A Review on Production Cost of Dye from *Opium Poppy*

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Abstract:
For encouraging manufacturers and restaurants to switch to safer, natural colorings. As a result of government pressure, and other multinational companies now market foods switched to dye and this had created a great market for production of natural food colored dye from the Opium. This review paper consist of the production values, and the revenue needed for the production and method utilized for production.

Key words: Food color, Manufacturing and cost and returns.

I. INTRODUCTION

As per Wasteland Atlas of India-2019, nearly one-sixth of total geographical area of the country is a wasteland. India being an agricultural country has 460 lakh ha. of waste land.

Telangana and Andhra Pradesh rank 5th among different states of India comprising about 37297 sq.km. of area under wastelands. Reclamation of these lands can be brought about by growing opuntia in these areas as it can survive and grow in a wide range of climatic conditions.

In spite, there is growing demand for dyes as well as natural food color in Indian industry. Dye stuff sector is one of the core industrial sector in our country.

The Indian dye stuffs industry has transformed from being import dependent to an export driven industry. This dye can be used for a wide variety of purposes such as textile dyeing, painting, preparation of food stuffs, etc.

Past performance: existing in various parts of South Africa, USA.

II. CONSTRAINTS OF INDUSTRY.

Unavailability of trained labor, local availability of machinery, lack of storage facilities Competition with multinational companies, lack of own outlet stores, skilled work is needed in the process of dyeing.

Production Description

Cultivated species: *Opuntia ficus indica*

Family: cactaceae

The juice of the fruits is used as a natural dye which contains betalin pigment. These betalins have no toxic effects in the human body and are seen as a natural and safe alternative to synthetic red coloring. They have anti-oxidant properties. The dye and the food color have anti-fungal, anti-bacterial agents against various organisms such as *E. coli, B. subtilis, ps. aeruginosa, staphylococcus aureus*, etc.

The dyes can provide bright hues and color fastness properties. Has a Ph in the range of 5-7.

The dye is water soluble and hence various mordents are used in order to fix it and make it permanent.

The cladodes produced also has a wide variety of uses. These dyes are used to color a wide variety of cotton and wool fibers.

Dyes are provided in containers of 100 ml, 250ml, 500ml and 1 liter. Food color is provided in containers of 35ml, 100ml and 250ml. Cost of production of 1 unit product i.e., 1 liter is Rs.45.8

III. BUILDING INFRASTRUCTURE

A building with good ventilation in the processing area and with a dark room in it in order to process the food color.

Labor

Skilled labor: 4
Unskilled labor: 6
Permanent labor in field: 1
Hired labor at the time of harvesting: 8

Utilities

• POWER: 1750 units/month

• WATER: Good water sources are available.

• POLLUTION CONTROL: No liquid, gaseous, and solid wastes are disposed

• Still we have applied for the certificate from State Pollution Control Board
PRODUCTION METHOD

Harvested fruits

Fed to the peeling machine

Taken into a large bowl

Homogenized with equal amount of water

Heated for 5 min. at 600c and above

Collected on a ice bath

Reaches a temp. of 0-10 c

Filtration is done

Centrifuged for 20 min

Add 4g/l of CuSO4 (green dye)

Dye loaded into boxes

Sealed

FOOD COLOR MANUFACTURING METHOD

Centrifuged extract in the above process is homogenized with equal amount of maltodextrin

Heated to a temperature of about 1000 c

This mixture is cooled and stored into glass containers and kept in complete darkness for a period of about 24 weeks (by doing so the pigment retention capacity increases)
IV. MATERIAL REQUIRED

1. OPUNTIA FRUIT PEELER
- Cost: 3,50,000
- Capacity: 200 FRUITS/HOUR
- Suppliers: Henan shouman machinery equipment co.ltd. China

2. FRUIT CRUSHER
- Cost: 45,000
- Capacity: can crush nearly 100 fruits per hour
- Suppliers: Zigma machinery & equipment Coimbatore – Veerakelalam

3. ICE FLAKE MACHINE
- Model: AF 8
- Capacity: 70 kg/24 hrs.
- Energy: 7.5 kW /24 hrs.
- Cost: 2,00,000
- Suppliers: Hammer frost corporation – Chauhan market, New Delhi

4. CENTRIFUGE
- 4 in number
- Cost of each unit: 21550
- Capacity: 4 x 500 ml at a time
- Suppliers: Remi R-8 c laboratory centrifuges online suppliers
- Supply: 220-240 volts

OTHER RAW MATERIALS
- Ferrous sulphate, Copper sulphate
- Potassium dichromate, Tannic acid
- Suppliers: Prime laboratories, Hyderabad – Basheer Bagh, Amrutha organics, Quthbullapur

BOX SEALING MACHINE
- Cost: 180000
- Capacity: 300 cans/hr.
- Suppliers: unity metals containers, Mumbai

CONTAINERS FOR PACKING DYES
- Suppliers: Dilwar Akbar industrial works, Amberpet
- Sri Venkateshwara coach builders, Jeedimetla

CAPACITY OF THE PLANT
- 80000 liters of dye / annum
- 100 kg food color / annum

QUALITY CONTROL AND INSPECTION
- The samples were tested according to ISO standard methods.
- Specific tests were:
  - ISO 105 x 12 (1987) – color fastness to rubbing
  - ISO 105 - EO4 (1989) – color fastness to perspiration

V. RESEARCH AND DEVELOPMENT

We are successful with this unit of our enterprise. We will plan to extend our project to areas of Nalgonda district in the coming 5 years.

If we get back our investment, we will plan to buy our own transport vehicles. Along with the textile dyes and food color, we have an idea of developing paints using the same raw material.

MARKET POTENTIAL

➢ DEMAND AND SUPPLY POSITION
- The worldwide market for dyes and organic pigments is expected to grow 6 percent per year to reach $19.5 billion in 2019 from $14.5 billion in 2014
- The global market for textile dyes is expected to reach US $9.6 billion by 2024, driven by the growing demand for organic dyes against the backdrop of strong preference for sustainable textiles and dyeing.
- India ranked sixth as a global supplier of reactive and direct dyes.
- The growth of health consciousness among people is directing them towards the use of organic products which will be a benefit to our enterprise

➢ MARKET STRATEGY
- We want to market our product by distributing them to the wholesalers around our industry area.
- Universal marketing – Agapura, Hyderabad
- Sree Krishna trading company - Secunderabad
- In addition to this we want to supply our product to various boutiques around Hyderabad.

➢ PUBLICITY
- Through advertisements in newspapers, TV channels, distributing pamphlets, etc.
- Use of social media in order to popularize our product.

➢ WARRANTY AND AFTER SALE SERVICE
- We assure our customers that our product is resistant to various microbes and bacterial damage and refund the money if any of such damages are seen.
- Limitations to warranty:
  - We are not responsible for any damage that occurs due to improper dyeing.

➢ SEASONALITY FACTOR
- Our product will be available all through the season as the main raw material i.e., the availability of opuntia fruits is all through the year.

➢ TRANSPORTATION
- We procure our raw material from the site of production to processing plant through rented vehicles.
VI. CAPITAL COSTS AND SOURCE OF FINANCE

**FIXED CAPITAL (Rs.)**

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>COST (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building construction</td>
<td>38,00,000</td>
</tr>
<tr>
<td>Fruit peeler</td>
<td>3,50,000</td>
</tr>
<tr>
<td>Ice flaking machine</td>
<td>2,00,000</td>
</tr>
<tr>
<td>Fruit crusher</td>
<td>45,000</td>
</tr>
<tr>
<td>Centrifuge</td>
<td>86,000</td>
</tr>
<tr>
<td>Water tank</td>
<td>10,000</td>
</tr>
<tr>
<td>Electricity installation</td>
<td>50,000</td>
</tr>
<tr>
<td>Pre – operative expenses</td>
<td>60,000</td>
</tr>
<tr>
<td>Furniture, other equipment’s</td>
<td>57,000</td>
</tr>
</tbody>
</table>

**CONTINGENCY CUSHION @ 5% = 2,40,150**

**TOTAL FIXED CAPITAL = 48,03,000 + 2,40,150 = 50,43,150**

<table>
<thead>
<tr>
<th>CAPITAL</th>
<th>COST (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour rent</td>
<td>15,000</td>
</tr>
<tr>
<td>Unskilled labour</td>
<td>6*4,000=24,000</td>
</tr>
<tr>
<td>Company skilled labour</td>
<td>4*10,000</td>
</tr>
<tr>
<td>Permanent labour in field</td>
<td>1*12,000= 12,000</td>
</tr>
<tr>
<td>Hired labour in field</td>
<td>5,600</td>
</tr>
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Total labour cost = 81,600 Rs

VII. RAW MATERIALS (Rs.)

**MORDANTS:**

- oFeso4  -  Rs.15/kg - 20 *15 = 300 ok2cr2o7 - Rs.200/kg- 200*20 = 4000 oTannic acid - Rs.110/kg- 110*20 = 2380 oCuso4  -  Rs.119/kg – 119*20 = 2380
- Maltodextrin  - Rs. 48/kg- 48*100 = 4800
- FERTILIZERS  = 5,000 Total cost = 18,780 Rs

**UTILITIES(Rs.)**

| Power - 1750 units - Rs 7.5/unit - 13,125 |
| Irrigation - 9,000 |
| Transport charges - 28,000 |
| Packing materials - 7,000 |

Total cost = 57,125 Rs

**OTHER EXPENSES (Rs.)**

- Publicity & advertisement – 20,000
• Miscellaneous - 15,000
• R & M - 10,000
• Telephone bill - 1,000
Total cost = 46,000 Rs

TOTAL WORKING CAPITAL(Rs.)
• Land rent - 15000
• Labour cost - 81,600
• Raw materials - 18,780
• Utilities - 57,125
• Other expenses - 46,000
• Salaries for entrepreneurs - 90,000

TOTAL – Rs. 3,08,505
3,08,505 x 12 months = Rs 37,02,060
37,02,060 + 5,00,00(B.I) = Rs. 42,02,060 working capital/annum

VIII. CONCLUSION
It is find out to be a beneficial business with the great cost and benefit ratio.

IX. REFERENCES.

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