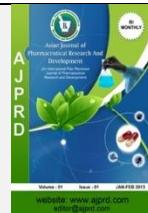


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Research Article

Comparative Study of Various Pharmacological Screening of *Argyreia speciosa* Sweet. In Relation with Ayurvedic Documented Literature

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ABSTRACT

Vruddhadaru is one of the important herbs in *Ayurveda*. It has been used in *Ayurvedic* traditional literature for various diseases and improves the health. It is also used as folklore medicine. Out of its entire therapeutic spectrum, the herb is famous for its wound healing activity for longer time. The Latin name of *Vruddhadaru* is *Argyreia speciosa*(Syn.-*Argyreia nervosa*; Family-*Convolvulaceae*).*Argyreia speciosa* is commonly known as *Vruddhadaru* in Sanskrit, *Vidhara* in Hindi, *Elephant creeper* in English and *Samudrashosha* in Gujarati. It has many synonyms like *Aavegi*, *Chhagalantri*, *Vrushyagandhika* etc. It has been described in *Dhanvantari Nighantu*, *Madanpala Nighantu*, *Kaiyadeva Nighantu*, *Raj Nighantu*, *Bhavaprakash Nighantu*, *Nighantu Adarsh* etc. This shows the importance of the drug. It is usually appreciated for its aesthetic merit. Therapeutically proven activities of this plant are – analgesic & anti-inflammatory, anti-cancer, anti-convulsant, anti-diarrheal, anti-fungal, anti-microbial, anti-obesity, antipyretic, anti-stress, anti-ulcer, anti-viral, aphrodisiac, CNS effect, hepatoprotective, hypoglycaemic, immunomodulatory, nootropic, wound healing activity etc. It is very interesting to observe that most of the pharmacological screened activities are documented in *Ayurveda* by various authors but in the language of *Ayurveda*. It shows that the former scientists (*Ayurveda* Philosophers) are extreme aware about the activity of the herb and was in practice as an *Ayurveda* medicine. The conventional evidences about the activity are the proof that there must be a scientific technique with the traditional healers to document the properties of the herb. The present review explains the correlation of the same activity noted by two different streams. This review helps to design futuristic pathway for pharmacological testing of herbs.

Keywords: *Vruddhadaru*, *Argyreia speciosa*, pharmacological screening, *Ayurveda***ARTICLE INFO:** Received 03 July 2019; Review Completed 03 Sept. 2019; Accepted 13 Sept. 2019; Available online 15 Oct. 2019**Cite this article as:**

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INTRODUCTION:

Ayurveda the science which is originated in our country India is *Mother* of all medical sciences. The term *Ayurveda* combines the Sanskrit words *Ayu* (life) and *Veda* (science). Thus *Ayurveda* means science of life. It is primarily the science of maintenance of positive of health and secondarily the science for the cure of diseases. In *Charaka Samhita* the description of *Trisutra Ayurveda*

(Three-way approach of *Ayurveda*) i.e.*Hetu*(Cause), *Linga*(Symptom), *Aushadha*(drug) indicates the importance of *Aushadha*.² The treatment depends on the *Aushadha*. Also in *Chikitsachatushpadi* (4 limbs of treatment approach) *Dravya* is second most important factor. It indicates the importance of *Dravya*(Substance). *Vruddhadaru* has various medicinal properties which are mentioned in *Ayurvedic* texts. It is a large climber which is widely distributed in tropical

regions of the world. It is seen throughout India up to an altitude of 500 m. It is also an ornamental plant. It is common in Bengal, Assam, Uttarakhand, Karnataka, Rajasthan, Kerala and Orissa. Ayurvedic pharmacology was well established in India. In *Ayurveda* the pharmacological actions of a drug are attributed to *Rasapanchakas* (five inherent tools to assess the drug) i.e. (*Rasa*(Taste), *Guna* (properties), *Veerya*(potency), *Vipaka* (end product of digestion), *Prabhava*(specific action)) and these are considered as foundation of *Dravyaguna Shastra* (Ayurvedic science of medicine) or Ayurvedic pharmacology. The pharmacodynamic and pharmacokinetic action of Ayurvedic drugs are difficult to explain in relation with modern pharmacology. Thousands of years earlier *Ayurveda* was so powerful to identify the medicinal properties of the drug and also proven the expected therapeutic response of the drug. There are much more references of pharmacological activities in *Ayurveda* *materia medica*. The published

pharmacological evaluation on *Vruddhadaru* in relation with *Ayurvedic* references is given as below.

Ayurvedic Documentation regarding Vruddhadaru:

Name of Plant: *Vruddhadaru* (*Argyreia speciosa Sweet.*)

Properties (*Guna*): *Pichchhila*^{1,24}, *Sara*²⁵

Actions (*Karma*): *Rasayana*^{1,25},
Balya^{1,24,28}, *Vrushya*^{1,26,28}, *Veeryadam*²⁴, *Medhya*²⁵, *Agnikara*²⁵,
*Swarakara*²⁵, *Kantikara*²⁵

Indicated diseases

(*Rogagnata*): *Shopahara*^{1,23,25,26,28}, *Aamavatahara*^{1,25},
Kasahara^{1,24}, *Shwasahara*¹, *Jwarahara*¹, *Krumihara*²³,
Mehahara^{1,23,25,26}, *Udarahara*²³

Conceptual tool for action:

Doshaghnata-Kaphahara^{1,23,24,25,26,27,28},
Vatahara^{1,23,24,25,26,27,28}, *Astrahara*^{23, 25, 26},

Rasa-Katu(Pungent), *Tikta*(Bitter), *Kashaya*(Astringent)

Veerya-Ushna

Vipaka-Madhura

Comparative correlation of the Pharmacological activity by two streams:

PHARMACOLOGICAL ACTIVITY	DIRECT AND INDIRECT CLASSICAL REFERENCE	AYURVEDIC INTERPRETATION
Analgesic and anti-inflammatory activity:- The fresh leaf ethanolic extract of <i>A. nervosa</i> (100,200 & 400 mg/kg) exhibited the activity on acetic acid induced writhing and hot plate model. The result of 400 mg/kg was the same as the standard drug aspirin. ³	<i>Shopahara</i> ^{1,23, 25,26,28}	Based on <i>Ushna veerya</i> , and having <i>Katu</i> , <i>Tikta Rasa</i> and <i>Kaphaghna</i> properties <i>Vruddhadaru</i> can perform the action.
Anti-cancer activity:- Quercetin from ethanolic leaf extract administered at dose of 100, 200 and 400 mg/kg in Wistar rats. As a result quercetin stimulates immune response in rats. ⁴	<i>Balya</i> ^{1,24,28} <i>Rasayana</i> ^{1,25} <i>Aamahara</i> ^{1,25}	As such there is no direct action of the drug on cancer but having <i>Rasayana</i> and <i>Balya</i> and <i>Amahara</i> it streamline the basic pathological conditions in patients. Due to such nature it is very good supportive for cancer treatment.
Anti-convulsant activity:- The hydroalcoholic extract of the root was used in different animal model of convulsion for 10 days treatment in different doses (100,200 & 400 mg/kg) and were accessed using pentelenetetrazole and maximum electroshock induced convulsion model and the result revealed that extract significantly inhibits the seizures through the potential anticonvulsant effect. ^{5,6}	<i>Vatahara</i> ^{1,23,24, 25,,26,27,,28}	There is no direct reference of the drug on anti-convulsant activity but it is <i>Vataghna</i> (probably due to <i>Ushna veerya</i>) so it may be useful in cases of epilepsy and other neurological pathology.
Anti-diarrheal activity:- <i>A.speciosa</i> ethanolic extract of flowers at a dose of (50,100 and 150 mg/kg) have shown significant anti-diarrheal activity. ⁷	<i>Aamavatahara</i> ^{1,26} <i>Kashaya rasa</i> <i>Agnikara</i> ²⁶	<i>Agni</i> and <i>Ama</i> are the basic component responsible for creating diarrhoeal condition. Surprisingly <i>Vruddhadaru</i> having activity on both these important components.

Anti-fungal activity:- Seed oil of the drug also evaluated for its anti-fungal activity against <i>Aspergillusflavus</i> , <i>Colletotrichumcapsici</i> , <i>Cryptococcus neoformans</i> , <i>Alternariasonani</i> , <i>Halminthosporium sp.</i> , <i>Colletotrichumdematiatum</i> , <i>Aspergillusniger</i> , <i>Aspergillussydowi</i> and <i>Fusariumoxysporum</i> . ⁸	<i>Krumighna</i> ²³ <i>Katu-Tikta rasa</i>	These two references will responsible to diminish the pathology of fungal infection. It is attributed that it must have broad spectrum antifungal action apart from mentioned.
Anti viral activity:- In CAM (chorioallantonicmembranes) cultures, the extract of the plant and fruits had interfere-against vaccinia virus but there is no activity against Ranikhet disease virus. ⁹	<i>Krumighna</i> ²³	Due to its properties it is having anti-viral activity and also acts as <i>Rasayana</i> which improves immunity.
Anti-microbial activity:- The herb showed anti bacterial activity as the study under taken the following test organism: Bacillus pumilis and Aspergilusniger, Streptococcus vulgarica, Salmonella typhé, <i>Bacillusamyloliquefacines</i> , Micrococcus luteus. At 484 micro gram per ml ⁱ ,the MIC value of methanolic and ethanolic extract of the drug was found maximum against <i>Bacillusmegaterium</i> . ¹⁰	<i>Krumighna</i> ²³ <i>Katu-Tikta rasa</i>	It fulfils the criteria for Anti microbial activity. The drug covers all the range of microbial growth because of its activity against <i>Kapha</i> (which provides the platform for microbs).
Anti-obesity activity: The root ethanolic extract (at a dose of 500 mg/kg on rats) of <i>A. speciosa</i> showed anti-obesity activity as it significantly lower triglycerides, total cholesterol, LDL level and atherogenic index when compared to obesity rat and it also increases the HDL level in treated rats. ¹¹	<i>Agnikara</i> ²⁵ <i>Kaphahara</i> ^{1,23,24,25,26,27,28} , <i>Vatahara</i> ^{1,23,24, 25,,26,27,,28} <i>Shophahara</i> ^{1,23, 25,26,28} <i>Ushna veerya</i> <i>Katu-Tikta rasa</i>	These bunch of tools is good for all obese and all pathological conditions for lipid metabolism. However, <i>Balya</i> and <i>Pichchhila</i> component may provide internal strength and not creates harsh action.
Anti-pyretic activity:- For testing the anti-pyretic activity, the whole aerial part extract of <i>A. speciosa</i> were used and accessed that there is significant antipyretic activity ($p<0.05$) against yeast induced pyrexia in rats. Author said the activity may be found due to inhibition of prostaglandin synthesis in the hypothalamus. ¹²	<i>Jwarahara</i> ¹	There is direct reference of the drug on this action.
Anti-stress activity:- The root extract of <i>A. speciosa</i> (100 and 200 mg/kg) was given for 7 days to evaluate the activity. The extract suppresses the immunity to the antigen, immunized by sheep RBC in mice. The extract shows anti-stress activity. ¹³	<i>Vatahara</i> ^{1,23,24, 25,,26,27,,28} <i>Rasayana</i> ^{1,25} , <i>Balya</i> ^{1,24,28} , <i>Vrushya</i> ^{1,26,28} , <i>Veeryadam</i> ²⁴ , <i>Medhya</i> ²⁵	Governed through <i>Vata</i> all mentioned tools becomes an important benchmark for treating stress conditions. The drug have direct action on psychology along with associated other tools.
Anti-ulcer activity:- A 50% ethanolic extract of the flower of <i>A. speciosa</i> (100-200 mg/kg, p.o.) was reported to protect ulceration in ethanol, aspirin, stress and fourth pylorus ligation induced gastric ulceration in rats. ¹⁴	<i>Madhura vipaka</i> , <i>Tikta-Kashaya rasa</i> <i>Pichchhila</i> ^{1,24}	<i>Tikta</i> , <i>Kashaya rasa</i> along with <i>Madhura vipaka</i> are the properties can subside the ulcerative status.
Aphrodisiac activity:- The root, flower and to some extent leaf of the herb exhibited aphrodisiac activity	<i>Vrushya</i> ^{1,26,28} , <i>Veeryadam</i> ²⁴ ,	There is direct reference of the drug on <i>Vrushya karma</i> .

by evaluating an increase in mounting behaviour of mice. ¹⁵		
CNS effect:- With n-hexane, chloroform, ethyl acetate and the remaining water fractions of hydroalcoholic extract of <i>A. speciosaroots</i> (100, 200 and 500 mg/kg,) was reported to reduce the spontaneous motor activity and potentiated pentobarbital induced hypnosis in mice. ¹⁶	<i>Vatahara</i> ^{1,23,24, 25,,26,27,,28} <i>Medhya</i> ²⁵	Due to its <i>Vatashamaka</i> and <i>Medhya</i> property, it is capable to control most of neurological diseases.
Hepatoprotective activity:- Ethanol extract and ethyl acetate extract (200 mg and 400 mg/kg) of <i>A. speciosaroot</i> and hepatoprotective activity was studied along with carbon tetrachloride induced hepatotoxicity in rats. ¹⁷	<i>Raktavikarahara</i> ^{23,25,26} <i>Udarahara</i> ²³ <i>Astrahara</i> ^{23, 25, 26}	Improving quality of blood is a part of hepatoprotective activity. According to Ayurveda liver is the place for <i>Rakta</i> . So in any blood disorder there is an involvement of liver. Moreover, there is a direct action on <i>Udara</i> (ascitis) where most of the time involvement of liver is considered.
Hypoglycemic activity:- For evaluating the hypoglycaemic activity, the alcoholic extract of <i>A. speciosa</i> (250, 500 and 750 mg/kg, p.o.) used by the researcher and it was found that there is reduction in dose-dependent percentage blood glucose in normal and also in alloxan-induced diabetic rats at 8 h. ¹⁸ .The dried seeds of <i>A. speciosa</i> also showed hypoglycemic activity. ¹⁹	<i>Mehahara</i> ^{1,23,25,26}	The drug acts against all inflammatory conditions such as diabetes, diabetic ulcers etc. There is direct reference in <i>Meha</i> in Ayurvedic texts.
Immunomodulatory activity:- A 95% ethanolic extract of dried root of <i>A. speciosa</i> observed to stimulate cellular and humoral immune response. ²⁰	<i>Balya</i> ^{1,24,28} <i>Rasayana</i> ^{1,25}	There is direct reference of the drug as <i>Rasayana</i> and also as a <i>Balya</i> .
Nootropic:- At a dose of 100 and 200 mg/kg, aqueous root extract improved memory and reverse memory loss induced by various agents such as diazepam and scopolamine and also brain acetylcholine esterase activity was improved which indicates significant Nootropic activity. ²¹	<i>Medhakara</i> ¹ <i>Medhya</i> ²⁵ <i>Balya</i> ^{1,24,28} <i>Rasayana</i> ^{1,25}	In Ayurvedic classics, there is direct reference it is said as <i>Medhya Dravya</i> . Other associated actions like <i>Balya</i> and <i>Rasayana</i> will also be useful for Nootropic activity
Wound healing activity:- The leaves ethanolic extract ointment (15% w/w) of <i>A. speciosa</i> exhibited significant wound healing effect in normal and diabetic rats. ²²	<i>Rasayana</i> ^{1,25} <i>Mehahara</i> ^{1,23,25,26} <i>Astrahara</i> ^{23, 25, 26}	The drug acts on blood diseases. It improves the quality of blood. The leaves are used externally to treat wounds, skin infections by the local traditional practitioners for longer time.

DISCUSSION and CONCLUSION:

Ayurveda, Siddha, Naturopathy etc. are the complementary system of medicine. These have gained much popularity in recent time. The eternal science *Ayurveda* has its own philosophy, principles, ideology, methods which are entirely different from modern pharmacological study. *Vruddhadaru* has the significant role in traditional medicine. In recent era, many researches like pharmacognosy, phytochemistry, pharmacology of *Vruddhadaru* have been carried out to explore chemical constituents of the drug and its activity. The present study is comparing the screening action of

Vruddhadaru with the *Ayurvedic* actions. The comparison is useful for understanding the screening more correctly by using *Ayurvedic* mode of action with is stated herewith. This *Ayurvedic* mode of action will explore more doors for futuristic research as using a typical chemical composition for typical action in future. However it will be very wide study and to identify a specific action of a chemical composition is not so easy. It is also to be noted that there are many actions of this herb apart from screened one which are expressed in the form of concepts like *Rasa* Concept, *Veerya* Concept and *Vipaka* Concept. This should also be screened through the Pharmacological model. *Amavata*, *Vrushya*,

Swarakara and *Udarahara* are some actions which are still be correctly not demonstrated in modern pharmacology. Here need an attention of a Pharmacologist to explore these

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