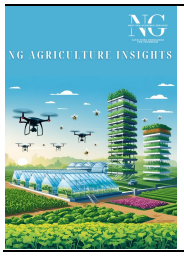

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Fig Production Technology and Solar Drying Potential in Anantapuramu District of Andhra Pradesh

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A B S T R A C T

Fig (*Ficus carica* L.) is a nutritionally rich and economically important fruit crop with considerable potential for cultivation in the semi-arid regions of India. The climatic conditions of Anantapuramu district, characterized by high temperatures, low humidity, limited water availability and abundant sunshine, are favorable for fig production. Successful cultivation requires suitable varieties, quality planting material, optimum spacing, balanced nutrient management, efficient drip irrigation, systematic training and pruning, and integrated pest and disease management. However, the highly perishable nature of fresh figs results in substantial post-harvest losses and limits their marketing period. Solar drying offers a promising value-addition strategy for extending shelf life, improving marketability and reducing post-harvest losses. The abundant solar radiation and large number of sunny days in Anantapuramu provide favorable conditions for adopting solar drying technologies such as solar tunnel, cabinet and mixed-mode dryers. Controlled solar drying can reduce fruit moisture to safe storage levels while producing a hygienic, high-value dried product with better shelf stability than conventional open-sun drying. Integration of scientific fig production practices with decentralized solar drying can enhance resource-use efficiency, create value-addition opportunities, generate rural employment and improve farm profitability. Thus, fig cultivation coupled with solar drying has significant potential as a climate-resilient and economically viable horticultural enterprise for dryland farmers of Anantapuramu district.

Keywords: *Ficus carica*, Fig production, Semi-arid agriculture, Solar drying, Value addition

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1. INTRODUCTION

Fig (*Ficus carica* L.) is one of the oldest cultivated fruit crops and is valued for its nutritional, medicinal and economic importance. Well adapted to arid and semi-arid conditions, it is emerging as a profitable crop in Anantapuramu due to the region's hot climate and limited water availability. Since fresh figs are highly perishable despite their high market demand, adoption of value-addition technologies such as solar drying can enhance shelf life and profitability (El Khadraoui *et al*., 2021).

2. CLIMATE AND SOIL REQUIREMENTS

Fig thrives under warm and dry climatic conditions with low humidity and annual rainfall ranging from 400–800 mm, making it well suited to the semi-arid environment

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of Anantapuramu. The district's high temperatures and abundant sunshine enhance fruit sweetness, colour development and reduce fungal disease incidence. Deep, well-drained sandy loam to red loam soils with a pH of 6.0–8.0 are ideal for cultivation, while waterlogged conditions should be avoided (Singh and Sharma, 2021).

3. SUITABLE VARIETIES AND PROPAGATION

Several fig varieties are cultivated commercially in India, among which Poona Fig, Bellary, Deanna and Brown Turkey are important. Poona Fig is the most popular variety due to its excellent fruit quality, sweetness and consumer preference. Bellary has shown good adaptability under South Indian conditions and is suitable for both fresh consumption and processing. Fig is generally propagated through hardwood cuttings obtained from healthy and disease-free mother plants. Cuttings measuring 20–25 cm in length and about 1–2 cm in diameter are collected during the dormant season and rooted in nursery beds. Well-rooted cuttings are transplanted to the main field during the onset of monsoon for better establishment.

4. PLANTING AND ORCHARD ESTABLISHMENT

Proper orchard establishment is essential for achieving higher yields and quality fruits. Pits of 60 × 60 × 60 cm filled with topsoil, farmyard manure, and neem cake are recommended, with planting at a spacing of 5 × 5 m during June–July. Adequate care during the initial growth stage ensures better establishment and uniform plant growth.

5. NUTRIENT MANAGEMENT

Balanced nutrient management is crucial for maintaining high productivity and fruit quality in fig orchards. For bearing trees, annual application of 25–30 kg farmyard manure along with 500–600 g nitrogen, 250–300 g phosphorus and 500–600 g potassium per plant is recommended. Splitting nitrogen and potassium through drip fertigation improves nutrient-use efficiency, root growth and fruit yield, particularly under the water-limited conditions of Anantapuramu (GrowTech, 2024).

6. IRRIGATION SCHEDULING

Although fig is a drought-tolerant crop, regular irrigation is essential for achieving higher yields and better fruit quality. Drip irrigation is the most efficient method under semi-arid conditions, with mature trees requiring about 15–20 L of water per day during winter and 30–50 L per day during summer and fruit development stages. Irrigation at 7–10 day intervals during summer and 10–15 day intervals during cooler months is generally adequate. Excessive irrigation should be avoided, as it can lead to fruit cracking, reduced sweetness and increased disease incidence (GrowTech, 2024).

7. TRAINING AND PRUNING

Training and pruning are important cultural operations in fig cultivation. Young plants are trained to develop a strong framework with four to six primary scaffold branches. Annual pruning after harvest promotes the emergence of new shoots, which bear the subsequent crop. Removal of dead, diseased, weak and overcrowded branches improves sunlight penetration and air circulation within the canopy, thereby reducing pest and disease problems. Proper pruning also facilitates harvesting operations and contributes to higher fruit production.

8. PEST AND DISEASE MANAGEMENT

Fig is generally less susceptible to pests and diseases than many other fruit crops; however, stem borers, fruit flies and mealy bugs can occasionally cause economic losses. Stem borers damage trunks and branches, fruit flies infest developing fruits and mealy bugs weaken plants through sap feeding and promote sooty mould development. Among diseases, fig rust (*Physopella fici*) is the most common, causing yellow leaf spots, rust-coloured pustules, premature defoliation and yield reduction. Anthracnose, leaf spot and fig mosaic disease may also affect orchards under favourable conditions. Adoption of orchard sanitation, pruning for better aeration, use of disease-free planting material and timely plant protection measures are essential for effective pest and disease management and sustained productivity (TNAU, 2024).

9. HARVESTING AND YIELD

Fig fruits are harvested when they attain full size, characteristic colour and slight softness. Fruits should be harvested carefully to avoid bruising because of their delicate nature. Commercial bearing generally commences from the second year after planting, while economic yields are obtained from the third year onwards. Mature orchards under good management practices can produce 20–30 kg of fruits per tree, corresponding to approximately 8–12 tonnes per hectare. Proper harvesting and post-harvest handling are critical for maintaining fruit quality and market value.

10. SOLAR DRYING POTENTIAL IN ANANTAPURAMU

Anantapuramu district has tremendous potential for solar drying owing to its semi-arid climate, abundant solar radiation and more than 300 sunny days annually. Fresh figs contain 75–85% moisture and are highly perishable, with a shelf life of only a few days under ambient conditions. Solar drying offers an efficient post-harvest management strategy by reducing moisture content

to about 18–20%, thereby extending shelf life for several months while retaining much of the fruit's nutritional quality and market value (El Khadraoui *et al*., 2021). Compared with conventional open sun drying, solar dryers provide better protection from dust, insects, birds and unexpected rainfall, resulting in a cleaner and higher-quality product. Solar tunnel, cabinet and mixed-mode dryers are commonly used for fig dehydration, with solar tunnel dryers being particularly suitable for farmer producer organizations and rural entrepreneurs. The process involves washing, grading, slicing and drying ripe fruits under controlled solar-heated conditions until the desired moisture level is attained. Solar-dried figs command significantly higher market prices than fresh fruits due to their longer shelf life, ease of transportation and increasing consumer demand. Therefore, adoption of solar drying technology can reduce post-harvest losses, promote value addition, create rural employment opportunities and enhance the profitability of fig cultivation in Anantapuramu (Costa *et al*., 2025).

11. CONCLUSION

Fig cultivation offers a sustainable and profitable horticultural option for the dryland farmers of Anantapuramu owing to its adaptability to semi-arid climatic conditions and comparatively lower water requirement. Adoption of scientific production technologies, including balanced nutrient management, drip irrigation, pruning and integrated pest management, can substantially enhance productivity and fruit quality. Furthermore, the abundant solar radiation available in the district provides excellent opportunities for solar drying and value addition, enabling farmers to reduce post-harvest losses, extend shelf life and increase their income through the marketing of high-value dried fig products.

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