethanolic extract of Acorus calamus rhizome. Int J Green Pharm. 2012;6(1):29-35.
3. Shalini K, Chandel SR, Atri S, Guleria S, Bhardwaj I, Rolta R. The therapeutic Properties and Applications of Acorus calamus (Sweet flag): A Review. Asian Jr of Microbiol Biotech Env Sc. 2021;23(1):122-36.
4. Bhowmik D, Chiranjib, Tiwari P, Tripathi KK, Kumar KPS. Traditional Indian memory enhancer herbs and their medicinal importance. Ann Biological Res. 2010;1(1):41-6.
5. Kaushik R, Binu S. Establishment of Monograph of Acorus calamus Linn Rhizomes, J Drug Deliv Ther. 2012;2(3):136-40.
6. Melani D, Himawan T, Afandhi A. Bioactivity of Sweet Flag (Acorus calamus Linnaeus) Essential oils Against Spodoptera litura Fabricius (Lepidoptera: Noctuidae). J Trop Life Sci.2016;6(2).
7. Singh S, Yadav M. A Critical Review of Vacha (Acorus calamus L.) In Ayurvedic and Modern Context, World J pharm med res. 2022;8(3):182-87.
8. Kirtikar KR, Basu BD, Indian Medicinal Plants, International Book Distributors. 2007;4.
9. Balakumbahan R, Rajamani K, Kumanan K. Acorus Calamus: An Overview. J Med Plant Res. 2010;4(25).
10. Umamaheswari N, Rekha A. Sweet flag: (Acorus calamus) - An incredible medicinal herb. J Pharmacogn. Phytochem. 2018;7(6):15-22.
11. Pansare TA, Sadabal B. Ayurvedic Phytochemical, Therapeutic and Pharmacological overview on Vacha (Acorus calamus). Int J Res Ind Med. 2020;4(4).
12. Paithankar V, Belsare SL, Vyas J. Acorus calamus: An Overview. Int Biomed Sci 2011.
13. Chandra D, Prasad K. Phytochemicals of Acorus Calamus (Sweet Flag). J Med Plant Studies. 2017;5(5): 277-81
14. Ranjan A, Jain P, Singh B, Singh P, Sharma HP. Acorus calamus L. An insight review of botany, chemistry, medicinal uses, and cultural practice. J Chem Bio Physiol Sci. 2016;66(33):l027-45
15. Raina VK, Srivastavaet S, Syamasundar KV. Essential oil composition of Acorus calamus L. From the lower region of the Himalayas. Flavour Fragr J. 2003;18(1):18-20
16. Vashi IG. Patel HC. Chemical Constituents and antimicrobial activity of Acorus Calamus Linn. Journal of Comparative Physiology and Ecology. 1987.
17. Tamari LC. Preliminary Phytochemical Screening of medicinal plants of hilly districts (Kumaon and Garhwali division) of UP. Bulletin of medico-ethno-botanical Research. 1984.
18. Yamamura S, Iguchi M, Nishiyama A, Niwa M, Koyama H, Hirata Y. Sesquiterpenes from Acorus calamus L. Tetrahedron. 1971;27(22):5419-431
19. Muthuraman A, Singh N. Acute and sub-acute oral toxicity profile of Acorus Calamus (Sweet Flag) in rodents. Asian Pac J Trop Biomed. 2012;2(2):1017-23
20. Chellian Rk, Pandy VP, Mohamed Z. Pharmacology and toxicology of α- and β-Asarone: A review of preclinical evidence. Phytomedicine. 2017; 32:41-58
21. Bist MK, Badoni AK. Araceae in the folk life of the tribal populace in Garhwal Himalayas. J EcoBot Phytochem.1990;1:21-24.
22. BalajiRao NS, Rajasekhar D, Raju, DC. Ethno-medicinal notes on some plants of Tirumala Hills for dental disorders. Ethnobotany 1996;8(1):88-91
23. Sharma P, Jain DK, Jain NK, Jain A, Bhadoria UP, Paliwal P et al. Anti-Parkinson's Potential of Acorus Calamus Linn: A Review. J Pharma Negative Results. 2022;13(5)

24. Tripathi AK, Singh RH. Clinical study on an indigenous drug Vacha (Acorus calamus) in the treatment of depressive illness, Journal of Research Ayurveda Siddha. 1995.
25. Priscilla H, Balamurugan R, Shah H. Antidiabetic Activity of methanol extract of
26. Acorus calamus in ST induced diabetic rats. Asian Pac J Trop Biomed. 2012;2(2):S94146
27. Mehrotra S, Mishra KP, Maurya R, Srimal RC, Yadav VS, Pandey R et al. Anticellular and immunosuppressive properties of ethanolic extract of Acorus calamus rhizome. Int Immunopharmacol. 2003;3(1):53-61
28. Rajangam J, Anitha T, Joshi VD. Analgesic and Anti-Convulsant effects of Acorus calamus roots in mice. Int J Pharmacol Research. 2010;2(1):552-55
29. Kaushik S, Koushik S. Study of the anxiolytic activity of Ethanolic extract of the root of Acorus calamus in albino mice. Asian J Pharm Clin Res. 2020;13(12):77-80.
30. Shah AJ, Gilani AH. Bronchodilatory effect of Acorus calamus (Linn.) Is mediated through multiple pathways. J Ethnopharmacol. 2010;131(2):471-7

HOW TO CITE: Rahul Kashyap, Shivaji Patel, Chandraprabha Dewangan*, GyaneshKumar Sahu, Acorus Calamus: An Ancient Remedy with Modern Medicinal Applications, Int. J. Sci. R. Tech., 2025, 2 (2), 140-148. https://doi.org/10.5281/zenodo.14892736