

## **ARGYREIA SPECIOSA LINN.F. : PHYTOCHEMISTRY, PHARMACOGNOSY AND PHARMACOLOGICAL STUDIES.**

**Ashish J. Modi\*<sup>1</sup>, S. S. Khadabadi<sup>1</sup>, I.A.Farooqui<sup>2</sup>, S.L.Deore<sup>1</sup>**

<sup>1</sup>Department of Pharmacognosy and Phytochemistry, <sup>2</sup>Department of Pharmacology  
Govt. College of pharmacy, Kathora naka, Amravati-444604. (M.S.), INDIA.

\*Email: [ashishmodi2011@gmail.com](mailto:ashishmodi2011@gmail.com)

### **ABSTRACT**

Many herbal remedies have been employed in various medical systems for the treatment and management of different diseases. The plant *Argyrea speciosa* Linn.f. (Syn: *Argyrea nervosa*) belongs to family convolvulaceae has been used in different system of traditional medication for the treatment of diseases and ailments of human beings. It is reported to contain various alkaloids, Glycosides, flavonoid glycoside and steroids. It has been reported as antimicrobial, antidiarrhoeal, hepatoprotective, nootropic, anticonvulsant, central nervous system, hypoglycemic, antioxidant, antibacterial, antiviral, nematocidal, aphordiasic, immunomodulatory, analgesic, anti-inflammatory activity. Many isolated constituents from *Argyrea speciosa* lack the reports of pharmacological activities, which support its further pharmacological studies.

**Keywords:** *Argyrea speciosa*, Pharmacognosy, Pharmacology, Traditional uses.

### **INTRODUCTION**

Plants have played a significant role in maintaining human health and improving the quality of human life for thousands of years and have served humans well as valuable components of medicines, seasonings, beverages, cosmetics and dyes. Herbal medicine is based on the premise that plants contain natural substances that can promote health and alleviate illness. In recent times, focus on plant research has increased all over the world and a large body of evidence has collected to show immense potential of medicinal plants used in various traditional systems. Today, we are witnessing a great deal of public interest in the use of herbal remedies.<sup>1</sup> Further more; many western drugs had their origin in plant extract. There are many herbs, which are predominantly used to treat cardiovascular problems, liver disorders, central nervous system, digestive and metabolic disorders.<sup>1</sup> Given their potential to produce significant therapeutic effect, they can be useful as drug or supplement in the treatment / management of various diseases. Herbal drugs or medicinal plants, their extracts and their isolated compound(s) have demonstrated spectrum of biological activities. Such have been used and continued to be used as medicine in folklore or food supplement for various disorders. Ethnopharmacological studies on such herbs/medicinally important plants continue to interest investigators throughout the world. One such plant, *Argyrea speciosa* (Linn.f.) sweet, invites attention of the researchers worldwide for its pharmacological activities ranging from aphordiasic to nematocidal activities.<sup>35-48</sup> *Argyrea speciosa* (Linn.f.) sweet belongs to family Convolvulaceae is a climbing shrub with woody tomentose stem, found mainly in Deccan, Karntaka and East slopes of the West Ghats at an altitude of 900m.<sup>2</sup> It is commonly known as Elephant creeper and in Samudra-sok Hindi.<sup>3</sup> Traditionally, leaves are used by Rajasthani tribes to prevent conception.<sup>4</sup> Seeds of *Argyrea nervosa* found to possess hypotension, spasmolytic,<sup>5</sup> and anti-inflammatory activity.<sup>6</sup> Chemical analysis revealed the

presence of triterpenoids, flavanoids, steroids and lipids.<sup>7</sup> Roots of *Argyrea nervosa* proved the immunomodulatory activity against the myelosuppressive effects induced by Cyclophosphamide.<sup>8</sup> 24R-ergost-5-en-11-oxo-3 beta-ol alpha-D glucopyranoside xylose was isolated from seeds of *Argyrea nervosa* known as Argyreoside.<sup>9</sup>

### **CLASSIFICATION<sup>10</sup>**

Kingdom	: Plantae – Plants
Subkingdom	: Tracheobionta – Vascular plants
Superdivision	: Spermatophyta – Seed plants
Division	: Magnoliophyta – Flowering plants
Class	: Magnoliopsida – Dicotyledons
Subclass	: Asteridae
Order	: Solanales
Family	: Convolvulaceae.
Genus	: <i>Argyrea</i> Lour. – <i>Argyrea</i>
Species	: <i>Argyrea nervosa</i> (Burm. f.) Bojer

### **Botanical description: (See on Figure: 1)**

A very large climber; stem stout, white-tomentose. Leaves are 7.5-30.0 cm. in diameter, acute, ovate, glabrous above, persistently white-tomentose beneath, base cordate; petioles 5-15 cm, long, white-tomentose. Flowers in subcapitate cymes; peduncles 7.5-15 cm, long, stout, white-tomentose; bracts large, ovate-lanceolate with a long acumen, thin, veined, pubescent outside, glabrous inside, deciduous the outer sometimes 5 cm, long; pedicels very short often almost 0, white-tomentose. Calyx white-tomentose outside; corolla 5-6.3 cm, long, tubular-infundibuliform, the bands silky pubescent outside, tube somewhat inflated, white pubescent outside, rose purple and glabrous inside. Ovary glabrous. Fruit glabrous, 2.0 cm in diameter, apiculate.<sup>14</sup>



**Parts used:** Roots, leaves, seeds, flower etc.

**Synonyms:**

Bea: Bichtawk, Eng: Elephant Creeper, woolly Morning-Glory, Guj: Samudrusoka, Samndrashoka, Hindi: Sumundar-ka-put, Suruudrashok, Kan: Chandrapada, Mal: Samudrapala, mar: Samudrashokha, Ori: Bryddhotereko, Tam: Samuddirapacchai, Tel: Chandrapada, Samudrapala.<sup>11</sup>

**Ayurvedic description:**<sup>11</sup>

Sanskrit name : Vriddhadaruka, Synonyms : Avegi, Chagalantri

Properties: Rasa: Kuru, tikta, kasaya; Guna : Laghu, snigdha, sara; Virya : Usna.

**Action:** vatakaphahara, sukравardhaka, vrsya, balya, rasayana, Medhya, swarakantikara

**Therapeutic uses:**<sup>11</sup> Klibato, daurbalya, amavata, vatarsa. Sotha.

**Traditional uses:**

**Plant:** in stomach complaints, sores on foot, small pox, syphilis, dysentery, and diarrhoea.<sup>12, 13</sup>

**Leaf:** antiphlogistic, emollient, poultices of wounds, externally for skin disease, gleet, gonorrhoea and chronic ulcers. Also used as a local stimulant and rubefacient.<sup>4, 14</sup>

Externally used in the treatment of ringworm. Eczema, itch and other skin diseases.<sup>4</sup>

**Root:** Appetitiser, anaemia, aphrodisiac, anti-inflammatory, brain-tonic, cardiogenic, cerebral disorders, diabetes, expectorant, obesity, syphilis, tuberculosis, ulcers and wounds.<sup>15, 16</sup>

**PHARMACOGNOSTIC STUDIES**

The Macro and microscopical features of the root, stem and leaf have been studied.

**Root:**

**Macroscopical:**

The commercial samples of the root vary in size as well as in thickness. The thin pieces of the root usually 2-4 mm in diameter. Show somewhat smooth brownish exterior. When cut transversely such pieces show a thin periderm and cambium appearing as a dark line almost midway between the centre and the outer circumference separating the outer phloem from inner central wood.

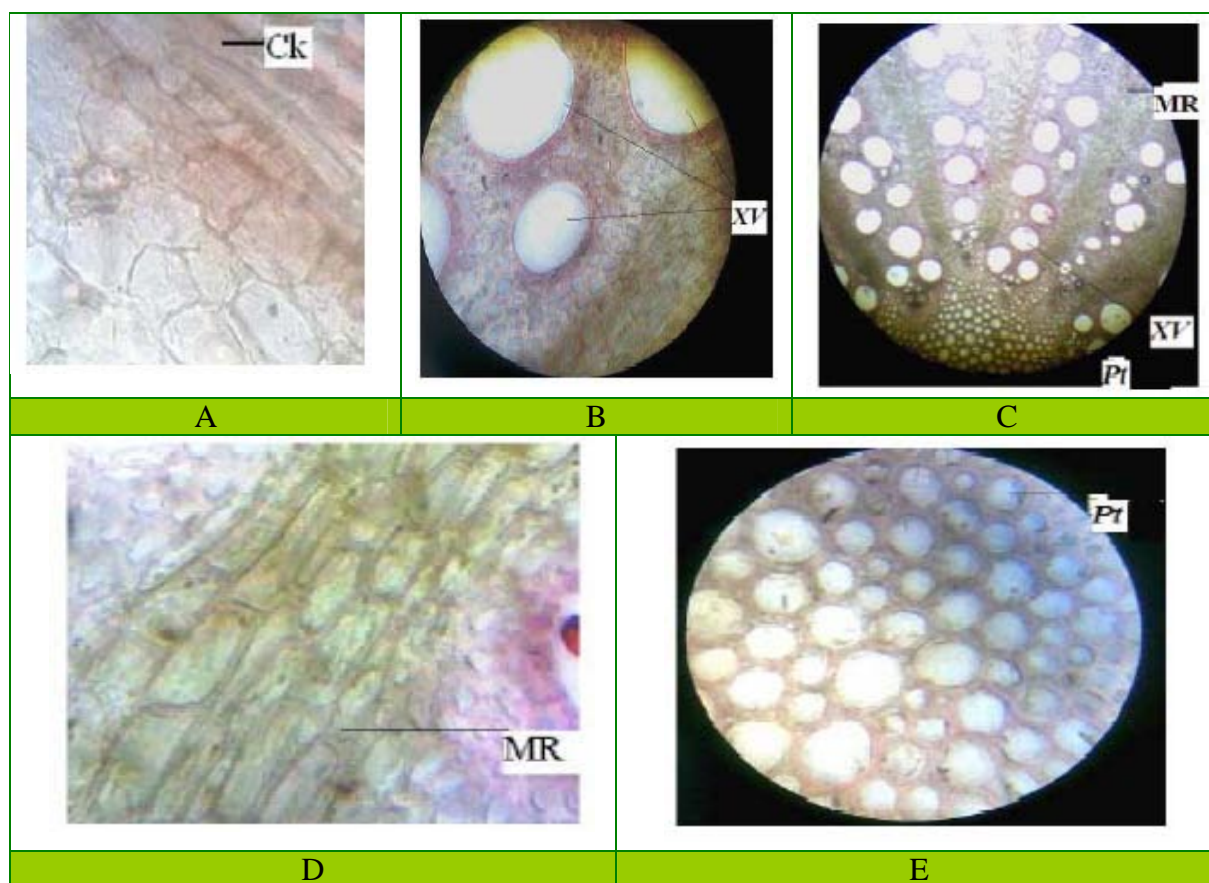
The thicker pieces of the root 5-25 mm in diameter or even more have a rough exterior due to the presence of large number of lenticels, A transversely cut surface of such root, shows colourless tertiary phloem and a pink coloured crescent shaped tertiary xylem.<sup>17-19</sup>

**Microscopical: (See on Figure 2)**<sup>55</sup>

Microscopically, the young root shows an epidermis composed of small cubical parenchymatous cells, followed by a wide cortex consisting of mostly isodiametric or in some cases, slightly oval cells. The primary vascular structure is tetrarch to pentarch, The mature root possesses a narrow periderm of 6-8 layers of cork cells, a single layer of phellogen and 10-12 layers of phelloderm cells, the phelloderm cells close to the phellogen are somewhat tangentially elongated and thin walled but become gradually polyhedral. Some of them possess rosette crystals of calcium oxalate.

The secondary phloem is a wide zone, consisting of sieve tube elements with companion cells and phloem parenchyma. Resin canals, small strands of tertiary xylem and tertiary phloem a found scattered throughout the region.

The secondary xylem is composed of large xylem vessels, tracheids, fibre tracheids and fibres. The vessels arc drum shaped, having bordered pits on the walls. The tracheids are cylindrical and possess bordered pits on the walls. The wood fibres are long and tapering with pointed ends.<sup>17-19</sup>



**Figure 2:** "Microscopy of root of *A. speciosa*"<sup>55</sup>

A: Transverse section consists of Cortex (100x)

B : Transverse section contains xylem vessel (100x)

C: Transverse section consists of pith, xylem vessel and medullary rays (100x)

D: Transverse section consists of medullary rays (100x)

E: Transverse section consists of Pith (100x)

Abbreviations: Ck-Cortex, MR-Medullary rays, Pt-Pith, XV-Primary xylem.

\* All images are taken from Sandeep ahlawat et al. (2009). Pharmacognostical Evaluation of *Argyreia speciosa* (Burm.f.) Bojer, *Pharmacognosy magazine*, Oct 1(3): 227-232.

#### Stem:

#### Macroscopical:

The stem is white and tomentose in young stages. The older stem 25 mm or so thick show vertical ridges and numerous lenticels, which are mostly transversely elongated.<sup>17-19</sup>

#### Microscopical:

The young stem microscopically, shows nonglandular hairs, which are uniseriate, multicellular and usually 3-celled. Resin canals are distributed throughout the cortex. Following the cortex is an amphiphloic siphonostele. The mature stem shows the cork composed of 10-15 layers of cells, which are stratified due to alternate arrangement of 3-4 layers of large cells, followed by almost equal number of shorter cells. The secondary phloem is wide and occupies the greater portion. A tertiary cambium arises in the secondary phloem and gives rise to tertiary phloem and tertiary xylem strands. The xylem vessels are drum shaped with well marked perforation rims. A few vessels are long and cylindrical. They have all bordered pits on the walls.

The tracheids are longer than the vessels. These also have bordered pits on the walls and there are no end wall opening. The xylem fibres are long with pointed tapering ends and short lumen. They are however, shorter and narrower as compared to the pericyclic fibres which have pointed or truncated ends and show in some cases peg like outgrowths towards the tapering ends.

The stem is often substituted for the root and is also adulterated with the stem cutting of *cocculus hirsutus*.<sup>17-19</sup>

#### Leaf:

#### Macroscopical:

The lower surface of the leaf is entirely covered with hair, which gives the leaf a silvery soft wooly appearance; the upper surface is green, glabrous and shows the markings of nerves by slight depressions. The mature leaf is dorsiventral, unicostate with a strong midnerve and several faint lateral nerves, alternate, petiole, acute at the apex and cordate at the base. The margin is entire but slightly wavy near the base. Lateral nerves 14-20 pairs arise alternatively on the midrib; the single nerves bifurcate before reaching

the edge; the-anterior branch unites with the posterior one of the neighbouring nerve; an arched nervule connects the two branches slightly above the point of bifurcation. Neither the main secondary nerves nor their branches reach the margin. Petiole stout and cylindrical, a little shorter than the length of the blade is completely covered with woolly tomentum.<sup>20, 21</sup>

#### Microscopical:

The transverse section of the leaf near the apex shows a prominent ridged midrib on the lower surface and a small groove on the upper surface, while a section through the basal region presents a small ridge on the upper side as well. The ventral cuticle is stratified while the dorsal is thin and simple.

The epidermal cells of the upper side have synclinal walls with rubiaceous type of sunken stomata. The openings of the latex canals are bound by 5-6 cells, the epidermal cells on the under side differ from those of the upper in possessing smaller cells and about twice the number of stomata and openings of latex canals. The cells of the epidermis along the veins on both sides of the leaf are roughly rectangular straight walled and completely devoid of appendages.

The spongy tissue is composed of rounded cells enclosing air spaces and a few latex canals. The palisade cells are nearly rectangular, roughly four times longer than broad and are seen in the section usually in a single row only and rarely in two rows. A few latex canals are sometimes present in this zone as well. The vascular bundles are hexagonal in transverse section and occur in characteristic, continuous single row chains.

The transverse section of the petiole at the base is grooved along the ventral side while the groove becomes rather negligible at the apex. Arrangement of the tissues in the petiole is as in the stem.

The vascular bundles are open, bicollateral and arranged in a ring. The vasculature is represented by a shallow abaxial arc and a pair of adaxial traces. Conjunctive parenchyma separates the xylem and the phloem tissues distinctly. There are broad patches of phloem parenchyma.

Xylary tissues of the leaf and the petiole are identical. Fresh vascular bundles are produced in the pith. The epidermal cells are barrel shaped and most of them bear trichomes. Hypodermis or any mechanical tissues are completely lacking; Hexagonal cortical cells are smaller towards the periphery and the stele but are larger in the central region. The cortex merge gradually with the phloem parenchyma. The endodermis and pericycle are not made out even in a very young petiole.<sup>20, 21</sup>

#### Powder analysis of *Argyrea nervosa* Burm.

It is pale green, fine, odourless powder with slight bitter taste. The powder microscopy revealed the presence of glandular & covering trichomes, xylem fibres, epidermal cells, cork cells, vessels with bordered pits, xylem vessels with spiral thickenings were recorded.<sup>16</sup> (See on Table 1, Table 2, and Table 3.)<sup>16</sup>

**Table 1:** Determination of Ash values of *Argyrea nervosa* Burm (*A.speciosa*)<sup>16</sup>

S. No.	Ash type	Percentage of Ash
1	Total ash	4.3% w/w
2	Acid insoluble ash	1.6% w/w
3	Water soluble ash	3.94% w/w

**Table 2:** Determination of extractive values of *Argyrea nervosa* Burm (*A.speciosa*)<sup>16</sup>

S. No	Solvent	Percentage of extractive
1	Petroleum ether	3.16% w/w
2	Chloroform	0.8% w/w
3	Ethyl acetate	1.4% w/w
4	Ethanol	0.2% w/w
5	Water	7.6% w/w

**Table 3:** Determination of phyto constants of *Argyrea nervosa* Burm. (*A.speciosa*)<sup>16</sup>

Leaf constants	Report
Vein islet number	10.2/mm <sup>2</sup>
Vein termination number	12.6/mm <sup>2</sup>
Stomatal index (upper epidermis)	4.5/mm <sup>2</sup>
Stomatal index (lower epidermis)	16/mm <sup>2</sup>

#### PHYTOCHEMISTRY

The petroleum ether extract of the leaves yielded 1-tricentanol, epifriedelinol acetate, epifriedelinol and  $\beta$ -sitosterol.<sup>22</sup> The leaves were found rich in quercetin.<sup>23</sup> Extraction of the leaves with 90% methanol led to the isolation of the flavonoids, quercetin and kaempferol together with the latter's glycoside kaempferol-3-o-l-rhamnopyranoside.<sup>24</sup> Two new flavone glycosides characterized as 7,8,3',4',5'-pentahydroxyflavone-5-o-l-rhamnopyranoside and 7,8,3',4',5'-pentahydroxyflavone-5-o-l-glucopyranoside were also reported from leaves.<sup>25</sup>

The hexane extract of the root yielded tetradecanyl palmitate, 5, 8-oxidotetracosan-10-one<sup>26</sup> and two novel aryl esters characterized as stigmasteryl p-hydroxycinnamate and hexadecanyl p-hydroxycinnamate along with scopoletin.<sup>27</sup>

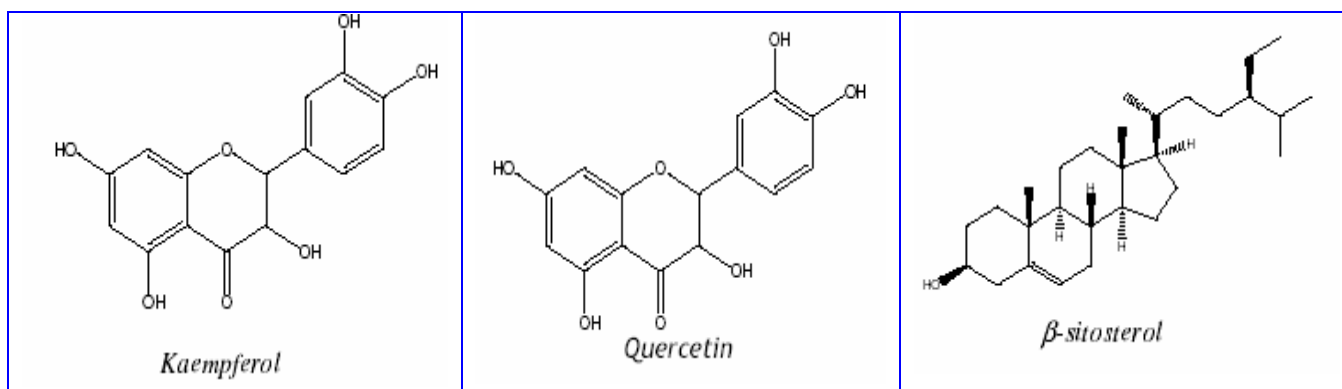
The seeds yielded fatty oil which found to contain the glycerides of palmitate, stearic, linoleic, linolenic and oleic acids.<sup>28, 29</sup> In another study the seed oil revealed the presence of myristoleic, myristic, palmitic, linoleic, linolenic, oleic, stearic, nonadecanoic, eicosanoic, heneicosanoic and behenic acids identified as their corresponding methyl esters through GLC.<sup>30</sup>

The ethanolic extract of the seeds revealed the presence of a mixture of three alkaloids, out of which only one was characterized as ergometrin. The other constituents isolated were caffeic acid and ethyl caffeate.<sup>31</sup> Another

study also revealed the presence of ergoline alkaloids in the seeds.<sup>32</sup> The ergolines were indicated to be of clavine type.<sup>32</sup>

The free amino acids reported in the seeds were glutamic acid, glycine, isoleucine, leucine, lysine, phenylalanine, tyrosine, praline and  $\alpha$ -amino butyric acid.<sup>33</sup>

The fruits were reported to contain n-tricontanol,  $\beta$ -sitosterol, p-hydroxycinnamoyloctadecanolate and caffeic acid.<sup>34</sup>



## PHARMACOLOGICAL STUDIES

Although a lot of pharmacological investigations have been carried out based on the ingredients presents but a lot more can still be explored, exploited and utilized. A summary of the findings of these studies is presented below.

### Aphrodisiac activity

The root, flower and, to some extent, leaf (homogenate in 2% gum acacia) of the plant showed aphrodisiac activity as evidenced by an increase in mounting behavior of mice. When different extracts of the root were tested, the activity was found in the alcohol extract (200 mg/kg; p.o, single dose). The extract, 1 hr after administration, stimulated mounting behavior of male mice in a concentration-dependent manner. The root- or flower-treated male mice also exhibited a remarkable increase in mating performance. Further, the number of males was found to be more among the pups fathered by the herbal drug-treated mice compared to those by the control mice. Thus, the plant has promising potential to be developed into an effective medicine for stimulating male sexual activity with an influence on sex ratio favoring males.<sup>35</sup>

### Immunomodulatory activity

Oral administration of the ethanolic extract of *A. speciosa* root (ASEE), at the doses of 50, 100 and 200 mg/kg in mice, dose-dependently potentiated the delayed-type hypersensitivity reaction induced both by sheep red blood cells (SRBC) and oxazolone. It significantly enhanced the production of circulating antibody titre in mice in response to SRBC. ASEE failed to show any effect on macrophage phagocytosis. Chronic administration of ASEE significantly ameliorated the total white blood cell count and also restored the myelosuppressive effects induced by cyclophosphamide. The present investigation reveals that ASEE possesses immunomodulatory activity.<sup>36</sup>

### Hepatoprotective activity

The ethanolic extract and ethyl acetate extract (200 mg/kg, 400 mg/kg) of *A. speciosa* roots decreased the elevated

enzyme levels induced by CCl<sub>4</sub>, thus protecting the structural integrity of hepatocyte cell membrane or regeneration of damaged liver cells. These two extracts are found to be capable of enhancing or maintaining the activity of hepatic enzymes which are involved in combating Reactive Oxygen Species. The hepatoprotective effect of *A. speciosa* roots was evidenced by the amelioration of biochemical indicators of liver damage and pathological disturbances caused by CCl<sub>4</sub>. (From the study we can conclude that) root extracts of *A. speciosa* protects liver from oxidative damage and could be used as an effective protector in CCl<sub>4</sub> induced damage.<sup>37</sup>

### Central Nervous System Activity

The n-hexane (n-HF), chloroform (CF), ethyl acetate (EAF) and water (WF) fractions of hydroalcoholic extract of roots of *Argyrea speciosa* were tested on the central nervous system. All the fractions (100, 200 and 500 mg/kg, p.o.) were evaluated for neuro-pharmacological activity using spontaneous motor activity and pentobarbital-induced sleeping time in mice. Chlorpromazine was used as a positive control. Central nervous system depressant activity was observed with all the fractions as indicated by the results in which they reduced spontaneous motor activity and potentiated pentobarbital induced hypnosis in mice.<sup>38</sup>

### Hypoglycemic

The hypoglycemic and antihyperglycemic activities of methanolic extract of stem of *Argyrea speciosa* sweet (*A. speciosa*, *A. nervosa*) were done in normal and alloxan induced diabetic rats. The blood glucose levels were measured at 0 h and 1, 2, 4, 6, 8, 12, 16 and 24 h after the treatment. Oral glucose tolerance test was performed in normal, diabetic control, plant extract treated normal and diabetic groups and tolbutamide also treated normal and diabetic groups. It was found that alcoholic extract of *A. speciosa* showed significant ( $P < 0.05$ ) dose dependent percentage blood glucose reduction in normal (26.42% at 250 mg/kg, 28.50% at 500 mg/kg and 34.25% at 750 mg/kg body weight) and in diabetic rats (24.72% at 250

mg/kg, 31.10% at 500 mg/kg and 40.47% at 750 mg/kg body weight) respectively at 8 h. The hypoglycemic and antihyperglycemic effect of *A. speciosa* was compared with the reference standard drug tolbutamide (40 mg/kg).<sup>39</sup>

### Nootropic

According to Hanumanthachar *et al.*<sup>40</sup> Effectiveness of aqueous extract of AS on ageing, scopolamine and diazepam induced memory deficits in mice was evaluated. Elevated plus maze and passive avoidance paradigm were employed to assess short-term and long term memory. In order to delineate the possible mechanism through which AS elicits the anti-amnesic effects, the whole brain acetyl cholinesterase (AChE) activity, was also assessed. Two doses (100 and 200 mg/kg, p.o.) of aqueous extract of AS were administered orally for 6 successive days to both young and aged mice. AS decreased transfer latencies and increased step down latencies in both young and aged mice AS (100 and 200 mg/kg, p.o.) successfully reversed amnesia induced by diazepam, scopolamine and natural ageing.

### Anti inflammatory activity

The alcoholic extract of the root exhibited statistically significant anti-inflammatory activity against granuloma formation technique in albino rats which comparable to acetylsalicylic acid. The extract did not show much activity against formalin induced arthritis in rats.<sup>41</sup>

### Anticonvulsant activity

The hydroalcoholic extract of *Argyrea speciosa* at the dose of 200 and 400 mg/kg significantly delayed the latency to the onset of the first clonus as well as onset of death in unprotected mice and exhibited protection in 16.66% and 33.33% of pentylenetetrazole treated mice respectively. Where as in case of maximal electroshock seizures, the dose of 200 and 400 mg/kg significantly reduced the duration of hind limb extension and both the doses were statically found to be equipotent. The reference standards, clonazepam (0.1 mg/kg) and phenytoin (20 mg/kg) provided complete protection.<sup>42</sup>

### Analgesic activity

The methanolic extract of *Argyrea speciosa* root was used in pain and inflammation models. The analgesic activity of AS at the dose of (30,100, and 300 mg/kg p.o) showed significant ( $p < 0.01$ ) decreased in acetic acid induced writhing, whereas ME of *Argyrea speciosa* at the dose of (30,100, and 300 mg/kg p.o) showed significant ( $p < 0.01$ ) increase in latency to tail flick in tail immersion method and elevated mean basal reaction time in hot plate method.<sup>43</sup>

### Antibacterial activity

The alcoholic extract of the leaves revealed antibacterial activity against staphylococcus aureas.<sup>44</sup> the seed oil was found to possess *in vitro* antibacterial activity against *Klebsiella* sp., *Escherichia coli*, *Pseudomonas aeruginosa* and *Bacillus anthracis*.<sup>30,45</sup>

### Antifungal activity

Hexadecanyl p-hydroxycinnamate and scopoletin isolated from the root were tested for antifungal activity against *Fusarium fusiformis*, *F.semuctectum* and *Alternaria alternata* at a concentration of 1000 ppm. It was found that both the compounds produced 100% inhibition against *Alternaria alternate*. The compounds also revealed phytotoxicity in terms of root growth inhibition of germinating wheat seeds.<sup>46</sup>

### Antiviral activity

The extract of the plant and fruits had interferon-like antiviral activity against vaccinia virus in CAM cultures, but was devoid of any activity against Ranikhet disease virus.<sup>47</sup>

### Nematicidal activity

The effect of the aqueous and alcoholic extracts of the leaves on the spontaneous movements of both the adult worm and a nerve/muscle preparation of *Setaria cervi*, a filarial worm of cattle, and on the survival of microfilariae *in vitro* was studied. The aqueous extract in a dose of 150 mcg/ml caused a decreased in tone and amplitude of spontaneous movements of the worm. A similar response was produced by the alcoholic extract but a much lower concentration of 75 mcg/ml. the aqueous extract produced complete paralysis of the nerve/muscle preparation in a dose 25 mcg/ml whereas with the alcoholic extract only 90 ng/ml was required.<sup>48</sup>

### CLINICAL STUDIES

A preparation made from this plant along with several other ingredients is used for curing sexual disorders in males.<sup>49</sup>

### TOXICOLOGY

A few of the ergoline alkaloids reported in this plant are hallucinogenic.<sup>49</sup>

### CONCLUSION

In this review, we have presented information on the botanical description, traditional uses, phytochemistry and pharmacology of *Argyrea speciosa* (*syn: Argyrea nervosa*), a medicinal plant found in central and southern Europe, western Asia and the United States, amongst others. There are over 400 different tribal and other ethnic groups in India which constituent about 7.5% of India's population. Tribal, rural and primitive societies have discovered solution for treatment of disease to almost all their needs and problems from the natural resources around them.<sup>50</sup> hence, in recent years, ethanomedicinal studies received much attention as this brings to light the numerous little known and unknown medicinal virtues especially of plant origin which needs evaluation on modern scientific lines such as phytochemical analysis, pharmacological screening and clinical trials.<sup>51-53</sup> *Argyrea speciosa* (*syn: Argyrea nervosa*) possesses various pharmacological activities as discussed in present paper. However, it is imperative that more clinical and pharmacological studies should be conducted to investigate the unexploited potential of this plant.

MARKET SURVEY<sup>54</sup>

Sr no.	Trade name	Company	Ingredients	Cost
1.	Speman	Himalaya, Transatlantic international	<i>Argyrea speciosa</i> 64mg, <i>Tribulus terrestris</i> -64mg, <i>Leptadenia reticulata</i> -38 mg.	6 \$/ 60 tab. bottle.
2.	Speman forte	Himalaya, Transatlantic international	<i>Argyrea speciosa</i> -64mg, <i>Tribulus terrestris</i> -64 mg, <i>Leptadenia reticulata</i> -38 mg, <i>Hygrophila auriculata</i> -38mg, <i>Withnia somnifera</i> -38 mg.	12 \$/ 60 tab. bottle.
3.	Tentax	Himalaya, Transatlantic international	<i>Argyrea speciosa</i> - 40mg, <i>Black pepper</i> - 40 mg, <i>Bombax ceiba</i> - 20 mg	8 \$/ 60 tab. bottle.
4.	Tentax forte	Himalaya, Transatlantic international	<i>Argyrea speciosa</i> - 40mg, <i>Black pepper</i> - 40 mg, <i>Bombax ceiba</i> - 20 mg, <i>shilajit</i> -40 mg, <i>Withania somnifera</i> - 38 mg.	11 \$/ 60 tab. bottle

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