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VERNONIA CINERIA: A WONDERFUL ANTI-CANCEROUS HERB

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Abstract: *Cancer is one of the most dreadful disease of present era, not only in India but also in worldwide. Recent study shows that 7 lac people died of cancer every year in India and mortality rate is higher in male than female. This is one of the major fatal diseases of life. In Ayurveda our Acharya (Charak, Sushruta etc.) also described this disease namely arbuda (major neoplasm) and granthi (minor neoplasm). Granthi is nothing but a pathological condition of vitiated doshas in muscular tissues, blood, fat and structure of vessels with result into gland like abnormal growth or neoplasm. It looks like bubble of water, round erect and knotted. Various Acharya mentioned different types of granthi. Ayurveda, the foremost science of medicine has lots of herbs which works well on granthi or arbuda. Tulsi, Sahadevi, Kanchanar, Varun are known to treat arbuda. Sahadevi (Vernonia cineria) is medicinal herb of Compositae family, distributed throughout the India and can be easily seen along with roadside, open waste places, dry grassy sites. This herb is effective to treat granthi roga in tribal area of rajasthan, but no documentation has been done. Granthi roga occurs due to vitiation of Vatadi doshas, mainly Kapha prominency.*

Keywords: *Granthi, Arbuda, Sahadevi, cancer etc.*

Introduction: Cancer is one of the most dreadful disease of present era, not only in India but also in worldwide. Recent study shows that 7 lac people died of cancer every year in India and mortality rate is higher in male than female. In 2012, WHO released new statistics on Cancer incidence, mortality and prevalence worldwide i.e. GLOBOCON 2012 estimates of 28 types of Cancer in 184 countries in which there is more prevalence of Cervix and breast cancer? The death rate due to cancer is 8.2 million and 14.1 million new cases, which increase to 19.3 million new cases per year by 2025.This, is one of the major fatal diseases of life [1, 2]. In *Ayurveda* our *Acharya (Charak, Sushruta* etc.) also described this disease namely *arbuda* (major neoplasm) and *granthi* (minor neoplasm). *Granthi* is nothing but a pathological condition of vitiated *doshas* in muscular tissues, blood, fat and structure of vessels with result into gland like abnormal growth or neoplasm. It looks like bubble of water, round erect and knotted. Various *Acharya* mentioned different types of *granthi*. *Arbuda* as described by *Acharya Sushruta* "The *doshas* having vitiated in any part of the body and afflicting the *Mamsa*, producing swelling which is circular, fixed, slightly painful, big sized, broad base, growing slowly and does not suppurate". *Acharya Charak* described as "complication of *Vata- Rakta*". In modern science many drugs were introduced but these drugs induce toxic effects in the patients. In *Ayurveda*, the treatment can be summarized as *Shodhana* and *Shamana Chikitsa. Shodhana* is purification process which eliminates *doshas* mainly by *Panchkarma,* whereas *Shamana* therapy is curative pacifies *doshas*. Here, in this disease, *Rasayana* (immune-modulators) therapy is also given as they are anti-oxidants and overcome the side effects of anti-cancerous drugs [3,4]. *Ayurveda*, the foremost science of medicine has many herbs, which works well on *granthi(cyst) or arbuda(tumour). Tulsi, Sahadevi, Kanchanar, Varun* are known to treat *arbuda*. Plants have played an important role as a source of effective anticancer agents and it is significant that 60% of currently used anticancer agents are derived from natural sources, including plants, marine organism and microorganism [5]. Plant based medicine has

definitely found a role in cancer treatment (chemotherapy) and the mechanism of interaction between many photochemical and cancer cells has been studied extensively. Medicinal plants have become a major component of human health care as they have no or less side effects [6].

Vernonia cinerea (family Asteracea) also called little iron weed is a perennial grass with erect stem seen in the mainland of China, Myanmar, India, Bangladesh, Srilanka, Australia, Africa, New Zealand, Asia and other places1-3.In other languages it is commonly called as sahadevi in sanskrit and hindi, kukshim in bengali, puvamkurunnel in Malayalam. Parts that were used include the flower (treatment of conjunctivitis), seeds (used as anthelmintic), root (dropsy), and juice (piles). The whole plant is also considered to promote perspiration in febrile condition. The plant is anthelmintic, antibacterial, antiviral, antifungal, anti-inflammatory, diuretic, and stomachic [7,8]. The roots are useful in cough, inflammations, skin diseases, leprosy, fever renal and vesicle calculi. The whole plant is edible and can be used as a medicine. The plant is used as anticancer, febrifuge, diaphoretic. The whole plant used in cancer [5,9].

Botanical Classification [9]

Botanical Name	***:***	*Vernonia cinerea*
Family Name	***:***	*Compositae (Asteraceae)*
Kingdom	***:***	*Plantae*
Sub kingdom	***:***	*Tracheobionta*
Division	***:***	*Magnoliophyta*
Class	***:***	*Magnoliopsida*
Subclass	***:***	*Asteridae*
Order	***:***	*Asterales*
Family	***:***	*Compositae*
Subfamily	***:***	*Asteraceae*
Genus	***:***	*Vernonia*
Species	***:***	*Cinerea*

Morphology of *V. Cinerea:* *Sahadevi(Vernonia cineria* Less., family-*Compositae/ Asteraceae*) is medicinal herb. It is distributed throughout India and can be easily seen along with roadside, open waste places, dry grassy sites and perennial crops during plantation [9]. It is erect, branched and reaches a height of 12-75cm. Stem are Glabrous, cylindrical, hairy and slightly branched. As it can grow under different conditions of moisture and soil, the height of the plant and the size of leaves and flowers vary considerably. Root is 5-12 cm long, 1-7 mm thick, oblique and gradually tapering, bearing a few rootlets; external surface, dirty brown; fracture, short. Stem are Glabrous, cylindrical, hairy, slightly branched; 10-17 cm long, 1-8 mm thick, grooved and ribbed; basal region of branches greenish-brown, apical region dark green, bearing a number of flowers; fracture, short. Leaf is Simple, dark-green, smooth, alternate, opposite, estipulate, 2.5-5 cm long,1.8-3.6 cm broad, elliptical, lanceolate, obtuse or acutely toothed; shape and size variable; petiole short; odour, slightly characteristic. Each brush-like flower is really composed of a number of tiny flowers. When the seeds (really fruits) ripen, small powder-puff-like balls are seen on the plant. Everywhere we can see many species of this plant having white, pink, violet, reddish or purple flowers. The present attempt is to review and compile updated information on various aspects of V.cinerea plant used in Indian system of medicine for variety of purposes [10].

Rashpanchak[5,10] –

Guna	*:*	*Laghu, Ruksha*
Rasa	*:*	*Tikta*
Virya	*:*	*Ushna*
Vipaka	*:*	*Katu*
Used parts	:	Root, seed, leaves, flower / Whole plant (Panchang)

Chemical Constitute: The chief constituents are the triterpenes. Aerial parts gave luteolin-monobeta-D-glucopyranoside. Whole plant gave triterpene compounds-betaamyrin acetate, lupeol acetate, betaamyrinand lupeol; sterols-beta-sitosterol, stigmasterol and alpha-spinasterol;

phenolic resin, potassium chloride, Aklaloids, Flavonoids, Tannins, Saponins, Vitamin C, Fixed Oils and Fats, Glycosides, constituents. [5,11, 12, 13]

Anti-Cancerous Effect of *V. Cinerea*: The whole plant is used to prepare decoction for treating diarrhea, abdominal pain, colic, carcinoma and cough. Although in the tribal area it´s, *kshara* preparation is famous for *granthi and arbuda.* It is good for cancerous malformations or anti cancerous activity. This drug is effective to treat granthi and arbuda/tumor in tribal areas but no documentation has been done.

Previous Anti-cancerous Research in Animal: The plant was reported to possess anticancer activity against sarcoma 180 in mice. The effect of Vernonia cinerea Less extract on the inhibition of lung metastasis induced by B16F-10 melanoma cells was studied in C57BL/6 mice. V cinerea extract significantly (P <.001) inhibited lung tumor formation (78.8%) and significantly increased the life span (72.5%). Moreover, lung collagen hydroxyproline, uronic acid, and hexosamine and also serum sialic acid, γ – glutamyl transferase (GGT), and vascular endothelial growth factor (VEGF) levels were found to be significantly (P <.001) lower in treated animals compared with untreated controls [14].

Antitumour activity is significantly seen in ethanolic and chloroform extracts of aerial parts of *Vernonia cinerea* against Dalton's ascitic lymphoma. In vivo studies in mice showed a decrease in cancer cell count with the injection of extracts and this protective effect is also concluded by hematological parameters [14].

Other Pharmacological Activities

Antioxidant Activity: Alkaloids are a major component present in the plant and are said to have antioxidant and immunomodulatory effect. It is due to the DPPH scavenging activity of the carbon tetrachloride fraction of methanolic extract of the plant. These extracts are used for medicinal and preservative purposes. The antioxidant activity of the plant is due to its phenolic activity and may also play a role in neurofibrillary tangles and neurotic plaques16. Higher antioxidant property is shown by methanolic extract of leaf when compared to flower [8, 15, 13].

Antimicrobial Activity: Saponins present in flower extracts and flavonoids present in leaf and flower extracts are known to have anti-microbial activity. Hexane and crude extracts of flower shows maximum inhibition against B.cereus, E.aerogenus and S.aureus whereas leaf extracts showed activity against B.cereus and E.aerogenus but not against S.aureus. Ether extracts also showed antibacterial against B.cereus, E.aerogenes and S. aureus. Antibacterial activity of various extracts of the plant against both gram positive and gram negative bacteria exhibited different effects with a maximum antibacterial activity in case of methanolic extract than hexane extract.The whole plant shows good anti-bacterial activity against E.coli and Klebseilla pneumoniae species. This activity can be tested using agar disk diffusion method. The antibacterial activity was shown by petroleum ether, chloroform, acetone,methanol and ethanol extracts of the whole plant and the greatest effect was shown by petroleum ether and ethanolic extracts [7, 8, 16].

Anti-hypergylcemic Activity: The ethanolic extract contains phytochemical bioactive compounds like glycosides, esters, flavonoids, steroids,tannins and terpenoids which have anti hyperglycemic activity. In vivo studies in mice with crude extract and sesquiterpene lactone showed that the plant did not cause any significant toxicity nor any changes in alertness, breathing, mental problems and motor activity including body weight. Decrease in blood glucose was seen in alloxan induced mice than normal mice was observed when treated with the plant for a period of fourteen days.Time dependent reduction in diabetic activity of alloxan-induced rats is due to restoration of pancreatic function by increased insulin output or decreased intestinal Absorption.[11]

Sedative Activity: This plant contains a centrally acting depressant agent primarily involved in short term analgesia. The active ingredient is water soluble and heat stable preparations against insomnia and other related ailments. It can be used in relatively low doses for controlling pain. In vivo studies in mice showed that after approximately 4mins of lethal dose injection it was known to cause reduction in motor activity, depressant action, convulsions followed by death. Sublethal doses showed same effects but in a milder form approximately after 10mins of injection. 1000mg /kg of the mice caused significant reduction in locomotor activity which was significant only for 20 mins [17].

Anti Helmintic Activity: In general, the chloroform extract and the alcholic extracts have been known to potentiate its effects against helminthiasis or worm infection.[18]

Antidiarrhoeal Activities: The methanolic extract of Vernonia cinerea is seen to have

antidiarrhoeal activity. Although the carbon tetrachloride fraction of this extract did not show such properties. Antidiahorreal activity is due to polar groups which enhances fluid and electrolyte absorption through gastrointestinal tract [19, 20].

Conclusion: *Ayurvedic* medicine can be used not only to prevent cancer, but also to treat cancer. Because of their pharmacological safety, these agents can be used alone or as adjuncts to current chemotherapeutic agents to enhance therapeutic effects and minimize chemotherapy-induced toxicity.

The wide spread use of *Vernonia cinerea* Less. As chemotherapeutic, antitumour and various other disorders has lead a scientific approach towards its use as medicinal plants. *Vernonia cinerea Less*. is an plant whose all parts are of medicinal value.

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