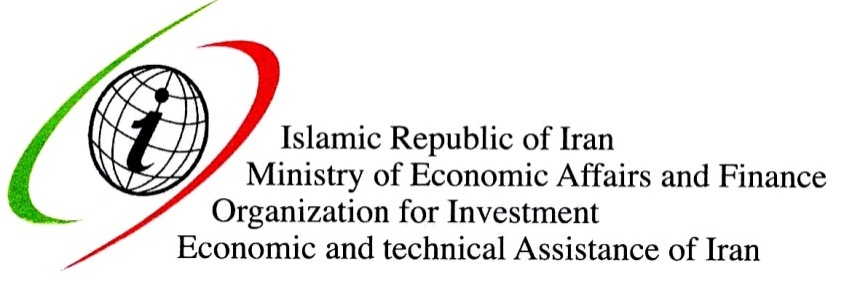
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**Pre-feasibility Study**

**Production of Narcissus Flower Essential Oil and Fragrance**



**Project Executor:**

Mabna Sustainable Development Company, Khorasan

**Project Consultant:**

Industrial Estates Company of South Khorasan Province

**Project summary:**

In recent decades, the development of small and cottage industries has been recognized as a key solution for increasing economic growth and enhancing the business environment, drawing the attention of managers in various agricultural, economic, and industrial sectors. One of the groups of plant constituents is essential oils. Essential oils, also known as volatile oils, are aromatic oily compounds with a plant origin, comprising heavy chemical compounds, volatile, and fatty substances. The following infrastructures are required in the mentioned plan:

The required land area for this project is 2000 square meters. The necessary electricity is estimated at 376,739 kilowatt-hours annually, water demand is 733 cubic meters per year, and the project's fuel requirements include 4950 cubic meters of gas, 4800 liters of gasoline, and 12,600 liters of diesel annually. The projected employment for this project is 22 individuals.

**Product Introduction:**

One of the groups of plant constituents is essential oils. Essential oils, also known as volatile oils, are aromatic oily compounds with a plant origin, comprising heavy chemical compounds, volatile, and fatty substances. Essential oils exist in cells and secretory cavities or glands, secretion channels on the surface, and internal parts of various plant organs, such as leaves, fruits, buds, and branches. These cells and secretory tissues may be present only in one organ of a plant, such as in flowers or fruits, or they may be scattered in various plant organs. In such cases, the obtained essential oils differ in quantity, quality, and the constituent elements and components from one organ to another. Therefore, one of the most important aspects of plant research is studying and comparing the essential oils present in different organs of a plant in terms of quality and quantity. The most important medicinal plants containing essential oils belong to the mint family, thyme, fennel, coriander, cypress chicory, and a few other plants.

The most significant factor encouraging investment and special attention to the medicinal plants industry is the general inclination of people towards using medicinal plants. Emphasis on a healthy lifestyle, an increase in the aging population, a rise in the consumption of dietary supplements, especially among women, a growing tendency towards preventive care, heightened concerns about the side effects of chemical drugs, and a preference for herbal remedies all contribute to the increasing trend of purchasing and using medicinal plants.

In addition to the market for selling cut narcissus flowers, its essential oil has various applications in the cosmetic, pharmaceutical, and health industries worldwide. The most notable feature of narcissus flowers is their very low water requirement, making them suitable for cultivation in arid conditions and withstanding unfavorable soil conditions. Narcissus flowers are a valuable national asset, not only contributing to the cosmetic, pharmaceutical, and health industries but also attracting a considerable number of tourists. This attraction leads to increased tourism, stimulating economic growth and providing employment opportunities.

Narcissus essential oil is truly remarkable, capable of significantly impacting the nervous system and promoting balance and mental tranquility for the body and soul. Given the conditions in South Khorasan province, focusing on producing high-quality narcissus flowers in the country and considering that a significant portion of farmers in the province engage in cultivating this product, the lack of sufficient processing industries for narcissus flowers in the province is evident. Unfortunately, this valuable product, which could contribute to the growth and development of the agricultural sector in the province, is currently only offered in its raw and unprocessed form. Therefore, this project aims to explore the possibility of processing narcissus flowers into essential oil in South Khorasan province. The essential oil, as one of the processed products from narcissus flowers, can not only meet domestic demand for products such as food flavoring and fragrances but also open up opportunities for export markets for this valuable product.

**Product Name and ISIC Code (Unique Product Code):**

ISIC is a kind of standard classification for productive economic activities. The purpose of ISIC is to provide a set of activity categories in which economic activities can be classified based on the type of activity they perform. The Ministry of Industry, Mining and Trade uses this classification to categorize industrial activities. The ISIC code related to this industry is presented in Table (1). The explanation is that the specific ISIC code has not been determined for the considered product, so the closest product has been considered in the reviews.

ISIC Code for the Project's Products

|  |  |  |
| --- | --- | --- |
| **Row** | **Product Name** | **ISIC Code** |
| 1 | Herbal essence | 2429312622 |

**The Necessity of Project Implementation**

The agricultural sector in South Khorasan province has always been overshadowed by other industries such as the production of tiles, cement, and construction materials from an export development perspective. Considering the emphasis on developing agricultural enterprises, branding products in this sector, and export incentives in the development plans, implementing these initiatives is crucial for the strategic development of narcissus flower exports in Iran.

Utilizing the opportunities created by Iran's accession to the Eurasian Economic Union trade agreement can facilitate favorable conditions for the economic development capacities from the export of narcissus flowers and, importantly, the export of value-added products derived from them. As the member countries of the union aim for large-scale transactions, export-oriented consortia in the province should be established to support narcissus flower exports.

The production of narcissus essential oil can be considered the only formulated product derived from narcissus flowers, representing a knowledge-based product. This product has various applications in the food industry, such as in ice cream, tea, flavoring for food, beverages, and more. Additionally, the production of this product can serve as a suitable candidate for export after meeting domestic demands, contributing to the presence of an Iranian product in other countries.

**Usage and Application of the Product:**

Due to their aromatic nature and distinct flavors, essential oils find applications in the food industry, perfumery, cosmetic products, and, generally, in industries producing scented or uniquely flavored products.

Essential oils can be categorized based on their applications into the following groups:

1. Essential oils for the food and pharmaceutical industries.

2. Essential oils for hygiene and cleaning industries.

3. Essential oils for cosmetic industries, including perfumes and colognes.

**Analysis of Substitute Products, Competitors, and its effects on Product Consumption**

Substitute products for essential oils include semi-synthetic and synthetic essences, which, depending on the preferences of producers or consumers, are produced and supplied to the market along with various essential oils used in the food, pharmaceutical, cosmetic, and hygiene industries. In recent years, industrial essences have become somewhat of a substitute for natural essential oils due to their cost-effectiveness.

**Strategic Importance of the Product in Iran and Foreign Markets**

A wide range of industries directly and indirectly utilize essential oils, as mentioned earlier. Some of these industries include the food, pharmaceutical, hygiene, and cosmetic industries. Given the growing trend of these industries and their vital importance in modern societies, the significance of essential oils is considerable.

**Checking the process of product import and export**

**The amount of product imports over the past years**

|  |  |  |
| --- | --- | --- |
| **Year** | **Importation** | |
| **weight (tons)** | **Value (thousands of dollars)** |
| 1396 | 498 | 9383 |
| 1397 | 195 | 4018 |
| 1398 | 285 | 6708 |
| 1399 | 290 | 6726 |
| 1400 | 509 | 9998 |

**The amount of product exports over the past years**

|  |  |  |
| --- | --- | --- |
| **Year** | **exports** | |
| **weight (tons)** | **Value (thousands of dollars)** |
| 1396 | 5031 | 14949 |
| 1397 | 4946 | 11463 |
| 1398 | 5089 | 9149 |
| 1399 | 5266 | 6356 |
| 1400 | 4107 | 4272 |

**Product sales market forecast in the next five years:**

To calculate the product production during the years 1402 to the end of 1407, the tables of units in operation have been used. In this way, we have predicted that all projects with physical progress of 81-99% will be put into operation in 1403, and projects with physical progress of 61-80% have been calculated in 1404 and in the same way until 1407. The result of the calculations is shown in the table below.

|  |  |
| --- | --- |
| **Year** | **The amount of domestic production** |
| **weight (tons)** |
| 1403 | 38458 |
| 1404 | 39458 |
| 1405 | 41221 |
| 1406 | 41308 |
| 1407 | 43217 |

**Checking and determining the minimum economic capacity**

1. **Fixed project costs**

|  |  |  |
| --- | --- | --- |
| **Row** | **Description** | **Total (million Rials)** |
| 1 | Land | 16000 |
| 2 | Landscaping | 3706 |
| 3 | Production and office building | 40390 |
| 4 | General facilities and equipment | 10132 |
| 5 | Laboratory machines and equipment | 55556.5 |
| 6 | Furniture and office equipment | 2614.875 |
| 7 | Transportation equipment | 11350 |
| 8 | Unforeseen expenses | 7172.46875 |
| 9 | Pre-operational costs | 3700 |
| **Total** | | **150621.8438** |

* 1. **Land**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Row** | **Description** | **area (square meter)** | **Unit price (Rials)** | **Total (Thousand Rials)** |
| 1 | Land | 2,000 | 8,000,000 | 16,000,000 |
| **Total** | | ----- | ------ | **16,000,000** |

## **1-2- Landscaping**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Row** | **Description** | **Meterage** | **Unit** | **Unit cost (thousand Rials)** | **Total amount (million Rials)** |
| 1 | Leveling and excavation and embankment | 2000 | Square meters | 150 | 300 |
| 2 | Fencing | 180 | Meter | 11000 | 1980 |
| 3 | Street drawing, table drawing and parking lot | 200 | Square metersl | 6000 | 1200 |
| 4 | Area lighting | 12 | original | 8000 | 96 |
| 5 | entrance door | 1 | number | 130000 | 130 |
| **Total** | | | | | **3706** |

**1-3- construction**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Row** | **Description** | **building type** | **area**  **(Square meters)** | **Unit cost (thousand Rials)** | **Total amount (million Rials)** |
| 1 | Production Hall | The skeleton of the shed | 400 | 47000 | 18800 |
| 2 | roofed warehouse | The skeleton of the shed | 220 | 47000 | 10340 |
| 3 | office building | Metal or concrete frame with anchorage | 90 | 75000 | 6750 |
| 4 | Caretaker and security and welfare | Metal or concrete frame with anchorage | 45 | 75000 | 3375 |
| 5 | Laboratory | Metal or concrete frame with anchorage | 15 | 75000 | 1125 |
| **Total** | | | **770** | **-** | **40390** |

**1-4- Facilities and branches**

|  |  |  |
| --- | --- | --- |
| **Row** | **Description** | **Total amount (million Rials)** |
| 1 | Electricity | 5185 |
| 2 | Water | 221 |
| 3 | Cooling and heating | 3230 |
| 4 | fuel | 391 |
| 5 | Protection and monitoring equipment | 1088 |
| 6 | Telephone lines | 17 |
| **Total** | | 10132 |

**1-5- Equipment and technology**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Row** | **Description** | **Number** | **Unit** | **Unit cost (thousand Rials)** | **Total amount (million Rials)** |
| 1 | Extraction | 1 | device | 11375000 | 11375 |
| 2 | Filling | 1 | device | 3050000 | 3050 |
| 3 | Pasteurizer | 1 | device | 7425000 | 7425 |
| 4 | Gate | 1 | device | 2280000 | 2280 |
| 5 | Storage tanks | 4 | device | 650000 | 2600 |
| 6 | Plastic storage barrels | 10 | device | 150000 | 1500 |
| 7 | Essential oil storage tanks | 1 | device | 250000 | 250 |
| 8 | Decanter tank | 1 | device | 2200000 | 2200 |
| 9 | Heat exchangers devices | 1 | device | 1600000 | 1600 |
| 10 | Washing and sorting machine of Bangale | 1 | device | 3880000 | 3880 |
| 11 | Shredder | 1 | device | 1800000 | 1800 |
| 12 | Press | 1 | device | 1900000 | 1900 |
| 13 | Homogenizer | 1 | device | 3825000 | 3825 |
| 14 | Jet print | 1 | device | 350000 | 350 |
| 15 | Sharing Pack | 1 | device | 800000 | 800 |
| 16 | Dust collector machine | 1 | device | 350000 | 350 |
| 17 | Inspection desk | 1 | device | 125000 | 125 |
| 18 | Purchase, Transport, Installation, and Commissioning Costs | 1 | series | 1000000 | 1000 |
| **Total** | | | | | **46310** |

**1-6- Production line costs**

|  |  |  |
| --- | --- | --- |
| **Row** | **Description** | **Total amount (million Rials)** |
| 1 | Automatic production line | 46310 |
| 2 | laboratory equipments | 2000 |
| 3 | Other supplies and belongings of the production line (5% of rows 1 and 2) | 2415.5 |
| 4 | Transportation cost - foreign purchase - installation and commissioning (10% of row 1 and 2) | 4831 |
| **Total** | | **55556.5** |

**1-7- Office equipment and supplies**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Row** | **Description** | **Number** | **Unit cost (thousand Rials)** | **Total amount (million Rials)** |
| 1 | Table | 6 | 35000 | 210 |
| 2 | Computer chair | 6 | 17500 | 105 |
| 3 | Computer | 5 | 167500 | 837.5 |
| 4 | Earphone | 6 | 3750 | 22.5 |
| 5 | stationery | 6 | 2000 | 12 |
| 6 | Uniforms and safety equipment | 22 | 10000 | 220 |
| 7 | office furniture | 1 | 162500 | 162.5 |
| 8 | the chair | 10 | 10000 | 100 |
| 9 | Laser printer | 1 | 137500 | 137.5 |
| 10 | fax | 1 | 100000 | 100 |
| 11 | Kitchen equipment, dining hall | 1 | 375000 | 375 |
| 12 | Work wardrobe | 2 | 52500 | 105 |
| 13 | dressing room | 2 | 62500 | 125 |
| 14 | office closet | 3 | 32000 | 96 |
| 15 | Zunken shelf | 1 | 6875 | 6.875 |
| **Total** | | | | **2614.875** |

**1-8- Equipment and means of transportation**

|  |  |  |  |
| --- | --- | --- | --- |
| **Row** | **Equipment name** | **Rial price (thousands of Rials)** | **Total (million Rials)** |
| 1 | Office car | 5500000 | 5500 |
| 2 | Nissan van | 5850000 | 5850 |
| **Total** | | | **11350** |

**1-9- Pre-operational costs**

|  |  |  |
| --- | --- | --- |
| **Row** | **Title** | **Cost (million Rials)** |
| 1 | Preliminary studies to obtain the necessary permits | 1800 |
| 2 | Personnel training | 700 |
| 3 | Test setup | 1200 |
| **Total** | | **3700** |

**2- Estimating the running costs of the project**

|  |  |  |
| --- | --- | --- |
| **Row** | **Description** | **Amount (million Rials)** |
| 1 | Cost of raw materials | 86005 |
| 2 | The cost of salaries and wages | 41155.8 |
| 3 | Energy costs (water, electricity, fuel, etc.) | 1030.842 |
| 4 | maintenance cost | 3031.4125 |
| 5 | Unforeseen production costs (5%) | 6561.152725 |
| 6 | Advertising costs (1% of sales) | 4800 |
| 7 | Financial facility costs (5% of the loan amount) | 6024.87375 |
| 8 | Insurance costs (0.002 fixed capital) | 301.2436875 |
| 9 | Depreciation expenses | 7637.8975 |
| 10 | Depreciation costs before operation 20% | 740 |
| **Total** | | **156988.2222** |

**2-1- raw materials**

The raw materials required for the design and the amounts of each of them have been calculated separately. Prices of raw materials are determined based on inquiries from reputable domestic companies and the wholesale market. The following table shows the estimated cost of supplying the main raw materials of the unit.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Row** | **Description** | **the unit** | **Production amount (tons)** | **Amount of material Required** | **Product unit cost (Rials)** | **Annual cost of supplying materials (million Rials)** |
| 1 | narcissus flower | tons | 1.5 | 67.5 | 1200000000 | 81000 |
| 2 | Glass bottle packing | number | - | 100000 | 22000 | 2200 |
| 3 | Carton packaging | number | - | 1000 | 300000 | 300 |
| Other (3%) | | | | | ---- | 2505 |
| **Total** | | | | | | **86005** |

**2-2- Estimating staff salaries**

The required manpower for the production unit is at least 22 people and they can be assigned to management departments; engineers; Administrative staff and services were divided.

Non-productive personnel

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Row** | **Description** | **number of people**  **Required** | **monthly salary**  **(thousand rials)** | **Total annual salary including bonus (14 months) (Thousand Rials)** | **Salary for 12 months**  **(thousand rials)** |
| 1 | the manager | 1 | 250000 | 3500 | 3000 |
| 2 | production manager | 1 | 200000 | 2800 | 2400 |
| 3 | warehouse keeper | 1 | 90000 | 1260 | 1080 |
| 4 | Quality control and laboratory | 1 | 120000 | 1680 | 1440 |
| 5 | Technician | 1 | 120000 | 1680 | 1440 |
| 6 | skilled worker | 4 | 120000 | 6720 | 5760 |
| 7 | Easy production | 10 | 80000 | 11200 | 9600 |
| 8 | Administrative and financial staff | 2 | 100000 | 2800 | 2400 |
| 9 | Specialist production personnel | 1 | 130000 | 1820 | 1560 |
| **Total** | | **22** | **----** | **33460** | **28680** |
| social security employer share insurance 23% | | | | 7695.8 | ---- |
| Sum of salaries and wages | | | | 41155.8 | ---- |
| **Total** | | | | **41155.8** | **----** |

**2-3- Estimation of energy and water consumption**

Types of energy needed include water; are electricity and fuel; The price of each type of energy is determined based on the latest rates announced by the relevant ministries.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Row** | **Description** | **unit** | **Annual consumption** | **Unit cost (Rials)** | **Annual consumption cost (million Rials)** |
| 1 | Water | cubic meter | 733 | 8000 | 5.864 |
| 2 | Electricity | kilowatt hours | 376,739 | 2000 | 753.478 |
| 3 | Gasoline | Liter | 12,600 | 3000 | 37.8 |
| 4 | Petrol | Liter | 4,800 | 30000 | 144 |
| 5 | gas | cubic meter | 4,950 | 6000 | 29.7 |
| 6 | Phone and internet | ------------------------ | | | 60 |
| **Total** | | | | | **1030.842** |

**3- Investment table**

|  |  |  |
| --- | --- | --- |
| **Row** | **Description** | **Total cost (million riyals)** |
| 1 | Fixed investment | 150621.8438 |
| 2 | capital in circulation | 69315.287 |
| **Total** | | **219937.1308** |

**4- Annual production cost**

Total annual production costs are estimated from the sum of fixed and variable costs.

|  |  |  |
| --- | --- | --- |
| **Row** | **Description** | **Amount (million Rials)** |
| 1 | Cost of raw materials | 86005 |
| 2 | The cost of salaries and wages | 41155.8 |
| 3 | Energy costs (water, electricity, fuel, etc.) | 1030.842 |
| 4 | maintenance cost | 3031.4125 |
| 5 | Unforeseen production costs (5%) | 6561.152725 |
| 6 | Advertising costs (1% of sales) | 4800 |
| 7 | Financial facility costs (5% of the loan amount) | 6024.87375 |
| 8 | Insurance costs (0.002 fixed capital) | 301.2436875 |
| 9 | Depreciation expenses | 7637.8975 |
| 10 | Depreciation costs before operation 20% | 740 |
| **Total** | | **156988.2222** |

**5- Table of economic and financial indicators of the plan**

|  |  |  |
| --- | --- | --- |
| **Row** | **Indicator** | **year of operation** |
| 1 | The percentage of sales at the top point | 70.2% |
| 2 | The amount of sales at the head point | 789750 |
| 3 | The amount of production at the head point | 5265000 |
| 4 | The ratio of the total facility to the total required investment | 80% |
| 5 | Internal rate of return on investment | 42,85% |
| 6 | The investor's internal rate of return | 42,85% |
| 7 | Internal rate of return on investment including all costs | 59,1% |
| 8 | Return of capital | 3,93 |
| 9 | The investment return period including all costs | 3,51 |
| 10 | Net present value of the investment | 59642.46 |
| 11 | Net present value of investment share | 59642.46 |
| 12 | The net present value of the investment including all costs | 78656.76 |
| 13 | The cost price of each production unit | 0.12 |
| 14 | The selling price of each production unit | 0.15 |

**Pre-Feasibility Summary**

|  |
| --- |
| **general information** |
| Project title: production of essential oil, perfume and deodorizer of narcissus flower |
| Employment rate: 22 people |
| Working days: 300 |
| Use of the product: Food, cosmetic and pharmaceutical industries |
| **Technical study** |
| Land area: 2000 square meters |
| Building area: 770 square meters |
| Main raw materials: narcissus flower |
| How to supply raw materials: internal |
| Electricity required: 376,739 kilowatt hours per year |
| Required water: 733 cubic meters per year |
| Required gas: 4950 cubic meters per year |
| Required fuel: 17400 liters per year |
| **Financial and economic study** |
| Fixed investment amount: 150621.8438 million Rials |
| Circulating capital: 69315.287 million rials |
| Total investment: 219937.1308 million Rials |
| The amount of sales at the end-to-end point: 789,750 million Rials |
| Net present value (NPV): 59642.46 million Rials |
| Internal rate of return (IRR): 42.85 percent |
| Return on investment period: 3.5 years |