OPEN ACCESS

Int. J. of Life Sciences, 2013 Vol.1 (1): 76-78 ISSN: 2320-7817

Response of *Withania somnifera,* (L.) Dunal. to Soils from different locations in Satara district w.r.t Germination and Vegetative Growth

R. S. Bhosale[1*] and A. D. More[2]

[1]Department of Botany, A.C.S College, Narayangaon, Junnar, Pune,
[2]Department of Botany, Fergusson College, Pune.
*** Corresponding author Email** : Rahul.bhosale3@gmail.com

ABSTRACT

Withania somnifera, Dunal. belongs to family Solanaceae. It is also known as Ashwagandha or Indian Genseng. Withanolides are constituents of roots of Ashwagandha. Withanolide is the major constituent with appreciable quantity of Withanone and traces of Withaferin-A. In Ayurvedic literature, is a "Rasayana" or rejuvenating drug and hence also traditionally known as Avarada which suggests the application of this plant for enhancing longevity. The seeds of *Withania somnifera,* Dunal. var somnifera were selected and used for following investigations. Different locations from Junnar taluka showed different response to germination and vegetative growth. From present investigation it can be concluded that soil with alkaline properties was more efficient for germination and growth of *Withania somnifera,* Dunal. than acidic soil.

KEY WORDS

Ashwagandha, Soils, Germination, Growth

Research Article

INTRODUCTION

Ashwagandha (*Withania somnifera* (L.) Dunal.) is a representative of the *Solanaceae* family, a self-pollinating plant which naturally occurs in subtropical areas. From time immemorial it has been used by folk medicine of African and Asian countries (especially India). Medicinal properties of the species are related to withanosides in roots, applied as an adaptogen (Russo et al., 2001), and withanolides in herb. *Withania somnifera* (L.)Dunal, also known as Indian ginseng and as Indian Winter Cherry is an important ancient plant, the roots of which have been employed in Indian traditional systems of medicine, Ayurveda and Unani. It grows in dry parts in sub-tropical regions. Rajasthan, Punjab, Haryana, Uttar Pradesh, Gujarat, Maharashtra and Madhya Pradesh are the major Ashwagandha producing states of the country. The estimated production of Ashwagandha roots in India is more than 1500 tonnes and the annual requirement is about 7000 tonnes necessitating the increase in its cultivation and higher production. The aim of this study is to assess the possibility of obtaining high yield of seeds capable of germinating. Investigations on growth parameters with application of different soil nutrients invitro showed significant changes in productivity (Cheruth et at., 2009). *Withania Somnifera* crop does not require heavy doses of manure and fertilizers; its growth depends on natural dry soil and differs from soil to soil (Atal and Kapur, 1977). In present paper pH dependent germination and vegetative development in Ashwagandha is mentioned considering natural soil without providing extra nutrient.

MATERIALS AND METHODS:

Different sites selected for studying growth parameters in *Withania sominifera* (L.) Dunal. were as follows-

Site first- Botanical Garden Sharadchandra Pawar Mahavidyalaya Lonand Tal- Khandala, Dist- Satara.

Site Second– Groundnut Research Center, Godrej Ind. Ltd. Ajanuj, Tal- Khandala, Dist- Satara. Seed material of *Withania somnifera* Dunal var. nagori were collected from Mahatma Phule Agriculture University, Rahuri.

Germination was studied in laboratory in different condition of light and temperature in seedling tray with sterile soil and soils from both sites in five trays with 100 seeds per tray. Germination was recorded at the end of 1st week in different soils. Healthy seedlings were transferred to pots with soils from different sites. Vegetative growth parameters like Plant height, Average number of branches, leaves per branch, Total leaf area. Root length was studied after

International Journal of Life Sciences

www.ijlsci.in

120 days at the time of fruit setting. Soil from both sites will be analyzed considering following parameters as water holding capacity, Total amount of organic matter, Phosphate and nitrates. Values of Phosphate and nitrate were obtained from department of Chemistry, Arts, Commerce and Science College, Narayangaon. Water holding capacity was studied in Botany laboratory of our college. Total organic content was obtained by combustion of sample in furnace. Total alkaloid was extracted according to Harbone, (1973) for plants from both sites and concentration was recorded.

RESULT AND DISCUSSIONS

Table1: Seed germination in different conditions

Sr. No.	Light	Temperature	% Germination
1	Alternating Light	Alternating above 35°C	78.90
2	Dark	35°C Incubated	01.00

Table2: Effect of soil on seed germination

Sr. No.	Site	% Germination
1	Site 1	82.00
2	Site 2	76.00

For each soil type 100 seeds were sown in tray and placed in different conditions of light and temperature, maximum germination was observed in alternating natural light and in high temperature up to 45 °C. Soil from site 1 showed Maximum germination. Vegetative growth parameters were observed as follows, Plant height was more in case of Site 1. Root length was also observed more in site 1. Soil from site 1 was also favorable for number of branches, leaves per branch and average leaf area. Total Alkaloid content was higher in Site 1 than site 2. Soil analysis showed that organic content was greater in site1, values for phosphates and nitrate were more in case of site one. Water holding capacity of site 2 was weaker than site 1. Overall growth in soil from site 1 was better than site 2. pH. of soil from site1 was 7.4 and that of site 2 was 5.2 i.e. Site 1was bit alkaline and site2 was acidic.

CONCLUSION

Seed germination in alternating light and temperature above 35°C was 78% and completely dark conditions inhibited germination. Biljana et al., (2010) observed similar result for *Capsicum annum* and *Solanum lycopersicum* w.r.t. Chloride content in soil and Commander et al.,(2008) w.r.t. temperature. Soil from Site1 was more favorable for germination than Site 2 i.e. 82.00 % and 76.00 % respectively. Similar results were coined by Grasyna et al., (2004) other growth parameters like Plant height, Average number of branches, leaves per branch, Total leaf area. Root length was also good in soil from site 1.

From present work it can clearly be indicated that soil with bit alkaline nature and good drainage capacity and organic content in temperature between 30°C to 40°C shows good germination, vegetative growth. Increase in leaf area shows increase photosynthetic rate therefore total alkaloid content is increased, gits4u.com/Medicinal Plant Ashwagandha http://www.gits4u.com/agri/agri5d.htm (2009).

In conclusion it can be said that use of chemical mutagens has succeeded in inducing M1 Biological parameters.

Table 3: Vegetative growth parameters

Sr. No.	Soil Site	Plant height (cm)	Root length (cm)	Avg. no. of Branches	Avg. no. of leaves/ Branch	Avg. leaf area/plant (cm^2)
1	Site 1	80	35	15	50	20 ×50×15
2	Site 2	50	30	10	40	16× 40×10

Table 4: Total Alkaloid Content

Sr.no.	Site	Alkaloid content /20gms of root powder (aprox.)
1	Site 1	0.1006
2	Site 2	0.0165

REFERENCES

Atal C.K. and Kapur B.M. (1977). Cultivation and Utilization of Medicinal and Aromatic Plants

Biljana Bojovic et al., (2010). Effects of Nacl on Seed Germination in Some Species from Families Brassicaceae and Solanaceae. Kragujevac J. Sci. 32, 83-87.

Cheruth Abdul Jaleel, M.M. Azooz And R. Panneerselvam, (2009). Global Journal of Molecular Sciences 4 (1): 06-09.

Commander L.E. et al., (2008). Seed Germination of *Solanum sp*. (Solanaceae) for use in Rehabilitation and Commercial Industries, Commonwealth Scientific and Industrial Research Organization, Collingwood, Australie Vol. 56, Pp. 333-341

Grasyna Obidoska, Ała Sadowska, Maria Rumowska, (2004). The Effect of Growing Factors on the Yield of Seeds of Ashwagandha (*Withania Somnifera* (L.) Dunal.) Cultivated in Polish Climatic Conditions. Folia Horticulturae Ann. 16/2, 57-63

Harbone J. B. (1973). Phytochemical Methods Chapman And Hill Tokyo Japan.

http://www.gits4u.com/agri/agri5d.htm (2009)

Russo A., Izzo A.A., Cardile V., Borrelli F., Vanella A. (2001). Indian Medicinal Plants As Antiradicals And Dna Cleavage Protectors. Phytomed. 8: 125-132.