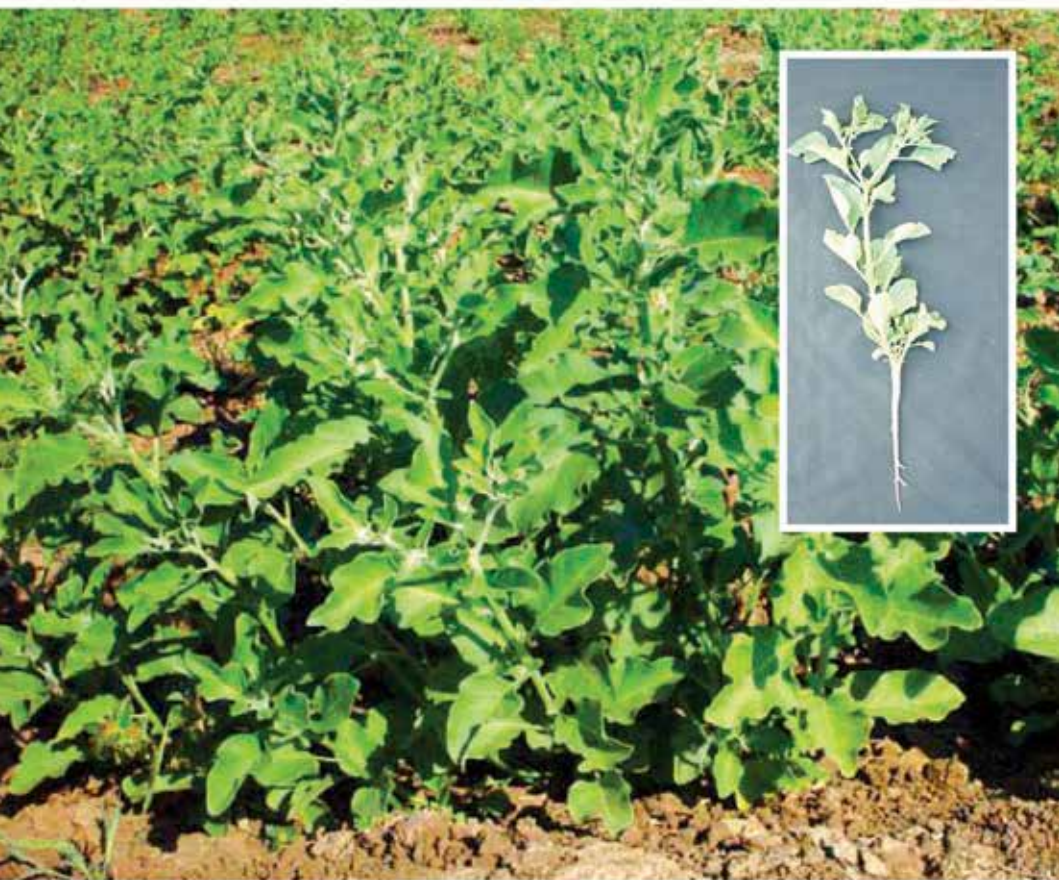


Good Agricultural Practices for Ashwagandha



**ICAR – DIRECTORATE OF MEDICINAL AND AROMATIC PLANTS RESEARCH
BORIAVI, ANAND – 387 310, GUJARAT**

Good Agricultural Practices for Ashwagandha

Compiled by

**R.S. Jat
R. Nagaraja Reddy
Ruchi Bansal
P. Manivel**



**ICAR – DIRECTORATE OF MEDICINAL AND AROMATIC PLANTS RESEARCH
BORIAVI, ANAND – 387 310, GUJARAT**

Published by : Dr. Jitendra Kumar,
Director, ICAR – Directorate of Medicinal and Aromatic Plants
Research, Boriavi, Anand - 387 310, Gujarat, India

Phone : +91-0269-2271602

Fax : +91-0269-2271601

E-mail : director.dmapr@icar.gov.in

Web address : www.dmapr.org.in

Printed : March, 2015

Front Cover :



Ashwagandha plant



Ashwagandha roots

Printed at : Anand Press, Anand 388 001, Gujarat
E-mail : anandpress@gmail.com

CONTENT

FOREWORD.....v

Ashwagandha

Name of the plant..... 01

Plant parts used for medicinal purpose..... 01

Uses 01

Characteristics of the plant..... 02

Major production areas..... 02

Cultivation methods 02

Post harvest processing..... 06

Documentation of activities..... 07

Yield and economics 07

Crop calendar 08

FOREWORD

Medicinal plants are wonder gift of nature which are used as medicine, cosmetics, hygiene and food supplements in improving the quality of human life. Most of the world's supply of medicinal herbs is from the wild collection (90%) and it resulted into dwindling natural resources, reduced biodiversity and irregular supply. Hence, the cultivation of medicinal plants will ensure the regular supply of quality raw drugs. This calls for availability of suitable cultivation practices. Further, as per the WHO guidelines, compliance of good agricultural practices (GAP) for cultivation of medicinal crops is necessary to produce good quality raw drugs.

Ashwagandha (Withania somnifera) is an annual to perennial, branched wonder herb with multiple medicinal properties. It is widely grown in dry parts of subtropical regions of India. All plant parts of ashwagandha have medicinal properties and are used in preparation of various drugs, however, roots are mainly used for preparation of vital tonics. It is Aphrodisiac, tonic, rasayan drug, general tonic in arthritis and debility from old age. It is used in anxiety, depression, phobias, alcoholic paranoia, schizophrenia etc. This crop has already brought under cultivation and being cultivated by the farmers.

At this juncture, I am happy that ICAR- DMAPR, Anand has taken an initiative in compiling and publishing this extension bulletin that would serve as useful guide to the ashwagandha cultivators for the production of better yield and quality raw material.

Anand


(Jitendra Kumar)

Date: 24-11-2014

Good Agricultural Practices for Ashwagandha



1. Name of the plant

1.1 Scientific name: *Withania somnifera* Dunal.

1.2 Local name: Asgandh, Nagouri asgandh, Punir

2. Plant parts used for medicinal purpose

Ashwagandha roots, leaves and seeds have medicinal properties and are used in preparation of various drugs.

3. Uses

Ashwagandha is considered as wonder herb with multiple medicinal properties. Ashwagandha roots are mainly used for preparation of vital tonics. It is a stress reliever and is used in treating senile dysfunctions. It is used in controlling anxiety, depression, phobias,

alcoholic paranoia, schizophrenia etc. The active ingredient that attributed to the medicinal property is the alkaloids and steroidal lactones.

4. Characteristics of the plant

Ashwagandha is an annual to perennial, branched, undershrub to herb of about 30 cm to 120 cm height, minutely stellate and tomentose branches. Roots are fleshy, tapering, whitish brown. Leaves are ovate and flowers are greenish. The mature fruits are orange-red berries.



5. Major production areas

Ashwagandha is widely grown in dry parts of subtropical regions. Rajasthan, Punjab, Haryana, Uttar Pradesh, Gujarat, Maharashtra and Madhya Pradesh are major ashwagandha growing states in India.

6. Cultivation methods

6.1 Climate

Being hardy and drought tolerant crop, ashwagandha requires relatively dry season throughout its growing period. It is grown as late rainy season (kharif) crop between 600-1200 m altitudes. The semi-tropical areas receiving 60-75 cm rainfall are suitable for its cultivation. Temperature between 20°C to 35°C is most suitable for its cultivation. Late winter rains are conducive for the proper development of the plant roots.

6.2 Soil

Soil for ashwagandha cultivation should not have any inherent pesticides contamination or danger of potential contamination such as from industries, busy roads or pesticides being sprayed in neighbouring. Soil should be tested for physical, chemical and biological parameters and pesticides residue from the nearby soil testing laboratory. The soil should be loose, deep and well drained. Ashwagandha grows well in sandy loam or light red soils having pH

7.5-8.0. Black or heavy soils having good drainage are also suitable for ashwagandha cultivation.

6.3 Land preparation

In Ashwagandha, roots are the major economic part. Thus, land should be prepared in such a way that it should not have any hindrance in the development of roots and get more length and girth for better quality. The land was ploughed once with mould board plough and harrowed twice to bring the soil to fine tilth after receiving pre-monsoon rain. Nourish the soil with plenty of organic matter at the time of land preparation. The manures or composts should be well decomposed and not made from city waste or human excreta. About 10-20 tonne of farm yard manure per hectare should be mixed into the soil at the time of last ploughing. The field is then levelled by planking.

6.4 Sowing time

Sowing should be done at right time to harvest maximum yield of good quality produce. It may be noted that since ashwagandha is a late kharif season crop, the time of sowing is decided by date of arrival of monsoon in that area. Early sowing may cause seedling mortality due to heavy rains. The optimum time for sowing is 2nd to 3rd week of August.

6.5 Method of sowing

Broadcasting with higher seed rates at 20-35 kg per hectare is the most common method for sowing of ashwagandha in rain fed areas. However, line sowing and raised bed sowing are also gaining importance in the recent time and have been reported to yield higher quantity of roots and also helps in performing intercultural practices properly. In some areas transplanting is also in practice. The seedling of 25-35 days old can be transplanted in the main field at the recommended spacing. The seeds are sown in lines at 1-3 cm deep in soil. Apply a light shower after sowing of seeds to ensure good germination.

6.6 Propagation material

Ashwagandha seeds do not have dormancy hence, commonly propagated by seeds. For sowing of ashwagandha, use the seeds that were harvested during the previous season and of good quality and

free of pests. Seeds should be procured from a reliable source with seed labels with detail information about the seed.

6.7 Recommended varieties

The recommended high yielding varieties and their source of availability are:

Variety	Seed yield	Source of availability
Jawahar Asgand-20	Dry root yield 5-6 q per hectare	MAP unit, College of Horticulture, RVSKVV, Mandsaur, Madhya Pradesh
Jawahar Asgand-134	Dry root yield 6-8 q per hectare	MAP unit, College of Horticulture, RVSKVV, Mandsaur, Madhya Pradesh
Raj Vijay Ashwagandha-100	Dry root yield 6-7 q per hectare	MAP unit, College of Horticulture, RVSKVV, Mandsaur, Madhya Pradesh

6.8 Seed rate

A seed rate of 10-12 kg is sufficient for the sowing of one hectare crop. Sowing should be done at right spacing at 30 cm or 15 cm row to row and 10 cm plant to plant spacing in line sowing method. However, about 500-750 g seeds are sufficient for raising seedlings for one hectare crop.

6.9 Crop nutrition

Optimum crop nutrition should be ensured as excess or deficit of any essential plant nutrient may decline the production as well as quality of the produce. Soil testing should be done before applying the nutrients. Use of organic manures preferred over inorganic sources of nutrients for growing of ashwagandha. Organic manures like, farm yard manure, vermicompost, green manure etc. may be used as per requirement of the crop. A fertilizer dose of 15 kg nitrogen and 25 kg phosphorus along with 10-15 tonne organic manures per hectare should be applied to harvest good yield.



6.10 Irrigation

Ashwagandha is usually grown as rain fed crop where irrigation facilities are not available. However, for irrigated crop there should be access to a clean and reliable source of good quality irrigation water. Excessive rainfall or water is harmful for this crop and not require irrigation if monsoon is well distributed throughout the growing season. However, one or two life saving irrigations can be given if required. Under irrigated conditions, the crop can be irrigated once in 15 days depending on soil type. Organic mulches such as wheat straw or ashwagandha straw of previous crop should be spread in between the rows to conserve the soil moisture, facilitate better water infiltration during excess rains and control weed.

6.11 Intercultural operations and weeding

The seeds sown by broadcasting or in the line in furrows should be thinned out by hands at 25-30 days after sowing to maintain a plant population of about 3 to 6 lakh plants per hectare. Weeds should be managed before they start competing with the crop for nutrients and light. One hand weeding at an early stage is sufficient to enable the ashwagandha plants to take over the growth of weeds. At later growth stages the weeds are get suppressed by its smothering effect. Care should be taken during hand weeding that the roots should not be damaged by hoe. Use of chemical herbicides is restricted for weed control in medicinal crops hence, alternative methods of weed control such as use of organic mulches to control weeds should be preferred as they inhibit the weed growth as well as conserve the soil moisture.

6.12 Insect pest and disease management

Areas which have low incidence of insect pests and diseases should be preferred for the cultivation of ashwagandha. Use of proper cultural methods (companion crops, trap crops, crop rotation, adjusting sowing time and spacing, balanced plant nutrition and timely irrigation), biological methods (parasites, predators and bio-pesticides) and mechanical methods (light-traps) are preferred for management of insect pests and diseases in medicinal crops. However, use of chemical pesticides are also recommended only if there are no other options, and only if there is sufficient time between application and harvest so that the chemical cannot be detected in the medicinal plant material. Ashwagandha is damaged by insects like aphid and hadda beetle which can be controlled by 2 to 3 spray of Daimethoate

or spray of Azadirachtin at 1% and Flavanoids at 6%. Diseases like, seedling rot and alternaria leaf blight are observed in some places. Seedling mortality becomes severe under high temperature and humid conditions. Disease can be minimized by use of disease free seeds and by giving seed treatment before sowing with Carbofuran at the rate of 2-2.5 kg per hectare. Alternaria leaf blight can successfully be controlled with the spray of Mancozed (12.3%). Bio-pesticides should be prepared from neem, chitrakmool, dhatura and cow urine and sprayed when required. Neem cake can also be applied in soil to control the diseases.

6.13 Harvesting

All the tools, containers and sacks to be used in harvesting should be washed and cleaned. Harvesting should be done at the right stage to ensure maximum levels of active ingredients and better quality. Ashwagandha plants start flowering and bearing fruits from December onwards. The crop is ready for harvest in January-March at 150 to 180 days after sowing. The maturity of crop is judged when leaves start drying and berries become yellow red. Root size, root and shoot biomass and alkaloid content were found maximum in 180 days crop which should be considered as best harvesting time for ashwagandha. Ashwagandha should be harvested in the dry weather and not in rain or in early morning when there is dew on the ground. Harvesting is done by uprooting the whole plant without damaging the roots. There should be sufficient moisture in the soil at the time of harvesting for easy uprooting the plants. Weed plants or any inert material should not be harvested with the crop plants.

7. Post harvest processing

Post harvest processing is usually the most critical stage in determining the end quality of the product. The harvested produce should be prevented from any contamination, degradation and/ or damage at any stage of processing. Transport the harvested plant material to the processing site in a clean vehicle and protect from heat and rain during transportation. The processing site should be clean and protected from direct sunlight and rain and have access to water. Use a clean surface, preferably a cemented floor or a tarpaulin sheet which is in good condition



Seeds

for laying out the harvested material. Remove weeds and other extraneous physical matter and substandard material. Then roots are separated from aerial parts by cutting the stem 1-2 cm above the crown roots. The roots are beaten with a club to remove adhering soil and breaks off the thin, brittle lateral rootlets. Then the roots are washed and sun or shed dried up to 10-12 % moisture content. The roots are either cut transversely into small pieces of 7-10 cm or dried as it is in the sun. Then the roots graded as per demand in the market. Leaves and berries of ashwagandha are hand plucked and crushed separately to take out the seeds. Pack the produce into a clean and dry sack, ensuring it is clearly labeled. Store the produce in a clean and dry room. Raise the sacks off the ground, away from the wall and not with fertilizers or pesticides. Use of rat poison and fumigation should be avoided in the storage rooms.

8. Documentation of activities

The documentation of all the activities starting from cultivation to post harvest processing should be in continuation and maintained properly. Records should be kept for each activity of cultivation such as sowing, weeding, irrigation, harvesting, and of post-harvest processing after harvest to sorting, drying, grading, packing and storage, with details of time and type of activity that refers to a complete history and ensure traceability of the final product.

9. Yield and economics

On an average from one hectare crop under commercial cultivation approximately 6-8 quintals of dried roots and 50-75 kg seeds can be obtained. Cultivation of one hectare ashwagandha crop may cost ₹10,000/- and gives return of ₹30,000 per hectare. However, it depends on the demand and supply at a given time in the market.

10. Crop calendar

Major activity	Month	Activity details
Land preparation	June-July	Field should be prepared to achieve fine tilth and apply 10-20 tonne of farm yard manure per hectare
Sowing	2 nd to 3 rd week of August.	10-12 kg seeds per hectare sown at 30/15 cm row to row and 10 cm plant to plant spacing
Irrigation	November-December	Apply 1-2 life saving irrigations, if required
Intercultural operations and weeding	November-December	Thinning should be done to maintain desired plant population. Two hand weeding first at 25-30 days and second after 60-70 days after sowing
Spraying	Whenever required	Neem based bio-pesticides
Harvesting	January-February	When leaves start drying and berries become yellow red. Harvest by uprooting the whole plant
Post harvest operations	March	Harvested plants are sun dried for 3-4 days and separated roots, leaves and seeds
Grading	March	Separate the substandard material from the good quality roots
Documentation	Through out the season	All the activities from sowing to harvesting and post harvest processing should be documented

Note

Note



हर कदम, हर उमर
किसानों का हमराफर
भारतीय कृषि अनुसंधान परिषद

Agri'search with a human touch