



Short Communication

Comparative Study of Seed Germination and Percentage of Fungal Infection of Ashwagandha (*Withania somnifera* (L.) Dunal.)

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Abstract

Ashwagandha (Withania somnifera (L.) Dunal.), is a medicinal plant. Presently, there are five different varieties are under in cultivation. These varieties shows different rate of seed germination and fungal infection. These variation in percent of seed germination and fungal infection are investigated in the present work by blotter method.

Key words: Ashwagandha, cultivated and, wild varieties, blotter paper method.

Introduction

Ashwagandha (*Withania somnifera* (L.) Dunal.) is popularly known as Indian Ginseng. It is an important medicinal plant. The roots of this plant, occasionally its leaves and seeds are used in ayurvedic and Unani medicines. It is commonly prescribed for hiccup, bronchitis, dropsy, rheumatism and female disorders; the roots of this plant also prescribed for general sexual weakness in human beings¹. Ashwagandha roots are used in many formulations prescribed in variety of manifestation viz. musculoskeletal conditions. It is a general tonic for overall health². *Withania somnifera* Dunal (ashwagandha, WS) is widely used in Ayurvedic medicine, the traditional medical system of India. It is an ingredient in many formulations prescribed for a variety of musculoskeletal conditions (e.g., arthritis, rheumatism), and as a general tonic to increase energy, improve overall health and longevity, and prevent disease in athletes, the elderly, and during pregnancy. Many pharmacological studies have been conducted to investigate the properties of ashwagandha in an attempt to authenticate its use as a multi-purpose medicinal agent. For example, anti-inflammatory properties have been investigated to validate. *somnifera*, *dunal*, *withaferin*, *sitoinoside*, *solanaceae*, Indian ginseng, and winter cherry. Results of these searches were reviewed to identify relevant articles.

Ashwagandha contains very high concentration of metabolites like steroidal lactones, alkaloids and flavonoides, so it is used in more than 90 commercially ayurvedic formulations³. This plant is cultivated in north western region of Madhya Pradesh, on about 400 ha.^{4,5} such valuable and economical important ayurvedic plant is infected by some fungi. The common diseases are leaf rust since many of ashwagandha's uses have not been scientifically validated, skepticism can naturally be expected when presented with an herb purportedly useful in so many ailments. In Ayurvedic medicine there is a class of herbs,

including WS, known as adaptogens or vitalizers. Adaptogens cause adaptive reactions to disease, are useful in many unrelated illnesses, and appear to produce a state of nonspecific increased resistance (SNIR)⁶⁻⁷ to adverse effects of physical, chemical, and biological agents. They are relatively innocuous, have no known specific mechanism of action, normalize pathological effects, and are usually glycosides or alkaloids of a plant⁸⁻⁹. The chemistry of WS has been extensively studied and over 35 chemical constituents have been identified, extracted, and isolated¹⁰⁻¹². The biologically active chemical constituents are alkaloids (isopelletierine, *Withania somnifera* (Ashwagandha) phenylbutazone (100mg/kg) was given as a positive control. WS was found to cause considerable reduction in inflammation. Acute phase reactants of the blood monitored by crossed immunoelectrophoresis showed changes in the concentration of many serum proteins (α 2-glycoprotein, major acute phase α 1-protein, and pre-albumin) in the WS group.

(*Aecidium withaniae* tuem), leaf spot (*Colletotrichum capsici* Syd. Butter and Bisby) damping off cause by *Pythium debaryanum*. The wilt infection commonly seen the results in wilting, death and decay of underground parts. The roots and infected plant shows cottony growth of fungus it was seen the basal part of infected plant. The spoilage of seed occurs due to excess water and the percent germination is poor, fungal infection is more. Hence the present study of seed germination and fungal infection of Ashwagandha is carried out.

Material and Methods

In this experiment the germination of different varieties like J.A.-20, W.S.-90-100, Indore general, Posida, Nagori, and Wild varieties of Ichalkaranji area. These seeds are collected from different regions like as mahathama phule Agriculture University, Rehire, Marathawada Agriculture University Parbhani, and Ichalkaranji field area.

The different methods are used for germination studies (sand, soil, agar plate method, towel paper method and blotter paper method). Among the followed methods are used the Blotter paper method, is found to be more suitable for germination as it is well documented by Thapliyal and Thapliyal, 2005.10 Healthy and each 10 infected seeds are selected from each variety. These seeds are dipped for one minute in 0.1% Mercuric chloride solution. Then, washed thoroughly with sterilized distilled water and are placed in Petri plates. Incubated for germination at room temperature, up to 14 days. The observations are recorded as given in table-1 and figure.1 a,b.

Result and Discussion

The incubation studies revealed that, after 14 days, the germination is initiated, in different varieties of Ashwagandha. The percentage of seed germination is found to be higher in variety J.A-20. And, lower in fungal infection. The variety Nagori, W.S.-90-100 and wild varieties show medium seed germination, and medium fungal infection. The varieties posida and Indore general, shows low seed germination and higher fungal infection.

Conclusion

The results of present work revealed that some varieties, like Posida, Indore general. Having low seed germination and higher fungal infection. There is necessity of treatment of different growth hormones, fungicides, nutritional sources and efficacy plant parts. So as to increase the productivity this plant Ashwagandha production is need to be increase day to day.

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Table-1
Comparative study of seed germination of Ashwagandha varieties and fungal infections

Method	Variety	Germination %		Fungal infection %	
		H	I	H	I
Blotter paper Method	W.S-90-100	60	32	30	20
	Nagori	50	30	20	40
	J.A.-20	75	40	25	31
	Indore General	40	30	40	40
	Posida	40	30	20	30
	Wild variety	60	50	40	38

H –Healthy seed, I-Infected seed



Figure -1 (a and b)
Comparative study of seed germination of Ashwagandha varieties and fungal infections