

PROJECT PROFILE



RATANJOT CULTIVATION AND PROCESSING



1. INTRODUCTION

Ratan Jot (*Arnebia euchroma*), locally known as **Demok**, is a rare and valuable medicinal herb native to the cold desert regions of Ladakh, typically found at elevations of 3,000 to 4,500 meters. Historically revered in Tibetan and Ayurvedic medicine, its deep red roots have been used for centuries for their therapeutic properties and vibrant natural dye. The pigment extracted from Ratan Jot is used in traditional cosmetics, ceremonial textiles, and medicinal salves, marking it as a culturally significant plant in Himalayan communities.

Due to its high-altitude growth requirements and slow maturation cycle, Ratan Jot remains underutilized despite its immense potential. However, in recent years, rising global awareness of the harmful effects of synthetic dyes and the increasing preference for clean-label, plant-based, and eco-conscious products have reignited interest in this ancient herb. The cosmetic, pharmaceutical, and handloom sectors are increasingly turning to botanicals like Ratan Jot for sustainable and ethically sourced alternatives.

Ladakh's unique climatic conditions make it one of the few viable regions in India for large-scale cultivation of Ratan Jot. By promoting its cultivation and establishing local processing units, this project aims to create a complete value chain—from farm to finished product. It offers a dual benefit: generating income for marginal farmers through climate-resilient agriculture, while contributing to biodiversity conservation by discouraging unsustainable wild harvesting.

Moreover, this initiative aligns with government missions such as the **Ladakh Organic Mission**, **Atmanirbhar Bharat**, and the **National AYUSH Mission**, all of which support the development of indigenous medicinal plant industries. With a well-planned cultivation, processing, and marketing strategy, Ratan Jot can become a flagship product of Ladakh—blending cultural heritage with modern economic potential.

2. PRODUCT & APPLICATIONS

Ratan Jot (*Arnebia euchroma*) is a high-value, multifunctional botanical resource whose applications span across the textile, wellness, pharmaceutical, and cosmetic sectors. The proposed project focuses on the sustainable cultivation and processing of Ratan Jot roots to develop a suite of premium, eco-friendly, and culturally rooted products.

Core Product Offerings:

1. Natural Dye Extracts

Derived from the roots of Ratan Jot, the vivid crimson pigment is a non-toxic, biodegradable alternative to synthetic dyes. Traditionally used in Ladakhi textiles like *Pashmina* and *Thangka paintings*, it is also suitable for:

- Organic textile dyeing (silk, wool, cotton)
- Artisanal crafts (hand-printed fabrics, natural inks)
- Cosmetic formulations (lipsticks, henna blends, soaps)

2. Herbal and Ayurvedic Products

The bioactive compounds in Ratan Jot possess anti-inflammatory, antimicrobial, and antioxidant properties, making it a powerful ingredient for:

- Medicinal ointments (for wounds, burns, and skin infections)
- Infused oils for massage and skincare
- Herbal capsules and salves for traditional healing practices

3. Raw Material Supply for Industrial Use

Dried and processed Ratan Jot roots can be supplied to:

- Ayurvedic medicine manufacturers (as a colorant and healing agent)
- Natural cosmetic producers (as a pigment and preservative)
- Research institutions (for phytochemical and pharmacological studies)

Application Sectors:

1. Textile and Handloom Industries

As demand surges for naturally dyed fabrics, Ratan Jot serves as a safe, heritage-based colorant with high appeal in:

- Organic fashion and sustainable apparel lines
- Artisanal and handicraft clusters
- Export-focused natural textile segments

2. Cosmetic and Personal Care Sector

With consumers seeking chemical-free, skin-friendly products, Ratan Jot-based cosmetics offer functional benefits alongside visual appeal:

- Lip and cheek tints, soaps, creams, and scrubs
- Ayurveda-inspired formulations for premium wellness brands
- Custom skincare ranges for eco-conscious markets

3. Pharmaceutical and Nutraceutical Industries

Ratan Jot is recognized in traditional medicine for treating inflammation, skin diseases, and ulcers. As an ingredient in herbal medicines, it supports:

- Therapeutic formulations
- Skin disease treatments
- Immune-boosting and detox supplements

4. Niche & Emerging Markets

- Natural pigment industries (inks, organic paints, biodegradable packaging dyes)
- Educational kits and museum stores promoting botanical heritage
- High-end hospitality sector (spas, natural treatments, traditional crafts)

3. PROMOTER QUALIFICATIONS

To successfully lead this venture, the promoter must possess a strong blend of academic background, field experience, and contextual understanding:

• Educational Qualifications:

A graduate or postgraduate degree in Agriculture, Botany, Horticulture, Plant Science, Herbal Product Development, or allied disciplines. Additional credentials in Sustainable Development or Agribusiness Management will be advantageous.

• Relevant Experience:

Minimum 2–3 years of hands-on experience in:

- Cultivation of medicinal and aromatic plants (MAPs)
- Herbal product formulation and value addition

- Organic and regenerative farming practices
- Supply chain and post-harvest management
- **Core Skills:**
 - Knowledge of high-altitude agriculture and climate-resilient practices
 - Herbal extraction techniques (maceration, infusion, cold-pressing)
 - Project management and quality assurance (GMP standards)
 - Marketing and e-commerce platforms
- **Certifications:**
 - National Programme for Organic Production (NPOP) Certification
 - Good Manufacturing Practices (GMP)
 - Fair Trade Certification (optional but valuable for exports)
- **Local Familiarity:**
 - Deep understanding of Ladakhi terrain, climate, and sociocultural dynamics
 - Strong community linkages for farmer mobilization and cooperative development

4. INDUSTRY TRENDS & OUTLOOK

The Ratan Jot value chain aligns with several rising global and domestic trends:

- **Natural Dye Market Growth:**
The global market for natural dyes is projected to grow at a CAGR of **8.5%** by 2030, driven by bans on toxic synthetic dyes and a resurgence of traditional crafts.
- **Ayurvedic and Natural Cosmetics Boom:**
Herbal and organic personal care products are growing at **5.5% CAGR**, particularly in wellness and luxury sectors. Ratan Jot appeals to this market due to its dual role as a pigment and healing agent.
- **Sustainability & Clean Label Movement:**
Consumers now demand transparency in sourcing, traceability, and eco-friendly packaging—advantages that a Himalayan-origin, organically farmed product like Ratan Jot can naturally provide.
- **Policy Support:**
 - **Ladakh Organic Mission** promotes region-specific crops and sustainable farming.
 - **National Medicinal Plants Board (NMPB)** offers cultivation incentives.
 - **Make in India** and **Atmanirbhar Bharat** emphasize indigenous resource use.

5. MARKET POTENTIAL & MARKETING STRATEGIES

Market Opportunities:

- **Textiles:**
 - India's handloom sector is valued at ₹1.3 lakh crore (2023), with demand for natural dyes in Pashmina, khadi, and silk industries growing rapidly.
- **Natural Cosmetics:**
 - The global market for herbal cosmetics is expected to reach **\$4.1 billion by 2027**, offering Ratan Jot a niche as a plant-based colorant and skincare ingredient.
- **Herbal Pharmaceuticals:**

- India’s herbal medicine market is estimated to reach **₹85,000 crore by 2030**, with rising integration into mainstream health and wellness.

Challenges:

- **Biological Constraints:**
 - Long cultivation cycle (3–4 years to maturity)
 - Vulnerability to frost or erratic snowfall during early growth stages
- **Awareness Gap:**
 - Low visibility outside traditional users and craftspeople
 - Need for scientific validation to appeal to modern wellness markets
- **Logistics & Infrastructure:**
 - Transportation costs from high-altitude villages
 - Limited cold storage and processing facilities in the region

Marketing Strategy:

- **Branding & Positioning:**
Market Ratan Jot as “*Ladakh’s Red Gold*”—a high-elevation super-ingredient combining tradition, purity, and performance.
- **GI Tag Initiative:**
Apply for a Geographical Indication tag to protect its unique regional identity and create a market niche.
- **Channel Strategy:**
 - Collaborate with ethical brands (FabIndia, Forest Essentials, Khadi Natural)
 - Partner with online marketplaces (Amazon Karigar, Etsy, 1mg)
 - Participate in exhibitions, organic fairs, and eco-trade shows
- **Awareness & Education:**
 - Conduct storytelling-driven workshops, live demos, and farmer-centric campaigns
 - Leverage influencers in eco-fashion, Ayurveda, and clean beauty

6. RAW MATERIAL REQUIREMENTS

Primary Agricultural Inputs:

- Ratan Jot seeds or tissue culture seedlings
- Organic compost and vermicompost
- Mulching sheets and drip irrigation components

Processing Inputs:

- Food-grade ethanol (for pigment extraction)
- Carrier oils (cold-pressed almond, sesame, coconut oil)
- Distilled water, glass containers, and stainless-steel equipment

Packaging Materials:

- UV-protected, biodegradable containers
- Tamper-proof seals and eco-friendly labels
- Sustainable shipping boxes for e-commerce

7. MANUFACTURING PROCESS

A. Cultivation (Years 1–4):

- **Site Selection:** Well-drained loamy soil at elevations between 3,000–4,500 meters
- **Land Preparation:** Composting, levelling, and moisture retention setup
- **Sowing Season:** April–May; seeds germinate within 4–6 weeks
- **Maintenance:** Mulching, weeding, pest control with organic inputs
- **Harvesting:** Root collection after 3–4 years of maturity during September–October

B. Processing:

- **Dye Extraction:**
 1. Clean and dry roots
 2. Grind into fine powder
 3. Soak in ethanol
 4. Filter and concentrate under reduced pressure
 5. Dry to a stable pigment paste
- **Oil Infusion & Herbal Products:**
 1. Cold-press chopped roots in carrier oil
 2. Filter and bottle for skincare use
 3. Combine with beeswax for balms or essential oil blends

C. Packaging:

Packaged in eco-safe, airtight, and UV-resistant containers to maintain color intensity and potency.

8. MANPOWER REQUIREMENT

Category	Details
Skilled	2 Agronomists, 1 Extraction Chemist
Semi-Skilled	5 Field Workers/Farmers
Support Staff	2 Packaging Technicians, 1 Sales Executive

9. IMPLEMENTATION TIMELINE

Phase	Activity	Timeline
Phase 1	Land lease, soil testing, seed sowing	Year 1
Phase 2	Cultivation cycle, organic certification process	Years 2–4
Phase 3	Processing unit setup, pilot trials	Year 5
Phase 4	Product launch, marketing, and full operations	Year 5

10. PROJECT COST ESTIMATE (INR)

Component	Cost
Land Lease (2 acres)	₹2 lakh
Cultivation (inputs, labour)	₹5 lakh
Processing Unit Setup	₹10 lakh
Packaging & Branding	₹3 lakh
Contingency	₹2 lakh
Total	₹22 lakh

11. MEANS OF FINANCE

- **Equity (Promoter Contribution):** ₹10 lakh
- **Debt (NABARD Loan @ 7%):** ₹8 lakh
- **Government Subsidy (MIDH):** ₹4 lakh

12. MACHINERY & EQUIPMENT

- Solar Dryers (for root dehydration)
- Pulverizer/Grinding Mill
- Cold-Press Oil Extractor
- Ethanol Recovery Unit
- Stainless Steel Filtration System
- Semi-automatic Packaging Machine

13. PROFITABILITY PROJECTIONS (Year 5 Onward)

Revenue Stream	Estimate (INR)
Dried Roots (500 kg × ₹2,000)	₹10 lakh
Value-added Products (dyes, oils)	₹15 lakh
Total Revenue	₹25 lakh
Operational Costs	₹12 lakh
Net Profit (Pre-Tax)	₹13 lakh

14. BREAK-EVEN ANALYSIS

- **Fixed Costs:** ₹8 lakh
- **Variable Cost/kg:** ₹1,000
- **Selling Price/kg:** ₹2,000
- **Break-even Point (BEP):**

$$\text{₹8 lakh} \div (\text{₹2,000} - \text{₹1,000}) = \text{800 kg of dried roots}$$

15. STATUTORY & REGULATORY COMPLIANCE

- **FSSAI License:** Required for consumable herbal products
- **Organic Certification:** Through NPOP standards
- **Wildlife/Forest Clearance:** If cultivation is near ecologically sensitive zones
- **GI Tag Application:** For regional branding of “Ladakhi Ratan Jot”

16. BACKWARD & FORWARD INTEGRATION

- **Backward Integration:**
 - Training and onboarding local farmers
 - Establishing seed banks and organic nurseries
 - Ensuring traceability through digital farmer records
- **Forward Integration:**
 - MoUs with Ayurvedic companies (Dabur, Himalaya)
 - Export linkages via APEDA
 - Own e-commerce presence and partnerships with ethical platforms

17. TRAINING & CAPACITY BUILDING

- **DIHAR (DRDO):** Training in high-altitude agronomy and cold desert farming
- **NMPB:** Medicinal plant cultivation, post-harvest handling
- **CSIR-IHBT (Palampur):** Herbal processing, extraction, and product formulation workshops

18. SUPPLIERS

For entrepreneurs aiming to establish a Ratan Jot (Demok) cultivation and processing unit in Ladakh, selecting reliable machinery suppliers is crucial. Below is a curated list of Indian manufacturers and suppliers for the essential equipment required in this venture:

Solar Dryers

Solar dryers are vital for dehydrating Ratan Jot roots while preserving their colour and medicinal properties.

1. **Raheja Solar Food Processing Pvt. Ltd. (Madhya Pradesh)**
 - Specializes in solar dryers and dehydrators for fruits, vegetables, and herbs.
 - Focuses on reducing post-harvest losses through reliable solar drying technology.
 - Website: rsfp.inrsfp.in
2. **Kosol Energie (Ahmedabad, Gujarat)**
 - Offers a range of solar dryers, including tunnel, portable, and cabinet dryers.
 - Known for energy-efficient and cost-effective solutions.
 - Website: kosolenergie.comrudrasolar.in+14Kosol+14sampackindia.in+14
3. **ATR Solar (Chennai, Tamil Nadu)**
 - Manufactures solar greenhouse dryers, cabinet dryers, and conveyor dryers.
 - Enlisted with MNRE for solar air heating systems.
 - Website: atrsolarindia.comkerone.com+11atrsolarindia.com+11Kosol+11
4. **Rudra Solar Energy (Ahmedabad, Gujarat)**
 - Provides solar dryers with capacities ranging from 40 kg to 50 kg.
 - Features include stainless steel construction and multiple trays.
 - Website: rudrasolarenergy.in
Shutterstock+6rudrasolarenergy.in+6tinosecolodge.gr+6

Cold-Press Oil Extractors

Cold-press oil machines are essential for extracting high-quality oil from Ratan Jot roots.

1. **Bharat Agro Industries (Rajkot, Gujarat)**
 - Offers cold press oil expeller machines with capacities up to 60 kg/hr.
 - Suitable for various seeds, including mustard, coconut, and almond.
 - Website: bharatagroindustry.com
2. **Nilsan Prime India Pvt. Ltd. (Surat, Gujarat)**
 - Provides a range of cold oil press machines with capacities up to 5 tons/day.
 - Models include NS-3000 B, NS-10000 B, and NS-6500 B.
 - Website: oilmaker.inKanakDharaEnterprise+2oilmaker.in+2bharatagroindustry.com+2
3. **Kanakdhara Enterprise (Ahmedabad, Gujarat)**
 - Supplies top-quality oil expeller machines with various capacities.
 - Offers customization options and fair pricing policies.
 - Website: kanakdharaenterprise.comatrsolarindia.com+26KanakDharaEnterprise+26Wayside Botanicals+26
4. **Sonar Appliances Pvt. Ltd. (New Delhi)**
 - Manufactures cold press oil machines that retain nutritional value and aroma.
 - Ideal for extracting oil from various seeds and nuts.

- Website: sonarappliances.in + 10 sonarappliances.in + 10 Kanak Dhara - Enterprise + 10

Ethanol Recovery Units

Ethanol recovery units are used to reclaim ethanol during the dye extraction process.

1. **Kerone Engineering Solutions Ltd. (Mumbai, Maharashtra)**
 - Provides ethanol recovery plants using counter flow water wash systems.
 - Offers efficient gas-water contact and minimal pressure drop.
 - Website: kerone.net
kerone.com + 2 [Kerone](https://kerone.com) + 2 kerone.com + 2 kerone.com + 1 [Kerone](https://kerone.com) + 1
2. **Dalal Engineering Pvt. Ltd. (Mumbai, Maharashtra)**
 - Designs solvent recovery plants with up to 97% efficiency.
 - Ensures continuous 24x7 operations with automatic controls.
 - Website: dalalengineering.com dalalengineering.com
3. **Attaquant Enterprises Pvt. Ltd. (Pune, Maharashtra)**
 - Manufactures solvent recovery plants suitable for various industries.
 - Offers customized solutions based on client requirements.
 - Website: attaquantpl.com attaquantpl.com

Filtration Systems

Filtration systems are crucial for purifying extracts and ensuring product quality.

1. **Filtration System Solutions India Pvt. Ltd. (Chennai, Tamil Nadu)**
 - Manufactures air, oil, fuel, hydraulic, and magnetic filters.
 - Supplies to major industrial OEMs in the country.
 - Website: fssipl.com [Filtration](https://fssipl.com)
2. **Filter Concept Pvt. Ltd. (Ahmedabad, Gujarat)**
 - Provides filtration solutions for air, gas, and liquid applications.
 - Caters to various industries with demanding filtration needs.
 - Website: filter-concept.com [Filter Concept](https://filter-concept.com) + 1 [Filtration](https://filter-concept.com) + 1
3. **K K Filter Systems (Mumbai, Maharashtra)**
 - Offers a wide range of filter systems and consumables.
 - Established in 2012 with over 25 years of experience.
 - Website: kkfiltersystems.com kkfiltersystems.com

Semi-Automatic Packaging Machines

Packaging machines are essential for efficiently packing the final products.

1. **Sampack India Corporation (Coimbatore, Tamil Nadu)**
 - Manufactures various packaging machines, including nitrogen flushing band sealing machines.
 - Offers semi-automatic machines suitable for different packaging needs.

18. CONCLUSION

Ratan Jot cultivation and processing offer a unique blend of cultural preservation and commercial viability in Ladakh. By leveraging organic practices and niche marketing, this project can tap into global demand for natural products while providing sustainable livelihoods to local communities.
