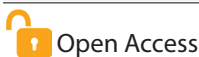


## Prospects for Dragon Fruit Cultivation in Odisha

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### Abstract

Horticulture is undergoing a significant transformation as traditional crops are increasingly being supplemented or replaced by exotic and underutilized species. This shift is driven by evolving consumer preferences and the need for crop diversification. Odisha's diverse geography, which ranges from coastal plains to hilly interiors, is particularly suitable for cultivating dragon fruit. This fruit, rich in antioxidants such as vitamin C, enhances immunity and protects against cellular damage. Its exotic appeal and health benefits have heightened urban market demand. In response to this potential, the Odisha government has launched several initiatives to support dragon fruit cultivation, including subsidies for planting materials and equipment, technical assistance through agricultural extension services and efforts to establish market linkages.

**Keywords:** Dragon fruit, Exotic fruit, Nutrition, Odisha

### Introduction

Horticulture has played a crucial role in agriculture by meeting the increasing demand for nutritious and varied food sources, boosting national economic health and supporting environmental sustainability. Its significance in ensuring food security and improving livelihoods is immense. Nonetheless, horticulture is continually evolving and we are now in a transformative period where traditional crops are being supplemented or even replaced by exotic and underutilized horticultural crops. This change is fuelled by shifting consumer preferences, the necessity for crop diversification and the growing relevance of niche markets. The Dragon fruit or Kamalam, an underutilized exotic fruit, is gradually gaining importance among fruit lovers and growers across the globe because of their nutritional features and appealing appearance (Figure 1). This herbaceous perennial climbing cactus also known as the “Wondrous Fruit of the 21<sup>st</sup> Century” has tremendous potential in the heartlands of Odisha, a state rich in diversified crops, animal husbandry and conducive climate. With its potential to thrive in diverse climates and its rising demand in international and domestic consumers, Pitaya or, dragon fruit presents a promising opportunity for Odisha's agricultural sector.



Figure 1: Bird-eye view of dragon fruit orchard; flower buds and mature fruits of *Hylocereus undatus*

### Dragon Fruit

Dragon fruit, commonly referred to as pitaya or pitahaya, is a member of the cactus family and originates from Central and South America. It primarily comes in three varieties: red skin with white flesh (*Hylocereus undatus*), red skin with red flesh (*Hylocereus monacanthus*, formerly known as *H. polyrhizus*) (Figure 1) and yellow skin with white flesh (*Hylocereus megalanthus*, formerly known as *Selenicereus megalanthus*). The fruit is renowned for its vibrant appearance, refreshing taste and numerous health benefits. Rich in antioxidants like vitamin C (Table 1), it boosts immunity and protects cells from damage. The fruit also contains significant amounts of fiber, aiding digestion and promoting a healthy gut. With minimal calories and no cholesterol, dragon fruit is a nutritious choice for weight management. It provides essential minerals such as iron, magnesium and calcium,

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Table 1: Nutritional components of dragon fruit

Nutrients	Quantity per 100 g	% Daily value
Water	87 g	-
Carbohydrate	11.0 g	3.4
Fat	0.4 g	-
Protein	1.1 g	2.1
Vitamin B <sup>2</sup>	0.05 mg	2.9
Vitamin B <sup>3</sup>	0.16 mg	0.8
Fiber	3 g	12
Vitamin B <sup>1</sup>	0.04 mg	2.7
Vitamin C	20.5 mg	34.2
Calcium	8.5 mg	0.9
Phosphorus	22.5 mg	2.3
Iron	1.9 mg	10.6

(Source: Anonymous, 2024b)

crucial for bone health and muscle function. Additionally, its low glycemic index makes it suitable for maintaining stable blood sugar levels.

### Climatic and Edaphic Requirements

Dragon fruit, a member of the Cactaceae family, differs from other cacti in that it needs ample water due to its tropical rainforest origins, rather than the arid conditions typical of desert cacti. This makes it suitable for cultivation in most regions of India, except those with low rainfall. Dragon fruit requires an annual rainfall of 1145-2540 mm and flourishes in a dry tropical climate with temperatures between 20-29 °C. It can, however, endure temperatures as high as 38-40 °C and as low as 0 °C for brief periods (Karunakaran *et al.*, 2014). However, temperatures exceeding 40 °C can harm the plants, causing the stems to turn yellow. Regions with heavy rainfall are unsuitable for dragon fruit cultivation, as too much rain can result in the dropping of flowers and fruit (Karunakaran and Arivalagan, 2019). Dragon fruit can thrive in various soil types as long as they are well-drained. The ideal soil is slightly acidic and rich in organic matter. Given that the soil in the target planting area is sub-marginal, organic fertilizer will be added to enhance its organic content. Dragon fruit plants prefer sandy loam with a high organic matter content and require well-drained soil for optimal growth.

### Cultivation Potential in Odisha

Odisha's geographical diversity, ranging from coastal plains to hilly interiors, provides a conducive environment for cultivating dragon fruit. The state's climate, characterized by warm temperatures and moderate rainfall are preferred by this cactus species. Additionally, dragon fruit is well-known for its ability to adapt to different soil types, including sandy and loamy soils, which are prevalent in many regions of Odisha. A very scanty report is available about the initial cultivation of dragon fruits in Odisha (Table 2). However, the COVID-19 pandemic, along with increased reliance on online social platforms, has encouraged farmers and other growers to adopt dragon fruit cultivation. In 2021,

Table 2: Initial attempts by various farmers for the cultivation of dragon fruits in Odisha (Source: Anonymous, 2024a)

Sl. No.	Block	District	Year of starting	Area (approx.)
1	Betanati	Mayurbhanj	2020	2.5 ac
2	Barpalli	Bargarh	2020	0.3 ac
3	Madanpur Rampur	Kalahandi	2020	1 ac
4	-	Nabarangpur	2020	2 ac
5	-	Cuttack, Nayagarh, Dhenkanal, Ganjam	2020	10 ac
6	Kudumulu-gumma	Malkanagiri	2021	1.5 ac
7	Basudevpur	Bhadrak	2021	0.5 ac
8	Dhanakauda	Sambalpur	2021	5 ac
9	Maruda	Balasore	2021	2 ac
10	Phiringia	Kandhamal	2022	8.0 ac
11.	Banki-Dampada	Khordha	2023	1.0 ac

the Kandhamal district administration initiated a campaign to promote dragon fruit farming, particularly in Maoist-affected areas where ganja was previously cultivated, as a means to discourage tribal communities from engaging in illicit farming. In the first phase, the administration, with the assistance of local farmers, planted dragon fruit on approximately 8 acres of land in Bedakheta village, located in the Phiringia block. In the same year another farmer in Sambalpur district (Dhankauda block) have started cultivating dragon fruit in five acres of land in lieu of regular cultivation of paddy. In 2021 a farmer has started cultivation of dragon fruit in the Maruda block of Balasore district and has earned initial benefits.

In Odisha, several districts are considered suitable for cultivating dragon fruit. Here are some districts known for their potential for dragon fruit cultivation:

- 1. Ganjam:** Located on the Southeastern coast of Odisha, Ganjam has a diverse geography ranging from coastal plains to hilly interiors. This diversity in terrain provides suitable conditions for dragon fruit cultivation.
- 2. Mayurbhanj:** Situated in the northern part of Odisha, Mayurbhanj district has a mix of forested areas and fertile plains. The climate and soil types in this region are conducive to grow dragon fruit.
- 3. Keonjhar:** Known for its rich mineral resources, Keonjhar district also has suitable conditions for horticultural crops like dragon fruit. The moderate climate and availability of suitable soils support fruit cultivation.
- 4. Koraput:** Situated in the southern part of Odisha, Koraput district boasts diverse agro-climatic conditions, ranging from

hills to valleys. The region's climate and soil properties make it ideal for cultivating various fruits, including dragon fruit.

5. *Kalahandi*: As the fruit thrives in warm climates with adequate sunlight and can tolerate drought conditions to some extent, making the climate of Kalahandi somewhat suitable.

6. *Balasore*: Situated in the northern coastal region of Odisha, Balasore district benefits from a moderate climate and fertile soils. These conditions are favourable for the cultivation of dragon fruit.

7. *Puri*: Known for its historical significance and religious importance, Puri district also has favourable conditions for horticultural crops. The district's coastal location and moderate climate support the cultivation of exotic fruits like dragon fruit.

These districts have been identified based on their climatic suitability, soil characteristics and existing agricultural practices. However, with proper irrigation facilities and agronomic practices, dragon fruit cultivation can potentially be expanded to other parts of Odisha as well.

#### **Economic Viability and Market Demand**

The economic prospects of dragon fruit cultivation in Odisha are promising. The fruit's growing popularity in urban markets due to its exotic appeal and health benefits has led to an increase in demand. Furthermore, dragon fruit is highly regarded for its potential as a cash crop, providing higher returns than traditional crops such as paddy or wheat.

#### **Challenges and Solutions**

Despite its potential, dragon fruit cultivation in Odisha faces certain challenges. These include initial investment costs for establishing plantations, the need for technical knowledge about cultivation practices and market access for selling the produce. However, these challenges can be mitigated through government support programs, farmer training initiatives and collaborations with agricultural universities and research institutes.

#### **Government Initiatives and Support**

Recognizing the potential of dragon fruit cultivation, the Odisha government has introduced various initiatives to support farmers. These include subsidies for planting material and equipment, technical guidance through agricultural extension services and efforts to create market linkages. Such support not only encourages farmers to adopt

dragon fruit cultivation but also ensures sustainable growth of this emerging sector.

#### **Future Outlook**

Looking ahead, the cultivation of dragon fruit in Odisha holds immense promise. With increasing consumer awareness about health and nutrition, the demand for exotic fruits like dragon fruit is expected to rise further. This presents an opportunity for farmers to diversify their income streams and enhance agricultural productivity in the state.

#### **Conclusion**

In conclusion, the cultivation of dragon fruit in Odisha represents a significant opportunity for agricultural transformation. With its adaptability to local climates, increasing market demand and government support, dragon fruit has the potential to become a profitable crop for farmers throughout the state. As Odisha embraces this exotic fruit, it not only enriches agricultural diversity, but also contributes to economic growth and prosperity in rural communities.

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