

Sector	Agro and Food Processing
Sub - sector	Medicinal Herbs
Project No.	AF-07
Project Title	Medicinal Herbs Extraction Unit

Project Description

The proposed project envisages setting up of a Medical Herbs extraction unit, which will produce finished products in the form of powder, oil, paste or aqueous solutions from extracted herbs. This project is suggested considering the availability of wide range of natural herbs in Gujarat.

Product Application

Medicinal herbs are widely used as diet supplements and treating illness like valerian. The extract of natural herbs can be used in various formulations like Ayurvedic medicines, natural flavoring agents, cosmetic ingredients and as natural ingredients in allopathic medicines.

Market & Growth Drivers

The global herbal market is estimated at US 60 billion dollars. China enjoys the lead, contributing 30% to the world market. The growth rate for herbal market is estimated to be around 7% - 15% annually. The market value of pharmaceuticals derived from plants used in traditional medicines exceeds USD 20 billion.

Herbal drugs are used in cardio vascular (27%), respiratory (15.3%), digestive (14.4%), hypnotics and sedatives (9.3%), miscellaneous (12%).

The Indian annual production of herbal drugs is estimated around INR 1000 million, while the medicinal plant value is about INR 50.0 billion and the anticipated export is around INR 5500 million. Considering the rich assorted and varied botanical resources available in the country, the exported value is not impressive. The Indian market has 1650 herbal formulation involving 540 major plant formulations.

There are medicinal plants exported from India in four forms:

- As dried plants or plant parts. e.g. liquorice roots, Senna leaves, Vinca Rosea (*Catharanthus roseus*) herbs.
- As extracts e.g. Sag of Opium poppy.
- As isolated and purified active ingredients/intermediates e.g. *Gymnema powder*, *Atropise sulphate*, *menthal crystals*, *Calcium sennoside*.
- As ayurvedic, Unani, Siddh, and homeopathic formulations e.g. Over the counter (OTC) drugs, and range of proprietary formulations. This also includes range of herbal cosmetic products.

Growth Drivers

- Increasing awareness about adverse effects of synthetic drugs, such as steroids, anti-biotic, pain killers, etc has boosted up the demand for medicinal herbs in domestic and export markets.
- Herbal drugs have no adverse effects and are safe to use.
- Herbal extracts and powders are comparatively cheaper than synthetic drugs and formulations.
- The herbal medicine will act as an alternate for the class who cannot afford the allopathic drugs with the new product patent regime act and under WTO provisions.
- India is seen as a reservoir of medicinal herbs and their uses by western countries.

Why Gujarat?

The State has several medicinal plants growing in different regions. State enjoys presence of around 37 traders / manufacturer of the herbal plants. This is primarily due to favorable climatic conditions, which provide a suitable environment for the growth of these plants. Particulars about some of the important medicinal plants that are commercially cultivated and have potential for development are given in the following table:

List of Medicinal Plants available in Gujarat

Sr. No.	Common name	Botanical name
1	Ashwagandha	<i>Withania somnifera</i>
2	Bel	<i>Aegle marmelous</i>
3	Ghrit kumari	<i>Aloe vera</i>
4	Gugulu	<i>Commiphora wightii</i>
5	Isabgol	<i>Plantago ovata</i>
6	Jeevanti	<i>Leptidinea reticulata</i>
7	Kouch	<i>Mucuna pruriens</i>
8	Neem	<i>Azadirachta indica</i>
9	Safed-musli	<i>Chlorophytum borivillianum</i>
10	Sankhapushpi	<i>Evolvulus Asinoides</i>
11	Senna or Sonamukhi	<i>Cassia angustifolia</i>
12	Shatavari	<i>Asparagus racemosus</i>

There is availability of required industrial and basic infrastructure to carry out herbal processing and developing products thereof, whether domestic or export oriented.

Technology/Process

There are many processes patented through out the world for commercial extraction of plant ingredients. Basically there are two methods of medicinal herbs extraction:

- The most successful commercial method for plant extracts is Super Critical Carbon dioxide extraction (liquid Carbon dioxide extraction) process which is very capital intensive.
- The other is a combination of percolation and solvent extraction method, using suitable organic solvents, where medicinal plants / seeds are first thoroughly washed and inspected for removing unwanted impurities. The materials are subjected to boiling for decoction followed by percolation by solvents.

- Further the material is crushed to fine mass, homogenized and converted into the paste form, prior to extraction of medicinal herbs.

Processing

Essential oils are commonly extracted by steam distillation. The basic still design is shown in the figure. Steam is piped from a boiler into the bottom of the still vessel which contains the plant material. The volatile oils in the plant material are released and carried upwards with the steam and pass from the top of the still vessel through a condenser. Cold water flows continuously through a system of internal tubing in the condenser, cooling the steam/oil mix to a liquid. The water and oil flow into a separator (Florentine flask) where the oil, generally having a specific gravity less than water, floats the surface and is collected. The still design, capacity, water purity levels and flow rates, operating temperatures and length of distillation are important aspects that can affect the composition and quality of the oil. Technical assistance to optimize extraction efficiency is necessary. Other products used in the flavors and fragrance industry can be extracted from plants using a solvent extraction system. A high degree of technical expertise and significant capital investment are needed to set up such a system.

Drying

To dry large quantities of crop effectively, a drying shed equipped with a forced-air drier or a freeze drier will be necessary. Volumes, drying temperature, length of drying and drying technique play an important role in the quality of the end product. Specialist advice will be required to recommend appropriate equipment and methods, to optimise drying efficiency and minimise loss of critical plant components.

Packaging

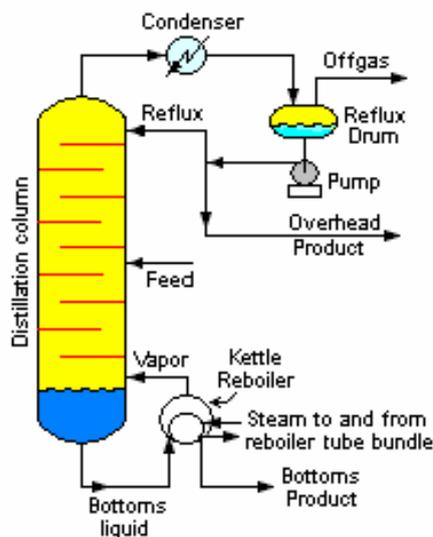
The type of packaging and how to meet consumer demand and market specifications requires excellent communication with the market. Specialist advice may be necessary.

Storage

Generally herb products and essential oils should be stored in a cool, dry place away from sunlight and protected from insect infestation. Essential oils should be bottled in glass or nonreactive metal containers. A cool store or freezer may be necessary to store plant material before processing. Detailed requirements should be obtained from the relevant authorities before setting up facilities.

Raw Material

As indicated previously there are several medicinal herbs available in Gujarat, both cultivated and naturally growing. Gujarat Forest corporation is collecting several herbs from the forests of Gujarat.



Source: Wikipedia

Apart from this there are several traders who are collecting these herbs from tribals as exchange for supplying their daily necessities. As per trade estimate Gujarat is having total herbal market of 50,000 MT to 70,000 MT and against this processing is done only for 25000 to 30, 000 MT per annum. There is sufficient availability of required herbs for the proposed unit as the capacity suggested is only 5000 MT per annum and which is much lower than the herbs quantity available in Gujarat.

Suggested Plant Capacity & Project Cost

Capacity - 5000 MT of input for herbal extracts and mix of herbal extracts.

Capital cost is estimated to be INR 90 million or USD 2 million.

Estimated Block Capital Cost of Project and Means of Finance

Sr.No.	Cost of project	INR in Million
1	Land and Land development	6.00
2	Building & Civil works	12.50
3	Plant & Machinery	47.50
4	Misc. Fixed Assets	5.00
5	Preliminary & Pre-operative	7.50
6	Provision for contingencies	3.661
	Total Fixed Assets	82.16
7	Margin Money for working capital	7.84
	Estimated Block Capital Cost of Project	90.00
	Means of Finance	
8	Promoters contribution	30.00
9	Term loan	60.00
	Total Means of Finance	90.00

The Proposed project will have land area of 10000 Sq. mt and building size proposed is 2500 Sq.mt. The Fixed cost of project estimated is INR 82.16 million and adding working capital margin of INR 7.84 million total project cost is estimated at INR 90 million. The project will have Debt: Equity ratio of 2:1 and accordingly promoter will bring INR 30 million against the term loan amount of INR 60 million.

Plant & Machinery Required

The proposed project of medicinal herbs extraction unit would require the following as basic and necessary plant and machinery:

List of Plant and Machinery

Sr. No.	Particular	Quantity	Suppliers
1	Distillation column	2	HI-Tech Chemi Equip, Mumbai Techno Process Equipments (India) Pvt. Ltd.- Mumbai

Sr. No.	Particular	Quantity	Suppliers
2	Freeze drier / Drier	2	Acmas Technocracy (Pvt) Ltd –Delhi Anand Refrigeration Co. Pvt Ltd – Delhi
3	Boiler	1	Thermax Limited, Vadodara, Gujarat Real Engineers and Boilers Repairers, Ahmedabad, Gujarat
4	Distillation Units, Pressure Filter, Reaction Vessel	3	M A Engineering Corporation- Mumbai
5	High pressure vessels, Condenser, Dryer	2	Kumar Metal Industries-Mumbai- Dee Development Engineers Ltd- Haryana
6	Solvent Extraction Plants	1	Oilex Engineers (India) Pvt. Ltd.- Mumbai Kumar Metal Industries-Mumbai
7	Pouch Packing Machine, Fully Automatic Powder Filling Machine With Turn Table And Conveyor, Liquid Filling Machine, Sticker Labeling Machine	Lot	Virajka Machinery Mfg. Co

Utilities

The proposed project of Medicinal herbs extraction will have electrical connected load of 150 HP and utilization will be approx.120 HP on regular basis. The unit will require approx.30 KL water for cleaning and cooling system of medicinal herb extraction plant.

Estimated Man Power Required

The proposed project will have total manpower requirement of 20 persons. This will include 3 managerial posts, 3 supervisory post, 6 operators, 2 engineering maintenance staff like and 6 accounts, administrative and security staff.

Suggested Location

The suggested districts for the location of the proposed project are: Panchmahal, Dangs, Junagadh, Sabarkantha, Valsad, Navsari & Kutch.

Project Time Line

The proposed project will have cumulative implementation period of 8 to 10 months of which 3 to 4 months would entail obtaining the obligatory clearances from various authorities.

Financial Indicators

The project will have Debt equity ratio of 2 : 1 and IRR for 10 years period will be 28%. Important financial ratios are summarized in following table:

Key Financial Indicators

Sr. No	Financial Ratios	1 st Year	2 nd Year	3 rd Year
A	Break-Even Point in % capacity	52.30	47.13	42.83
B	Debt-service Coverage Ratio	1.58	2.00	2.71
C	Average DSCR	2.09		
D	Return on Investment (ROI)	13.54	16.45	21.14
E	IRR	28 %		

Clearances Required

The proposed unit will have to register itself with Secretariat of Industrial Approvals (SIA), Ministry of Industries and Government of India, by filing Industrial Entrepreneur's Memorandum (IEM), as it will have plant and machinery investment of more than INR 10 million.

The proposed project is for medicinal herbs extraction and has domestic and export market in advance countries like USA, Canada, Europe, Japan and CIS countries. The unit will require to get register their product with Food and Drugs Administration (FDA) in these countries, apart from registration with Indian and state food and drugs administration.

The unit will get EOU registration from RBI, DGFT and with CHEMEXCIL as registered manufacturer exporter to avail export incentives.

Being an EOU the unit will have to follow strict quality standards as accepted in the countries where export is to be done.

Agencies to be contacted

Industrial Extension Bureau

Mott MacDonald India

Gujarat Agro Industries Corporation Ltd.