

## PHARMACOLOGICAL PROPERTIES OF *CARDIOSPERMUM HALICACABUM* L.: A REVIEW

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### ABSTRACT

*Cardiospermum halicacabum* L. (*C. halicacabum*) plant is as old as human civilization. The common name of this plant is balloon wine/ love in puff/ heart pea. All over the world, it harvested in backyards for its medicinal and food value. Whole plant and seeds considered useful. Seeds is in black coloured with a white heart shaped spot. It contains polysterols, saponins, alkanoids, small amount of long chain fatty acids. Polysterols have anti redness effect. It shows similar effects to corticosteroid. Cortisone creams contains similar and the active substance in a mother tincture. This natural cream is effective in treating Eczema, burns, redness or rheumatic disease. They show anti-inflammatory, antifilarial, anti-parasitic, anti-diarrhoeal, anti-hyperglycemic, anticonvulsant, anticarcinogenic activities properties. *C. halicacabum* used in the treatment of dermatitis. Plant seeds are good for arthritis. They immensely used as analgesic, laxative, anti-phlogistic. The drug show vasodepresant activity which, is considered to be transient in nature. The extract of Balloon wine is a good herbal treatment of cancer. It effects in inhibiting the immuno-suppressive action of drugs.

Keywords: *Cardiospermum halicacabum* L., Balloon wine, Antibacterial, Antifungal, Antiparasitic, Antidiarrheal, Antipyretic

### INTRODUCTION

The average height of *C. halicacabum* L. is about three metres and it is a shrub. It is mostly branched from the base. Plant uses tendrils to climb in the surrounding vegetation and for the support of themselves. The stems of this plant finds to scramble all over the ground. Based on commodities, *C. halicacabum* L. is eco-friendly and bio-friendly. *C. halicacabum* L. has been used for treatment of rheumatism, stiffness of limbs, snake bite, its root for nervous diseases, as a diaphoretic, diuretic, emetic, laxative, refrigerant, stomachic, and sudorific. Leaves and stalks used in the treatment of diarrhea, dysentery, and headache and as a poultice for swellings (Chopra *et al.*, 1986). The herbal products are also formed which are useful like gels, creams. They grow in ever wet or in seasonal climates. Shoots used in health care and fodder needs. *C. halicacabum* is belong

to spindaceae family (Boonmars *et al.*, 2005). The various plant parts used in traditional medicine system for treatment of anti-inflammatory (Sadigue *et al.* 1987), antibacterial (*Escherichia coli*, *Klebsiella pneumoniae*, *Salmonella typhi*, *Shigella boydii*, *Xanthomonas oryzae* pv. *oryzae*, *Xanthomonas campestris* pv. *Sesami*, *Xanthomonas campestris* pv. *Malvacearum* and *Xanthomonas campestris* pv. (Raman *et al.*, 1998), antipyretic (GuribFakim and Sewaj 1992), analgesic (Dhar *et al.*, 1968), anthelmintic (Gopalakrishnan *et al.* 1976).

## **PHYTOCHEMICAL CONSTITUENTS**

Result of Phytochemical analysis indicated that *C. halicacabum* contain tannin, saponin, flavonoid, steroid, terpenoids, cardiac, dlycosides, alkaloids, anthraquinones (Annadurai *et al.*, 2013).

## **THERAPEUTIC USES**

*C. halicacabum* shows various medicinal properties such as antibacterial, antifungal, antiparasitic, antidiarrhoeal, anxiolytic, rubefacient, antipyretic, anti-inflammatory, anticonvulsant, and anticarcinogenic. Earache can be treated by using leaves juice as eardrop. It enhances hair growth. Leaves of *C. halicacabum* are used to treat scalp. The extract is a good herbal treatment for skin redness. It acts as modulators in reactions. This gives antipruritic properties. This plant does not forms hematoma hence, can be used for long term. It is effective in neurodermatitis like illness in chronic stages cardiac glycosides found in small quantities in the extracts (Deepan *et al.*, 2012). It also inhibits the action of drugs. Hence, it acts as immunosuppressive. Various skin problem as well as eczema can also be treated by the extract. Root extract are also used. Roots give quick remedy to pain, swelling, arthritis, body ache. Diarrhoea can also be treated by consuming leaves of this plant. Extract of roots are useful to cure hemorrhoids. Herbal tea can also be prepared.

## **MEDICINAL PROPERTIES AND USES**

*C. halicacabum* works as diaphoretic, diuretic, emetic, laxative, refrigerant, stomachic and sudorific and has antibacterial, anti-diarrheal, antioxidant activities, suppresses TNF production, exhibits anticancer, vaso depressant effect, rheumatism, severe bronchitis, snakebite. Antiulcer, analgesic, antiparasitic, antimalarial, antifilarial, and antipyretic (Raman *et al.*, 1998; Rao *et al.*, 2006; Kumaran and Karunakaran, 2006; Babu and Krishnakumari, 2006; Sheeba and Asha, 2006; Gopalakrishnan *et al.*, 1976; Asha and Pushpagan, 1999).

## **ANTIBACTERIAL ACTIVITY**

*C. halicacabum* extract shown antimicrobial activity against the pathogens *viz.* *Escherichia Coli*, *Pseudomonas aeruginosa*, and *Streptococcus sp.* (Gopal *et al.*, 2014).

## **ANTIPYRETIC ACTIVITY**

*C. halicacabum* exhibited antipyretic activity against yeast-induced pyrexia in rats (Asha and Ushpagan, 1999).

## **ANTIFUNGAL ACTIVITY**

The herbal extracts have shown inhibition against the fungi. Mahmud *et al.*, 2009 reported that the extract of *C. halicacabum* L. shown antifungal activity against human pathogens (*Aspergillus niger*, *Candida albicans*), animal pathogens (*Microsporillum gypsicus*, *Trichophyton mentagrophyte*) and plant pathogens (*Saccharomyces cerevisiae*, *Penicillium sp.*) (Shareef *et al.*, 2012).

### **ANTIOXIDANT ACTIVITY**

Methanol extract of *C. halicacabum* shown antioxidant potential *in vitro* systems. The extract of *C. halicacabum* indicates that it has good potential as a source for natural antioxidants. This prevent it from free radical-mediated oxidative damage (Joshi *et al.*, 2017).

### **ANTIDIABETIC ACTIVITY**

Antidiabetic effect of *C. halicacabum* ethanolic extract against streptozotocin-induced diabetic rats shown good activity. Many flavonoids present in the extract. These flavonoids reported as the antidiabetic principles. The leaf extract of *C. halicacabum* help to increase the activity of glucokinase and decrease the activity of glucose 6-phosphatase and fructose 1,6 phosphatase in the liver (Rajeswari and Sriidevi, 2014).

### **ANTIARTHRITIC ACTIVITY**

A topical herbal gel formulated by *C. halicacabum* and *Vitex negundo*, which shown promising results for the treatment of arthritis (Rajasekaran *et al.*, 2016).

### **ANTICOVULSANT ACTIVITY**

Petroleum ether fraction of *C. halicacabum* shown anticonvulsant activity against electroshock induced convulsions in rats (Vetrichelvan *et al.*, 2000).

### **ANTI-INFLAMMATORY ACTIVITY**

Ethanolic extract of possess good anti-inflammatory activity against mouse macrophage cell line RAW264.7 (Sheeba and Asha, 2009).

### **ANTIPARASITIC ACTIVITY**

Extracts of *C. halicacabum* tested against third-stage larvae of *Strongyloides stercoralis*. Aqueous extract of *C. halicacabum* exerted more rapid effect on larval motility than that of the alcoholic extract (Boonmars *et al.*, 2005).

### **ANTICANCER ACTIVITY**

The presence of phytochemicals, the extract of *C. halicacabum* showed anticancer activity against the breast cancer cell lines MCF-7 (Sagadevan *et al.*, 2013).

### **NEUROPROTECTIVE ROLE**

Methanolic extract of *C. halicacabum* potentially improved memory. It also significantly decreased the whole brain acetyl cholinesterase activity. Dementia is a type of neuro disease in which progressive brain dysfunctions that leads to (Kukkar *et al.*, 2014).

## CONCLUSION

*C. halicacabum* has enormous medicinal value, which, used to treat simple ailments to chronic diseases because of presence of their bioactive phytochemical constituents. It possess significant properties that support its role in medicinal field. It possesses anti-inflammatory, antidiarrheal, antiparasitic, antipyretic, antifilarial, anxiolytic, anticancer activity.

## REFERENCES

- Chopra, R.N and Nayar, I.C. and Chopra, S.L.R. 1986. Glossary of Indian Medicinal Plants. New Delhi: Council of Scientific and Industrial Research.
- Sadigue J, Chandra T, Thenmozhi V, Elango V (1987) Biochemical modes of action of Cassia occidentalis and *Cardiospermum halicacabum* in Inflammation. J Ethnopharmacol 19:201–212.
- Raman N, Radha A, Ravi M (1998) Antibacterial activity of *Cardiospermum halicacabum* against human and plant pathogens. Indian Drugs 35:29–31.
- GuribFakim A, Sewraj MD (1992) Studies on the antisickling properties of extracts of Sideroxylon Puberulum, *Faujasiopsis Flexuosa*, *Cardiosperum halicacabum* and *Pelargonium grareolens*. Planta Med 58:648–649.
- Dhar LM, Dhar MM, Dharwan NB, Mehrotra NB, Ray C (1968). Screening of Indian plants for biological activity. Indian J Exp Biol 6:232–247.
- Gopalakrishnan C, Dhananjayah R, Kameswaran L (1976) Studies on the pharmacological actions of *Cardiospermum helicacabum*. Indian J Physiol Pharmacol 20:203–208.
- Annadurai A., Elangovan V., Velmurugan S. and Ravikumar R 2013 Preliminary phytochemical screening and antibacterial of *Cardiospermum halicacabum* L. Advances in Applied Science Research, 2013, 4(5):302-308.
- Deepan T, Alekhya V, Saravanakumar P, Dhanaraju MD (2012). Phytochemical and Anti-Microbial Studies on the Leaves Extracts of *Cardiospermum halicacabum* Linn. Adv. Biol. Res. 6(1):14-18.
- Rao NV, Prakash KC, Kumar SM. Pharmacological investigation of *Cardiospermum halicacabum* (Linn.) in different animal models of diarrhoea. Indian J Pharmacol. 2006; 38 Suppl 5:3 46-49.
- Kumaran A, Karunakaran RJ. Antioxidant activities of the methanol extract of *Cardiospermum halicacabum*. J Pharm Biol. 2006; 44(2): 146-151.

Babu KC, Krishnakumari S. Anti-inflammatory and antioxidant compound, rutin in *Cardiospermum halicacabum* leaves. *Anc Sci Life* 2005;25(2):47-49.

Asha VV, Ushpangadan P (1999) Antipyretic activity of *Cardiospermum halicacabum*. *Indian J. Exp. Biol.* 37(4):411-414.

Gopal, RM, K. Prabhakaran, C. B. Pradeepa Devi, S. Amirtham and Settu. A, Phytochemical and antibacterial activities of *Cardiospermum halicacabum* leaf extract. *Scholars Research Library Archives of Applied Science Research*, 2014, 6 (4):74-77.

Shareef, Huma & Rizwani, Ghazala & Mahmood, Shaukat & Khursheed, Raheela & Zahid, Hina. (2012). In vitro antimicrobial and phytochemical analysis of *Cardiospermum halicacabum* L. *Pakistan Journal of Botany*. 44. 1677-1680.

P Joshi, R Vajpai, S Jawed. 2017. Studies on Phenolic Compounds and Anti-Oxidation Property Present in Medicinal Plants of Genus *Ficus*. *Epitome journal*, 3.

Rajeswari, R & Sriidevi, M. (2014). Study of in vitro glucose uptake activity of isolated compounds from hydro alcoholic leaf extract of *cardiospermum halicacabum* linn. *International Journal of Pharmacy and Pharmaceutical Sciences*. 6. 181-185.

Rajasekaran, A., Govindarjan, A. and Ramasamy, A. (2016). Formulation and evaluation of topical herbal gel for the treatment of arthritis in animal model. *Brazilian Journal of Pharmaceutical Sciences*. 52. 493-507.

Vetrichelvan T, Narasimhan CL, Venkatramani R. Anticonvulsant action of petroleum ether fraction of *Cardiospermum halicacabum* against electroshock induced Convulsion in rats. *Anc Sci Life*. 2000, 19(3-4) 174-175.

Sheeba, M.S. and Asha, V.V. (2009). *Cardiospermum halicacabum* ethanol extract inhibits LPS induced COX-2, TNF- $\alpha$  and iNOS expression, which is mediated by NF- $\kappa$ B regulation, in RAW264.7 cells. *Journal of ethnopharmacology*. 124. 39-44.

Boonmars, Thidarut & Khunkitti, Watcharee & Sithithaworn, Paiboon & Fujimaki, Y. (2005). In vitro antiparasitic activity of extracts of *Cardiospermum halicacabum* against third-stage larvae of *Strongyloides stercoralis*. *Parasitology research*. 97. 417-419.

Sagadevan, P.; Suresh, S. N.; Rathishkumar, S.; Gayathri, S.; Vithya Eswari, D. Anticancer activity of methanolic leaf extracts of *Andrographis paniculata* (Nees) and *Cardiospermum halicacabum* (Linn) against human breast cancer cell line (MCF-7). *International Journal of Pharmacy & Life Sciences*. 2013, 4: 2983-2986.

Kukkar, M.R. & Saluja, A.K. & Sachdeva, P.D. & Kukkar, R.R. (2014). In vivo investigation of the neuroprotective potential of *Cardiospermum halicacabum* linn. *International Journal of Pharmacy and Pharmaceutical Sciences*. 6. 64-66.