



PROJECT PROFILE ON TURMERIC PROCESSING

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| Product Name | TURMERIC PROCESSING |
| Product Code- | 319917509 |
| Production Capacity Per Annum | 300 M.T |
| Value In Rs Per Annum | Rs 180 Lacs |
| Month & Year of Preparation | JANUARY-2019 |
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PROJECT REPORT ON CULTIVATION & PROCESSING OF TURMERIC.

INTRODUCTION:

Since the man kind started gathering food, spices seem to have been used to make the food more appetizing. They add aroma & spices to taste to the insipid cereal or meat dishes & mask the off-flavor of stored & decomposing foods. Turmeric because of its yellow color must have attracted attention from the very early days and it was probably used alongwith ginger, Haridara, as turmeric is refereed to in ancient Indian Vedic texts has been in continuous use for its coloring, flavoring and digestive properties. Turmeric continue to be extensively used as a versatile. Spice through out India. It also has a traditionally important place in women cosmetic for its brilliant yellow color & characteristic fresh perfume. The same yellow color also appears to have been chosen for religious & auspicious occasions. It is also used as an antiseptic & pain killer, in food, cosmetic & medicines. It is also used in making Rangoli used by Indian married ladies as a sign of married woman.

Turmeric is grown in plenty in Andra Pradesh, Maharastra & Tamilnadu. Beside, it is also cultivated in Meghalya state because a large number of peoples have farming attitude and these days farming is a profitable venture, When all care is taken and modern mechanized techniques are applied working. In our country rich belt of cultivation are Guntur, Karim Nagar in the district of Andra Pradesh, Sangli & Santara district of Maharastra, Salem & Erode districts of Tamil Nadu. It is also being cultivated in the state of Meghalaya in few districts. The plenty growers in Maharastra, Andhra Pradesh & Tamilnadu are facing marketing problem due to little local demand & is compelled to sell in other parts of the country. Hence in the state of Meghalaya there is good scope for cultivation & processing of turmeric at commercial level. It brings remunerative price to the growers and will cater to the outside market also.

CULTIVATION:

The cultivation of turmeric is similar to that of ginger in many respects. In India turmeric is being cultivated in many states but the bulk of the commercial product comes from Andra Pradesh, Maharastra & Tamilnadu. (which accounts for nearly half of the Indian production).

Following points may be considered at the time of cultivation of turmeric:

1. Land & Atmosphere:

For good cultivation of turmeric moist & hot atmosphere is necessary. It may be cultivated in rows and can well be sewed even under the trees. Land with preferably loamy soil(also black soil) with good drainage water is best for rich production of turmeric.

2. Time of sowing:

Sowing period for turmeric is April to July. Arrangement of water is required at the time of sowing. Hence, rainy season is good for sowing as it need lot of irrigation after and before sprouting.

3. Preparation of Land:

Land can be prepared by ploughing the field 6 to 8 times with plough to secure fine tilt. Flat beds are prepared in red soil or raised beds in black dry loams.

4. Treatment of Seed:

Before sowing the seed is necessary that it should be treated with 0.25% solution of Bevestin & dried in shade or in the room to avoid decay of seeds. After drying keep these knots under the hay for 10-15 days for sprouting seed.

5. Method of sowing:

Prepare your field into 8-10 meter length and 2-4 Mtrs width rectangular lawn for sowing the seeds, distance between line to line should be 30-40 cm and distance between knots to knots should be 25-30 Cm for sowing & keep the seed in the depth of 4-5CM. Sprouting in seed generally takes place after 25-30 days.

6. Quality of Fertilizer:

10 Tons Compost fertilizer (dung fertilizer)

40 kg, Nitrogen

20 Kg phosphorous

20 Kg Potash is required per acre.

Half quality of above mentioned Nitrogen and Phosphorous & full quantity of Potash may be used at the time of showing rest quantity of nitrogen may be used after 40-45 days of sprouting. Therefore, following quantity is required.

1. Urea: 100Kg

2. Single Super phosphate 125Kg

3. Muriate of Potash 30 Kg

7. Quality of seed:

6-7 quintal per acre well developed (sprouted) seed is enough for sowing.

8. Irrigation:

In the initial days well developed irrigation is required to be done at the regular intervals of 8-10 days and in rainy season after regular intervals of 20-25 days.

9. Diseases & Pests:

Turmeric is susceptible to serious microbial diseases & pests. Leaf blotch, caused by *Taphrin Maculans* is most serious drying up of leaves which affect the yield considerably. This disease is controlled by application of 1% Bordeaux mixture or 0.2% Maneb plus zinc, leaf spot caused by *collectotricum capsici* is another fungal disease also affect the yield of turmeric because of drying up of the affected leaves. This disease can be controlled by regular spraying of 0.3% Zine, at early onset or preventively. A disease caused by *pythium gramminicolum*, which is possible borne through the seed material, result in rapid and total loss of crop the disease is marked by

the drying up of the leaves, softening of the pseudo stems and decay of the formed rhizomes. A brown dry rot of turmeric rhizome has recently been reported due to fusarium & nematodes associated with it. The pests are the common shoot borer *Dochocrosis punctiforalls* causing damage to pseudo stem, rhizome and the leaf roller caterpillar *udaspes falus* & scale insect causes damage to turmeric rhizome in the field and also in storage.

1. Harvesting:

Maturity of crop is indicated by drying up of plant including the stem, and entire plant color changes green to yellow and finally brownish yellow and shape and size of raw turmeric becomes similar to ginger of brownish yellow color, this take 8-9 months after planting . Thus harvesting is done from February to April.

2. Yield:

The Yield of the turmeric is highly variable. It is depend upon climatic condition and methods of cultivation.

MARKET:

The product turmeric have found multifarious use in Cosmetic, Medicine & in food. Hence, it is the basic need of every man and family because use of turmeric in vegetable cooking is essentially as well as it is being used in Toilet soaps for fairness colour of body. India is a largest producer of turmeric, it is being cultivated in many of states through dominantly in A.P., Maharastra & Tamilnadu. Production of turmeric in recent year has been fluctuated between 150-175 thousand tons. This is followed by Bangladesh with an estimated production of 25 thousand tons production in other countries is very While in India more that 95% of curcuma produced is the true turmeric. Due to not availability of turmeric in foreign countries, they are continuously importing Turmeric from India. However, from the trend of import, turmeric consumption in western countries would appears to be slowly increasing alongwith that of all other species.

Consumption is equally divided between household & industry . In household . consumption in India is near about 75% while in Japan Industrial consumption is 85%. However, it is being used largely in mustard paste and pickle industries in U.S and other western countries would imply that the bulk of turmeric is used many industrial sector . But scope for the export of turmeric to foreign countries. Due to excess production of turmeric in India it is being export to the other countries since last 30-40 years.

IMPLEMENTATION SCHEDULE:(FOR Turmeric Processing)

The schedule of implementation should be as follows:

| | | |
|---|---|-----------|
| 1 | Market Survey and Preparation of Project Profile | One Month |
| 2 | Registration with concerned DCIC of the state | One Month |
| 3 | Approval of Loan from Banker/ Financial Institution | One Month |

| | | |
|---|---|------------|
| 4 | Construction of building & other activities | Four month |
| 5 | Procurement of Machinery & Equipments | One Month |
| 6 | Recruitment of Staff and Labour | Two Weeks |
| 7 | Erection and Commissioning of Plant | Two Weeks |
| 8 | Trial Run and Actual Commercial Production | Two Weeks |

BASIS & PRESUMPTION:

The Project report has been drafted taking into consideration the following aspects:

| | | |
|---|--|----------|
| 1 | No. of working shift in a day | One |
| 2 | Duration of one shift in term of time | 8 Hrs |
| 3 | No. of working days in a year | 300 Days |
| 4 | Efficiency of plant | 75% |
| 5 | The construction of building & layout of factor will meet the Norms as prescribed under FDA & FPO | |
| 6 | The entire expenditure will be borne by the Entrepreneur except loan approved by the bank | |
| 7 | The plant will be able to handle 3.0 – 3.5 tons of turmeric per day. However preparation part is to be performed in one shift while the drying operation will have to continue round the clock to achieve the mentioned capacity | |
| 8 | The yield of dehydrated/procured turmeric is assumed as 250-300 kg per ton | |

PROCESSING/DEHYDRATION OF TURMERIC:

Dehydration of turmeric may be done by following two processes.

1. Sun drying
2. Mechanical drying.

1. Sun drying process: In sun drying process, after harvesting green knots are washed in running water to remove soil particle & other fibers, particularly from the outer surface. For processing of turmeric curing is an essential process, After washing the knots (Mother & finger rhizome) are boiled separately in 0.1% solution of sodium bicarbonate for one hour to 6 hour (time depend upon the shape & size of knots) In the process of cooking raw rhizomes are to be taken in big pot the quantity of water should be just sufficient to cover the bulb. Curing may be done in the field or in the yard near the farmers house and it may done in varying lots(according to the convenience) using vessel of difference, shape & size. Green rhizomes are either directly charged into the perforated vessel (This is common when charges are small) or placed in a basket with perforated bottom & sides & then dipped in covered tank (when the charge is large). The heating is done over country type furnaces fired by readily available wood, stalk & leaves. Skilled operator control the degree of cooking as this operation is reported to influence the colour and aroma of the final product. The vessel in which rhizomes are boiled can be covered with gunny bag to retain the steam during boiling. In this process . Surface layer open up & the main component starch get gelatinized. Presence of white fumes with thick smell of turmeric is the index of curing. At this stage, rhizome can be pierced easily with a blunt match stick. In place of NaHCO₃ we can use cow dung or lime in same way(but use of cow dung & lime is non-hygienic). The curing will help in the uniform distribution of yellow colour . After cooking charge can be taken out, water be drained out & boiled turmeric spread out for drying in open area, Now these knots can be dried in shade for about 10-15 days and after drying can be rubbed with the help of foot or mechanically for the purpose of polishing on the outer surface.

1. Mechanical Drying:

Cured knots of turmeric can be dried mechanically at 55-60 Degree Centigrade drying time is usually 20 hours in Cross Flow Drier & 12 hours in through drier . When properly dried the rhizomes become hard almost horny, brittle and of uniform yellow colour. The moisture content of dried rhizome is generally less than 5%. Data compiled by Krishnamurthy, M.N. Personal Communication, 1977 on effect of process variables on composition of turmeric is given below:

EFFECTS OF PROCESS VARIABLES ON QUALITY OF TURMERIC

| Curing Treatment | Sun Drying | | | Mechanical Drying | | |
|---|------------|----------------|------------|-------------------|-----------|-------|
| | Moisture % | Volatile oil % | Curcumin % | Moist % | Vol.Oil % | Cur.% |
| Whole untreated | 8% | 3% | 2.3% | 7% | 3% | 2.7% |
| Boiled for one Hour | 10% | 3% | 1.7% | 7% | 3% | 2.7% |
| Boiled for 3 Hrs. | 8.5% | 3% | 1.8% | - | - | - |
| Peeled for 30 Seconds. | 7.5% | 3% | 2.3% | 10% | 3% | 2.9% |
| Peeled and boiled for one hour or steamed for 10 minutes. | 6% | 2.9% | 1.9% | 5% | 3% | 2.5% |
| Sliced | 7.5% | 3% | 2.1% | 6% | 2.7% | 2.7% |
| Sliced & steamed for 5 | 8% | 3% | 1.9% | 7% | 2.9% | 2.3% |

| | | | | | | |
|----------|--|--|--|--|--|--|
| minutes. | | | | | | |
|----------|--|--|--|--|--|--|

POLISHING:

Dried turmeric has a poor appearance and a rough & outer surface with scales & root bits. The appearance can be improved by smoothening and polishing on the outer surface by manual or mechanical rubbing. Manual polishing is effected by trampling the dried rhizomes in the trade as unpolished turmeric. Another manual method is tumbling the dried rhizomes placed in bamboo or reed basket alongwith granite stone. In this operation is known in the trade as “ Polished Turmeric”. Manual methods gives low output around 20 kg per 8 hour for two persons. The mechanical polishing drums have been developed for handling large quantities and are usually located in assembling market and principal trade centers. The polishing drums or barrels are 0.7 meter long and 1 meter with a closer mesh as a central axis. The sides are expanded metal with a closer mesh as a outer cover. Each drum is charged with 25-30 kg of dry turmeric & rotated manually at about 30-40 rpm for about per 30 minutes to give the polished turmeric. Mechanical power oil engine or electric motor or steam engine is now used to for rotate large size drums (which may be circular hexagonal or octagonal in shape). When handling large batches of dried rhizomes during polishing the scale rootlets and some of the epidermal layers are removed as dust through sleeve mesh the polishing drum surrounded the polishing drum sieved dust is generally used as manure. The material loss during polishing varies from 2 to 8% depending on the degree of polishing.

Turmeric is made more attractive by imparting to the surface a bright yellow color, after partial polishing by a dry or wet process. Turmeric powder(and before the ban was imposed, coal tar dye, chemichrome, or lead chromate)is added to the polishing drum in the last 10 min. In the wet process, turmeric powder is suspended in water and mixed by sprinkled inside the polishing basket. A paste of alum, ground castor seed and turmeric powder is sometimes used for giving a brighter color, but this effects the smooth appearance of the product. The wet process requires further drying for safe storage.

CHEMICAL COMPOSITION OF TURMERIC:

A little information is available on the chemical composition of turmeric. Some early analysis quoted by Winton and Winton, and recent analysis from India are collected in Table given below. There is considerable alcohol authentically, prolonged storage and maturity of the samples could be responsible for the differences. Starch as the reserve carbohydrate of the Curcuma rhizomes can be expected to be the major component. Some species of this genus *C. angustifolio* Roxb., *C. Zedoaria* Roscoe are essentially used as sources of starch in remote places or in times of fiber, the components that are characteristic of the spice turmeric are the deep yellow pigments, the curcuminoids, and the volatile oil. Earlier analyses do not give values for the pigments separately; more recent analyses give values varying from 2 to 5%. The volatile oil varies from 2 to 6%. These variations, as is known from recent studies, are due to varietal differences in fertilizer inputs and agricultural practices. The very large difference in the alcohol extractives are possibly due to maturity difference. In the recent analysis represented by

the lower starch content would possibly indicate not fully mature samples, yielding high alcohol extractives.

**CHEMICAL COMPOSITION OF TURMERIC – TRADE SAMPLES
(In-%)**

| Source | Moisture | Starch | Protein | Fibers | Ash | Fixed | Volatile oil | Alcohol extractives |
|-----------------|----------|--------|---------|--------|-----|-------|--------------|---------------------|
| China | 9.0 | 48.7 | 10.8 | 4.4 | 6.7 | 8.8 | 2.0 | 9.2 |
| Pulena | 9.1 | 50.1 | 6.1 | 5.8 | 8.5 | 7.6 | 4.4 | 7.3 |
| Allepey | 8.1 | 50.4 | 9.7 | 5.8 | 6.0 | 7.5 | 3.2 | 4.4 |
| Indian | 13.1 | 69.4 | 6.3 | 2.6 | 3.5 | 5.1 | 5.8 | - |
| Allepey(finger) | 11.0 | 30.8 | - | 4.0 | - | - | 3.4 | 24.2 |
| Allepey(bulbs) | 12.0 | 26.3 | - | 4.6 | - | - | 3.4 | 16.2 |
| Kadur | 19.0 | 32.1 | - | 3.7 | - | - | 4.5 | 16.3 |
| Duggirala | 11.0 | 32.8 | - | 1.8 | - | - | 2.9 | 13.9 |

STORAGE:

The assembling markets at Duggirala (A.P), Sangli (Maharashtra) & Erode (Tamilnadu) stock the rough dried turmeric in underground pits made in elevated grounds with side lines with twisted grass. Polishing is done as required all the year. The finished product stored in double gunny bags in ware houses. Periodic fumigation if necessary as the hard dry turmeric is quite susceptible to insect infestation.

FINANCIAL ASPECT FOR PROCESSING OF TURMERIC

FIXED ASSETS:

A) Land Building:

Land 1000/- sq.Meter @Rs.2500/- Sq.Meter= Rs.25,00,000/-

B) Built up Area:

Main factory building 500 sq.Meter.

Construction Value @Rs.2000/- Sq. Meter - Rs.10,00,000/-

Cost of boundary & fancying - Rs 50,000/-

Hence Total cost of Land & Building: Rs. 35,50,000/-

Say Rs. 35.0 lacs.

Plant & Machinery:

| Sl.No. | Items | No. | Value (Rs.) In Lacs |
|--------|--|--------------|----------------------|
| 1. | Trey drier electrically heated with a holding capacity of 200 trays, complete with a fan, motor, heating coil yemp. Indicator etc. | 2 | 3.0 |
| 2. | Big pan cap.5 Qtls. | 4 | 0.50 |
| 3. | Treys | 250 | 0.50 |
| 4. | Trolleys | 5 | 0.20 |
| 5. | Polishing drum, mounted on a central axle sides are of expanded metal with a closer mesh as outer cover (capacity 25-30 kg dry turmeric) | 2 | 1.0 |
| 6. | Heat sealing machine for mini packing | 1 | 0.30 |
| 7. | Preparation table | 3 | 0.15 |
| 8. | a) weighing scale cap.10-100kg b) weighing scale cap.0,1gm-5kg | 1 1 | 5000 5000 |
| 9. | Testing equipment | - | 0.10 |
| 10. | Pollution control equipment | - | 0.20 |
| 11. | Energy Conservation equipment | - | 0.20 |
| 12. | Other miscellaneous equipment Electrification and Installation charges @10% of total cost of machinery & equipment (Approx.) | | 0.62 |
| | | Total | Rs. 6.87 Lacs |

C) Office furniture Almirah and other office equipments -
D) Pre Operative Expenses

Rs. 50,000/-
Rs. 20,000/-

Total Fixed Capital Investment = 25+10+0.50+6.87+0.20=- **Rs.42.57 Lacs**

Recurring Expenses.**Raw Material (Per Month)**

| Sl.No. | Particular | Qty. | Rate | Value(Rs.) In Lacs |
|--------|--------------------|----------|---------|--------------------|
| 1. | Raw Turmeric | 106 tons | 10/kg | 10.0 |
| 2. | Lime/NaHCO3 | 50 kg | 40/kg | .02 |
| 3. | Gunny Bag | 500 Nos | 6/piece | 0.03 |
| 4. | Packaging Expenses | | | 0.10 |
| 5. | Wood | 5 tons | 2000PMT | |

| | | | | |
|----|--------------|-------------|---------------|-------------------|
| | | | | 0.10 |
| 6. | NaturalColor | 20kg apprx. | 200/kg apprx. | 0.04 |
| | | | TOTAL | 10.29 LAKH |

STAFF LABOUR (P.M):

| Sl.No. | Personnel | No. | Salary(Rs.) |
|--------|-------------------------------|--------------|-----------------|
| 1. | Manager-Cum-Food Technologist | 1 | 12,000 |
| 2. | Analytical Chemist | 1 | 10,000 |
| 3. | Clerk-cum-Typist | 1 | 6,000 |
| 4. | Skilled worker | 4 | 20,000 |
| 5. | Unskilled worker | 8 | 32,000 |
| | | TOTAL | 80,000/- |

**OTHER EXPENSES (P.M)
UTILITIES;**

| Sl.No. | Item | Amount (Rs.) |
|--------|---------------------------|--------------|
| 1. | Electricity Charges | 15,000 |
| 2. | Water | 1,000 |
| 3. | Postage & Stationery | 500 |
| 4. | Telephone | 500 |
| 5. | Transport charges | 5,000 |
| 6. | Advertisement & Publicity | 500 |
| 7. | Insurance | 500 |
| 8. | Repairing & Maintenance | 1,000 |
| 2. | Other expenses | 1,000 |

| | | |
|--|--------------|----------------|
| | Total | 25,000/ |
|--|--------------|----------------|

Total Recurring Expenses (P.M): - 10.29 + 80,000+25,000 = **Rs.11.84 lacs**

Working Capital for 3 months
= 11.84 x 3 = **=35.52 Lacs.**

Total capital Investment:

1. Fixed Capital Rs. 42.57
2. Working Capital for 3 months Rs.35.52

Total Rs.78.09Lacs.

COST OF PRODUCTION(P.A):

| SI.No. | Item | Amount (Rs.) |
|--------|---|-------------------------|
| 1. | Raw Material | 123.48 |
| 2. | Staff & Labour | 9.60 |
| 3. | Other expenses | 3.00 |
| 4. | Depreciation on plant &M/C @10% | 0.63 |
| 5. | Depreciation on Building @5% | 0.59 |
| 6. | Depreciation on Furniture @20% | 0.10 |
| 7. | Interest on Total Capital Investment @18% | 9.37 |
| | Total | Rs. 146.77 Lacs. |

Say 1.47 Crores

Turnover:

Sales proceeds by sale of 300 tons of dried Turmeric @60000 P.M.T = **Rs. 1.80 cr.**

Annual Profit = Rs 1.80 – 1.47 Crore = **Rs. 33.0 LACS.**

Less 10% discount to Dealers, Stockiest etc. = = **Rs.3.30**

Hence Net Profit = **Rs. 29.70 Lacs**

Percentage of profit on sale:

$$\frac{29.70 \times 100}{180} = 16.5\%$$

Profit on Total Capital Investment:

$$\frac{29.70 \times 100}{78.09} = 38\%$$

Break Even Point:

Fixed Cost:

Amount (Rs.)

1. 40% of Salary & Wages

3.84

2. 40% of Other Expenses

1.20

3. Depreciation on Building, Furniture & Plant & M/c.

1.23

4. Interest on Total Capital Investment

9.37

15.64

= Rs. 15.64 Lacs

$$\frac{15.64 \times 100}{15.64 + 29.70} = \frac{1564}{45.34} = 34.4\%$$

Address of Machinery & Equipment suppliers:

(i) Mather and Platt (India) Ltd. Hamilton House, 8 J, N Heredia Marg
Ballard Estate, Post Box 327, Bombay-400 038.

(ii) M/s B. Sen Berry & Co., 65/11, Rohtak Road, New Delhi – 110 005.

(iii) M/S Gardners Corporation, Post Box Bo. 299, Gole Marker, New Delhi.

(iv) East End. Engineering Co., 173/ Gopal Lal Thakur Road, Calcutta – 700 035.

(v) M/s K.C. Enterprises, Rawar Road, Karnal – 132 001.

Plant may be fabricated locally as per requirement of the local need and specification of the customers

Addresses of Raw Materials Suppliers:

Locally available.