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Medicinal properties and seed germination study in *Rauvolfia serpentina* (L.) Benth.ex Kurz (Sarpagandha)

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Abstract: Sarpagandha is famous for its alkaloids and so shows therapeutics active components in various medicinal treatments. It's important is also found in Ayurveda, Homeophty, Siddha and in Unani Medicine. Plant can be cultivated by propagated rather collecting from forest natural habitat by the help of their seeds. The current work is deals with to study the medicinal important and seed germination activity in nursery condition rather natural condition. After the all standard protocol of seed germinations, it was found that the percentage of seeds germination was 65±8.49 after 28 days of sowing in specific farm yard manure.

Key words: Medicinal Plant, Seed Germination, Sarpagandha and Rauvolfia serpentine.

INTRODUCTION

***Rauvolfia serpentina* (L.) Benth.ex Kurz i**s commonly known as Sarpagandha from the family Apocynaceae chief and commercial source plants alkaloids. Plant is used in variety of disese like roots of being used in Ayurveda, Homeopathy, Siddha and Unani medicines for the treatment insomnia, cardiac diseases, high blood pressure and asthma. Leaves juice is used as a remedy for removal of opacities of cornea in eye (Paul D *et al.*, 2008).

Sarpagandha is not only important in traditional health care but also its important is increasing in pharmaceutical industries all over the world. 'Serpasil' tablet for high blood pressure is made from the root of Sarpagandha. Around 30 different alkaloids are known to exist in plant some are reserpine, ajmaline, rescinnamine, deserpidine, ajmalicine and rauvolfinine (Pawa *et al.*, 2012, Muneshwar BR 2015).

Rauwolfia contains different phytochemicals, which also include alcohols, sugars and glycosides, fatty acids, flavonoids, phytosterols, oleoresins, steroids, tannins, and alkaloids. The important alkaloids in the plant are indole alkaloids, which have more than 50 of those alkaloids having been isolated in the plant. Indole alkaloid is a group of nitrogenous compounds that are derived from tryptophan an amino acid. They have one nitrogen molecule with a common 5 and 6 carbon heterocyclic ring structure (Pandey *et al.*, 2010). All parts of the plant, including the stem and leaves, contain indole alkaloids, but the highest concentration is seen in the bark of the root. One of the major alkaloids got from plants is reserpine (Bhuyar *et al.*, 2000 and Ponkumar *et al.*, 2008). The reserpine content is lower in the stems and leaves and is been found to be higher in the root. Scientists have believed that it is one of the most prevalent indole alkaloids in the plant; however, different assays have challenged that prediction (Rahul *et al.*, 2018).

The Plants distribution is scattered form in the tropical Himalayas and in the plains near the foot of the hills from Moiadabad to Sikkim. It occurs in Assam, Dehra Dun, and the Siwalik range and in the Sub-Himalayan tracts ascending to an altitude of 4000 ft (Asha Raghav and Pawan K 2012).

Classification*:*
Kingdom: Plantae
Division: Magnoliophyta
Class: Magnoliopsida
Sub Class: Asteridae
Order: Gentianales
Family: Apocynaceae
Genus: *Rauvolfia*
Species: *serpentine*

Botanical name: *Rauvolfia serpentina* (L.) Benth.ex Kurz

Local Name: Chota-chand, Sarpagandha, Nakuli, Harki

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***Fig: Rauvolfia serpentine* (a) Habit** **(b) Seeds**

Morphology of *Rauvolfia serpentina* **:** Plant erect, perennial herb with irregular tubular roots. The plant is a small erect hardy shrub, 40 to 60 cm in height, the baric is green when young, brown when mature, and the leaves are arranged in whorls, almost elliptical in shape tapering gradually at the apex. The leaves are smooth and glossy, light to deep green in color. Petiole is short. Inflorescence many flowered cymes with long peduncle; the flower bud white when very young, pinkish white when mature; the pedicels, calyx and the lower part of the corolla tube is pink in color, the color of the pedicels persistent; the flowers small, little inflated above the middle. The fruit 1-2 seeded, a drupe, the fruit with maturity gradually changes color from green, brown, reddish brown, purple,, to pinkish black. The roots are thick and stout, breaks easily under pressure, tortuous in outline like a snake (commonly known as snake root plant). The root bark when fresh is easily separable from the root wood under pressure (Gupta e*t al.,* 2002). The root wood is pale yellow in color. The bark as well as the wood is extremely bitter in taste.

Due to the remarkable and valuable importance of plants the current work is designed for cultivation investigation of plants by taking them as Propagules. The physiology of seed germination has been recorded and the pattern of plant growth in controlled condition was studied as per slandered mythology (Redford, 1967 and Abdel *et al.*, 2015).

MATERIAL AND METHODS

Most of plant crop can be propagated by seed, stem cutting and root cuttings. Among them seed propagation is the best method for raising commercial plantation of crop (Singh CB, Motilal 1970). Seeds germination in Rauvolfia *serpentina* (L.) Benth.ex Kurz was plain by considering standard seed germination protocols during April 2017 to March 2019 in botanical garden. The seeds sample were collected from local forest area of Amravati distort area.

Seed germination in *Rauvolfia* is highly variable. It is reported to vary from 5 to 30 percent even when only heavy seeds are chosen for sowing purpose. Light and heavy seeds can easily be separated by simple water flotation. Germination of heavy seeds during May-June after soaking them in water for 24 hours was 20-40 percent and 62.77 percent germination was recorded in freshly collected heavy seed lot. In all, 6 kg of seeds are sufficient to raise one-hectare plantation (Bhuyar *et al.*, 2002, Bhupendra K. Dorkar 2018 and 2019).

Collection, Identification and classification of the collected specimens were made with the help of Flora of Melghat (Bhogaonkar and Devarkar, 1999) and other Standard Floras (Naik, 1998) and specimen sample is stored in Department of Botany Shree Shivaji Science College, Amravati for further record purpose.

The daily observations on all Propagules germination were taken and rate of germination is recorded for each plants in each replicate plots up to 19th day after germination. Also, the observations were taken in terms of germination %. The suitable time for Propagules germination was also recorded for all five selected plants (Debarati *et al.*, 2013).

RESULTS AND DISCUSSION

The nursery in botanical garden is prepared by raised beds of 10x10 m. dimension under partial shade made up of one-third of well matured (Farm Yard Manure) FYM and leaf mould, and two-thirds amount medium of silt-loam soil. The seeds sown, 2-3 cm apart in rows in shallow furrows during April end. The furrows are then covered with a fine mixture of soil and FYM with light watering to bed. Seeds germination starts after 19-20 days and continues up to 25 to 28 days.

Pattern of seed germination in *Rauvolfia serpentina* were also recorded in all replicates between 15 to 28 days after sowing of seeds. As of average, among all ten replicates *Rauvolfia* plants shows 65±8.49 percentage in seed germination (Table 1.). These results of seed germination are helpful for observing seeds quality and cultivation

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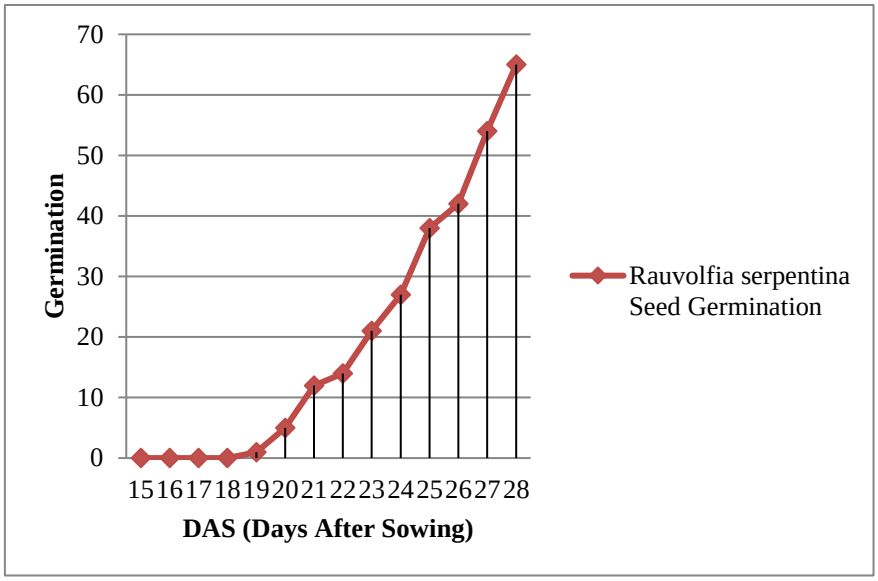
practice for commercial way of this medicinal plants. The patterns of seeds germination percentage in each replicate and germination peak heights are represented in table 1. and graph no. 1. Given below.

Replicate of Plant	Table 1. *Rauvolfia serpentina* Germination of Seeds in number (15-28 days after sowing)														Germination %
	15	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	
Replicate 1	0	0	0	0	0	0	1	1	2	3	5	5	6	7	70
Replicate 2	0	0	0	0	0	0	1	1	2	2	2	3	5	7	70
Replicate 3	0	0	0	0	1	1	2	2	2	3	3	4	4	5	50
Replicate 4	0	0	0	0	0	1	2	2	2	3	4	4	6	7	70
Replicate 5	0	0	0	0	0	0	0	1	1	1	3	4	5	6	60
Replicate 6	0	0	0	0	0	1	1	1	2	3	3	4	6	7	70
Replicate 7	0	0	0	0	0	0	1	1	3	4	6	6	7	8	80
Replicate 8	0	0	0	0	0	1	1	1	2	2	4	4	5	6	60
Replicate 9	0	0	0	0	0	1	1	2	2	3	4	4	5	6	60
Replicate 10	0	0	0	0	0	0	2	2	3	3	4	4	5	6	60
Total	0	0	0	0	1	5	12	14	21	27	38	42	54	65	**65**
Germination % SD= 65±8.49															



Graph no. 1. Seed Germination in *Rauvolfia serpentine*

Rauvolfia, if grown in areas which receive rainfall of 150 cm or above well distributed throughout the growing season such as in Assam and Kerala, can be raised and rain fed crop under subtropical conditions. It needs regular irrigation where temperature rise high combined with low rain fall during rainy season. It is suggested that 15 to 16 irrigations, amounts to irrigation at 20 days interval in summer and at 28 days interval in winter.

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REFERENCES

[1]. Abdel-Haleem A. H. El-Shaieny. Seed Germination Percentage and Early Seedling Establishment of Five (*Vigna unguiculata* L. (Walp) Genotypes Under Salt Stress. European Journal of Experimental Biology, 2015, 5(2): 22-32

[2]. Asha Raghav and Pawan K Kasera. Seed germination behaviour of *Asparagus racemosus* (Shatavari) under in-vivo and in-vitro conditions. Asian Journal of Plant Science and Research, 2012, 2 (4):409-413

[3]. Bhogaonkar, P.Y. and V.D. Devarkar. Additions to the Flora of Melghat. Some rare and uncommon plants. Technical Bulletin, No. VII. The Directorate, Project Tiger, Melghat, Amravati. (Maharashtra, India) 1999

[4]. Bhupendra K. Dorkar. Study of cultivation practice in *Chlorophytum tuberosum* (Roxb.) Baker. (Liliaceae). International Journal of Science Info (IJSI), 2018 Vol. III. Issue IV. PP-616-623

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[5]. Bhupendra K. Dorkar. Study of Seed Germination Practice in *Asperagus racemosus* Willd. International Journal of Research and Analytical Reviews (IJRAR). 2019, 6 (1) 769-773
[6]. Bhuyar S, Wankhade SG, Paturde JT, Khode PP. Seed germination studies in sarpagandha (*Rauvolfia serpentina* Benth). Res. Crops 2000; 1(2):189-191.
[7]. Bhuyar S, Wankhade SG, Paturde JT, Khode PP. Seed germination studies in sarpagandha (*Rauvolfia serpentina* Benth). Res. Crops 2000; 1(2):189-191
[8]. Debarati Mukhopadhyay, Chauhan J.S., Parihar S.S. and Malavika Dadlani. Seed Storage Behaviour in Berberis Aristata. Indian Journal of Agricultural Sciences. 2013 83 (3): 304–309.
[9]. Gupta, S., Kumar, A. and Sharma, S. N. Improvement of Seed Germination in *Asparagus racemosus* Willd. Journal of herbs, spices and medicinal plants, 2002 9(1): 3-9.
[10]. Muneshwar BR. Standardization of seed germination testing procedure in sarpagandha (*Rauvolfia serpentina* Benth.). M. Sc. (Agri.) Thesis, Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra, 2015.
[11]. Naik, V. N.. Flora of Marathwada, Amrut Prakashan, Aurangabad. 1998
[12]. Pandey AK, Mandal AK. Influence of propagation techniques and harvesting time on root yield and alkaloid contents of *Rauvolfia serpentina*. J. Natural Remedies. 2010;10(1):44-49.
[13]. Paul D, Paul NK, Basu PK. Seed germination response of *Rauvolfia serpentina* Benth. To certain physical and chemical treatments J. Bio-sci. 2008;16: 129-131.
[14]. Pawar GS, Guru SK. Influence of gibberelic acid and seed coat removed on the seed germination behavior of *Rauwolfia serpentina* L. under controlled environment. J. Non Timber For. Prod. 2012;19(1):5-8
[15]. Ponkumar P, Padma M, Rajkumar M, Madulety TY. Effect of chemicals and plant growth substances on breaking of seed dormancy in sarpagandha (*Rauvolfia serpentina* L.). J Res. ANGRAU. 2008; 36(1):54-56.
[16]. Rahul S Phatak, NK Hegde, PM Gangadharappa and Laxminarayan Hegde. Seed germination and seedling growth as influenced by seed treatment in sarpagandha (*Rauvolfia serpentina* Benth.). Journal of Pharmacognosy and Phytochemistry 2018; SP3: 14-17
[17]. Redford, P.J. Growth analysis formulae their use and abuse. Crop Sci., 1967 7: 171-175.
[18]. Singh CB, Motilal VS. Effect of Gibberellic acid (GA3) and temperature on seed germination of *Rauvolfia serpentina*. Plant.Sci.1970; 2:109 - 111.

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