

# Economics of *Withania somnifera* (L.) Dunal for Commercial Cultivation in Rajasthan

Vivek Sharma

Department of Botany, Govt. Meera Girls College, Udaipur, Rajasthan, India

Corresponding author: viveksharma39@gmail.com

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## ABSTRACT

*Withania somnifera* (L.) Dunal, also known by the name of Ashwagandha, Indian Ginseng or winter cherry is widely used in Indian systems of medicine and homeopathy to cure diseases like leprosy, nervous disorders, intestinal infections and rheumatism. In Ayurveda and Unani preparations roots, bark, leaves, fruits and seeds are used to cure various body ailments. Its products are also used as a health tonic to overcome all kinds of weakness and to increase vigour and stamina. It is an erect branched shrub up to 1.25 meters in height normally found in all the states of India especially in subtropical regions like Punjab, Haryana, Rajasthan and Gujarat. In Rajasthan, it is a natural product of Nagaur and Bikaner District and widely grown in south-eastern districts of Rajasthan. It is cultivated in sandy loam or light red soil having a pH of 7.5 to 8.0 with good drainage. It is a late rainy season crop. The roots, leaves and fruits possess tremendous medicinal value. Ashwagandha is the best rejuvenate that helps maintain proper nourishment of tissue, particularly muscle and bones while supporting the proper function of the adrenals and reproductive system. It contains a number of alkaloids like nicotine, somnine, somniferine, withanine, tropine, 3-alpha-tigloxytropine and withasomine etc.

**Keywords:** *Withania somnifera*, Ayurveda, Ashwagandha, Rajasthan

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## Medicinal benefits of *Withania somnifera* (L.) Dunal

The root powder has been used for centuries in India, in Ayurvedic medicine, but there is no high-quality evidence of its benefits (healthifyme.com). The traditional medicine offers several benefits that include the following:

- **Helps combating stress:** The results, published in the Indian Journal of Psychological Medicine show that Ashwagandha helps promote relaxation as it is a natural adaptogen. Ashwagandha is one of the Indian herbs with adaptogenic benefits meaning, it helps the body to adapt to various emotional and physical stress. As Ashwagandha helps to reduce cortisol, the 'stress hormone' in the body, it is considered an effective treatment to reduce stress.
- **Favorable effects on nervous system:** Ashwagandha benefits aid in reducing symptoms of anxiety and anxious mood. Regular consumption of Ashwagandha in its right dosage reduces severe depression in adults. Though research is limited, Ashwagandha is believed to reduce depression. In addition to that, it also helps calm the central nervous system.
- **Regulating blood sugar levels:** The herb has the ability to lower blood sugar levels and help keep blood sugar levels in control. It also helps reduce fasting blood sugar levels.
- **Anti-cancer properties:** Ashwagandha is believed to have anti-cancer properties as the herb helps to induce apoptosis- programmed death of cancer cells. Ashwagandha also delays the growth of

new cancer cells. There are no confirmed tests and clinical studies to confirm the results on human beings. But several centuries of Ashwagandha being used as medicine is encouraging.

- **Offers anti-inflammatory and analgesic benefits:** Ashwagandha aids in reducing inflammation by improving the immune cells that fight infection. It is also linked to decreasing markers of inflammation, which increases the risk of heart disease.
- **Helps to lower cholesterol and triglyceride:** Ashwagandha is shown to improve heart health by reducing the levels of bad LDL cholesterol and triglyceride levels.
- **Improves learning, memory, and reaction time:** Ashwagandha promotes antioxidant activity to protect the nerve cells from harmful free radicals. It reduces oxidative stress and improves memory and brain function. Ashwagandha taken in small to medium quantities aids in improving general memory, task performance and attention. Though there is limited research in this area, Ashwagandha has traditionally been used to boost memory in Ayurvedic medicines.
- **Attention deficit-hyperactivity disorder (ADHD):** Ashwagandha has shown improvement when it comes to Attention deficit-hyperactivity disorder in children, and it also aids in improving attention and impulse control.
- **Stabilizes hypothyroidism:** When people have high blood levels of a hormone called TSH or thyroid-stimulating hormone, it means that they have an underactive thyroid or hypothyroidism. In people who have a mild form of underactive thyroid, Ashwagandha helps to lower TSH and increase thyroid hormone levels.

### Nutritional Composition of *Withania somnifera*

The biologically active chemical constituents of *Withania somnifera* (WS) include alkaloids (isopelletierine, anaferrine, cuseohygrine, anahygrine, etc.), steroidal lactones (withanolides, withaferins) and saponins (Mishra *et al.* 2000). From proximate analysis it was found that dehydrated medicinal

herbs powder Per 100 g Nutrient composition of Ashwagandha root powder (Per 100 g) obtained by chemical analysis is as follows, Moisture was found to be 7.45%, Ash was found to be 4.41 g, the amount of Protein was 3.9 g, Fat was 0.3 g, the amount of Crude Fiber was 32.3 g, Energy was 245 Kcal, Carbohydrate was 49.9g, Iron was 3.3mg, the Calcium content was 23mg, Total carotene was 75.7 µg and Vitamin C was 5.8mg/100 g (Sangeeta kumara *et al.*).

### Commercial Cultivation of *Withania somnifera*

Although Ashwagandha is a natural vegetation of Rajasthan but now a days it is also being cultivated as commercial crop with great potential and high remuneration. To make the cultivation of Ashwagandha commercially viable it is very important to know the economics of its cultivation per unit of land area.

### Methodology

The present study is based on a field survey of 50 farmers cultivating Ashwagandha in Ramganj Mandi tehsil of district Kota in Rajasthan. Ashwagandha is widely grown in Kota, Bundi, Baran and Jhalawar districts of Rajasthan. Commercial cultivation of Ashwagandha is done in Bhawani Mandi, Chhatarpura, Sunel areas of district Jhalawar and RamganjMandi of district Kota. The study was conducted in the year 2009-10. Out of total area under commercial cultivation of Ashwagandha in Rajasthan, district Kota was selected purposively based upon highest number of farmers adopting to Ashwagandha cultivation. In the Kota district Ramganj Mandi tehsil was selected based on highest area under Ashwagandha cultivation and highest concentration of farmers shifting to Ashwagandha. Tabular analysis was done to know the economics and profitability of Ashwagandha cultivation.

Table 1 depicts the economics of cultivation of Ashwagandha crop in Ramganj Mandi area of district Kota, Rajasthan. Ashwagandha being a *kharif* crop its sowing is done from mid-July to mid-August. Field preparation is done in the month of June in which 2-3 deep ploughings are essential. Mostly field preparation and sowing operations are done

through tractor. Although the recommended seed rate for Ashwagandha is 10-12 Kgs per hectare but in the study area the average seed rate was found to be 20-25 Kgs per hectare. The seed rate was found more on unirrigated farms which shows that this tendency of sowing higher seed rate per hectare of land is a risk mitigation technique of farmers in cases of low or untimely rainfall. Price of Ashwagandha seed in the study area was ₹ 50 per Kgs.

**Table 1:** Economics of cultivation of Ashwagandha in Ramganj Mandi, Kota (₹/hectare)

| Sl. No. | Particulars                         | Cost/ Returns (₹) |
|---------|-------------------------------------|-------------------|
| 1       | Human Labour                        | 240               |
| 2       | Machine Labour                      | 2200              |
| 3       | Seed                                | 1250              |
| 4       | Fertilizer                          | 1300              |
| 5       | Irrigation                          | 1500              |
| 6       | Harvesting & collecting operations  | 1550              |
| 7       | Cleaning & Grading                  | 1450              |
| 8       | Post-harvest Operations             | 750               |
| 9       | Total Cost(1to 8)                   | 14240             |
| 10      | Returns from main crop(dried roots) | 32000             |
| 11      | Returns from seeds                  | 1800              |
| 12      | Return from byproduct(stems)        | 1200              |
| 13      | Total returns(10 to12)              | 35000             |
| 14      | Net Returns(13 -9)                  | 20760             |

Use of chemical fertilizers in Ashwagandha is very small. Mainly phosphatic fertilizers are used in Ashwagandha. In some cases urea was also applied @ 50 Kgs per hectare. More use of nitrogenous fertilizer leads to higher vegetative growth but there is no significant improvement in development of roots. The expenditure of intercultural operations like weeding, thinning etc. was ₹ 3000 per hectare. The crop is mainly taken as unirrigated crop. In extreme weather conditions two irrigations are given costing ₹ 1,500 per hectare. The expenditure on harvesting, collection of roots and grading costs ₹ 3,750 per hectare. Thus the total expenditure on Ashwagandha cultivation including only the operational cost or out of pocket cost was ₹ 14,240 per hectare.

The production from one hectare of Ashwagandha crop is 2-4 quintals of dried roots, 25-30 Kgs of seeds and 5-6 quintals of stems and leaves. In the study area the roots produced were mostly of grade B which were sold at an average price of ₹ 5000-8000 per quintal. Thus the returns from sale of roots were ₹ 32000 per hectare, returns from sale of seeds were ₹ 1800 and that from sale of stems were Rs. 1200 per hectare. Thus total returns from one hectare of Ashwagandha crop was ₹ 35000 giving net returns of ₹ 20,760 per hectare over operational costs only.

## CONCLUSION

Ashwagandha which is not only rich in medicinal value and nutritive value but it can also help poor farmers in rain-fed areas to earn a decent level of profit. The commercial cultivation of Ashwagandha can be promoted as a potential agri-business viable option if proper facilities of processing and market linkages could be developed.

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