

## ***Arisaema tortuosum* (Wall.) Schott : an important medicinal plant**

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### **Abstract**

*Arisaema tortuosum* is found wild in the valley as well as the hilly regions. It is frequently found under bamboo bushes which is common during rainy season. *Arisaema tortuosum* has been exploited for many reasons from its wild. It is been used in the traditional medicines for treating various diseases, stomachache, rheumatism, dog bite, liver disorders, piles and many more. Several phytochemicals are found to be present in *Arisaema tortuosum* such as alkaloid, flavonoid, triterpenoid, saponin, luteolin, quercetin, and lectin, etc. Extract of *Arisaema tortuosum* was observed to have antinematodal, antihelmentic, anticancerous, antibacterial, antiviral, antihepatotoxic, antioxidant and anticancerous properties. *Arisaema tortuosum* lectin is reported to show *in-vitro* anticancer activity against OVCAR-5, SiHa, and Ht-29. It may be reported that *Arisaema tortuosum* contains many valuable compounds which may have great potential in pharmacology.

**Key words :** *Arisaema tortuosum*, pharmacology, traditional medicines, phytochemicals.

Several plants having valuable medicinal properties are being used in preventing and treatment of different diseases. Many studies are underway using different plants and plant parts to find novel ways of treatment. Around 25 percent of all prescription drugs are derived from plants, shrubs or herbs<sup>24</sup>. The genus *Arisaema* having around 250 species and the species are being used in different medicinal purposes<sup>1</sup>. *Arisaema* species are found available

in many regions of the world. *Arisaema tortuosum* (Wall.) Schott is delicate tall Angiospermic herb. The family of *Arisaema tortuosum* (Wall.) Schott is Araceae. In English, it is called Whipcord Cobra Lily. *Bagh Jandhra* in Hindi and *Lin-chieshoo* in Manipuri. *Arisaema tortuosum* is found in Rhododendron forests areas, it is found to be available in India, Myanmar, China, and Pakistan<sup>2,17</sup>. In the state of Manipur of India, it is found in the

valley as well as the hilly regions, it is found in wild and frequently under bamboo bushes which is common during rainy season and short lived.

*Arisaema tortuosum* is utilized in various traditional medicine. It used for piles, snake bite, digestive tract problems, rheumatism, in the fracture of bone and infections caused by parasites<sup>6,22,24</sup>. Extracts from the *Arisaema tortuosum* tuber are reported for having aesthetic, anti-inflammatory, anti-cancerous, antioxidant and anti-microbial activities<sup>2,16</sup>. Ethyl acetate, chloroform, and n-hexane fractions of *Arisaema tortuosum* tubers have been studied and observed to have antibacterial and antifungal activities<sup>2</sup>. Lectins from *Arisaema tortuosum* tubers were reported to show anti-proliferative activity in *in-vitro* against human cancer cell lines and also showed anti-insect activity<sup>7,14,17</sup>. The aim of this review paper is to present the important pharmacological and medicinal values of *Arisaema tortuosum*<sup>5</sup>.

#### *Morphology of Arisaema tortuosum :*

The plant appears like a cobra with a whip-like tongue which rises up vertically up to 12 inches long and thus, its name is derived. The spadix-appendage is of green or purple color. In the month of June, the 4' tall thick fleshy petiole comes out furnished by two palmate leaves which are green in colour and arranged near the top<sup>5</sup>. When the leaves open, the pitcher which is on the top of the stem unfurl revealing a Jack-in-the-pulpit flower which is green color with a whip-like tongue extending upward from the mouth of the flower up to 12 inches or more<sup>5</sup>. Flower of *Arisaema tortuosum* is up to 30 cm long and bisexual<sup>1</sup>.

The tall stem of these plants bears the bright red berries ripen bearing seeds during autumn. And the seeds regenerated into new plants. This plant is a wonderful kind in the garden woodland<sup>5</sup>. The plant height is around 50 cm and even upto 2 m and grow in aggregation forming large clump.

#### *Medicinal uses of Arisaema tortuosum :*

The genus *Arisaema* of the Areaceae family is found in all continents except Europe, South America, and Australia<sup>1</sup>. The genus *Arisaema* has more than 250 species<sup>1</sup>. It has been used for medicinal and food purposes as well. *Arisaema tortuosum* is an important medicinal plant of the genus *Arisaema*. *Arisaema tortuosum* is a wild plant. It is being used as food material as well as by the traditional medicinal practitioners. *Arisaema* has been used for treating many diseases<sup>1</sup>. *Arisaema tortuosum* dried powder form of tuber as well as the juice of *Arisaema tortuosum* have been utilized for stomachache and rheumatism<sup>10,12</sup>, snake-bite<sup>3</sup>, dog bite as well as liver disorders<sup>12</sup>, piles<sup>23</sup>, indigestion, digestive tract problems, abdominal pain, constipation, dysentery<sup>8,16,23</sup>, and utilized as contraceptive<sup>18</sup>. It is utilized against infections caused by nematodes and for abscess, used as antihelmentic and for healing the wound and in the treating fracture of bone and infections caused by parasites<sup>1,6,22,24</sup>. Dried powder and juice of *Arisaema tortuosum* have been utilized and applied for snake bites as well as to kill parasites which infest cattle<sup>6</sup>.

*Arisaema tortuosum* is used in the folk medicine of India. Used in Ayurveda because of its medicinal properties, it is used

in the treatment of hyperuricemia, gout, and cancer and for curing different types of diseases which are related to inflammation and stress<sup>1,17,20</sup>. Tubers of *Arisaema tortuosum* exhibit antioxidant, antihepatotoxic, aesthetic, anticancerous, and antimicrobial properties<sup>16</sup>. In Manipur, rhizome decoction of *Arisaema tortuosum* is utilized as antidote to snake-bite and kill worms which infested the cattle<sup>11</sup>.

#### *Phytochemistry of Arisaema tortuosum :*

*Arisaema tortuosum* is found to contain several phytochemicals such as steroids, glycoside and carbohydrate<sup>24</sup>. It is also reported to contain alkaloids, flavonoids, triterpenoids, saponins, and lectins<sup>13</sup>. The *Arisaema tortuosum* showed antiviral activity of *Arisaema tortuosum*<sup>21</sup>. The extracts of *Arisaema tortuosum* was found to be active against acyclovir-resistant HSV-2 and HSV-1 and also HPLC PDA MS/MS analysis of the extract of *Arisaema tortuosum* was observed to contain flavonoids including apigenin as well as luteolin<sup>21</sup>. The *Arisaema tortuosum* leaf and tuber extract showed strong antibacterial activity<sup>4</sup>.

The TLC (thin layer chromatography) and HPTLC analysis of methanolic extract of the tuber of *Arisaema tortuosum* showed the presence of lectin, luteolin, quercetin, and rutin<sup>17</sup>. The methanolic extract of the tuber of *Arisaema tortuosum* was found to have higher antioxidant activity as compared with Trolox (standard) while evaluated using DPPH, ABTS, and FRAP assay, also a good amount of phenolics, 86.2 milligram per 100 gram and flavonoids, 175.5 milligram per 100 gram were obtained and showed potent anti-inflammatory

activity by b-glucuronidase and diene-conjugate assays comparing with salicylic acid as standard<sup>17</sup>. Antiproliferative activity of *Arisaema tortuosum* tuber methanol extract was also studied and observed the *in vitro* inhibition of the growth of tumor on HeLa cancer cells<sup>17</sup>. A plant lectin from the tubers of *Arisaema tortuosum* was obtained using affinity chromatography on asialofetuin-linked amino activated silica beads. *In-vitro* anticancer activity of *Arisaema tortuosum* lectin against five human cancer cell lines was studied. The cancer cell lines were OVCAR-5 for ovary, SiHa for cervix, SNB-78 for cNS, PC-3 for prostate and HT-29 for colon and they were subjected to antiproliferative test<sup>7,15</sup>. Out of this five, *Arisaema tortuosum* lectin showed anti-cancer activity against three cell lines, an inhibition of upto 56% inhibition was observed for OVCAR-5, 49% for SiHa and 45% for Ht-29, but for SNB-78 and PC-3, no significant antiproliferative activity was obtained<sup>7</sup>. *Arisaema tortuosum* was found to have complex specificity towards asialofetuin, a serum glycoprotein and towards LacNAc (Nacetyl-D-lactosamine) as well<sup>7</sup>.

A few lectins are reported for being utilized in the research and therapy of cancer<sup>7</sup>. Lectin isolated from *Viscum album* indicates its immune stimulating effects for the cancer-immunosuppressed lymphocytes and in some malignant cell lines, it inhibits the protein synthesis<sup>25</sup>. Extracts of mistletoe are applied for treating patients with tumor<sup>9</sup>. *Agaricus bisporus* lectin reversibly inhibits colonic cancer cell lines proliferation without the cause cytotoxicity<sup>19</sup>.

The present article highlighted the phytochemistry and medicinal uses of *Arisaema tortuosum* (Wall.) Schott. *Arisaema tortuosum* has been exploited for many human usages from its wild. Strategies to conserve *Arisaema tortuosum* should be taken up. *Arisaema tortuosum* as a medicinal plant has many medicinal properties and are being used in traditional medicines. Extract of *Arisaema tortuosum* showed potential antibacterial and antiviral activity. A plant lectin isolated from *Arisaema tortuosum* was observed to have *in-vitro* anticancer activity. It may be concluded that *Arisaema tortuosum* is a potential medicinal plant in pharmacology. Further it is may be suggested to have many more research on valuable compounds present in *Arisaema tortuosum* and their biological activity.

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