ATVAB, BIOVALL, ANADEC: CAROB SYRUP

Key Company Facts

Get to know the Community:

- Products: Syrup or "Rob" of Carob; Ceratonia siligua L.
- Main Activities: Local varieties, Direct contact with rural women (2021), Preserve nutritional quality and biological benefits
- No. of Employees: Rural women and their family members
- Production Volume: (100 L/season year/ women) (One month/year)
- Type of Ownership: Private
- Mission and Vision:
- Improve the local environment by using technologies such as emarketing and extend the consumers. Preservation of a highquality Rob by using suitable recipients and storing it in labelled glass opaque bottles.

Company's ecosystem

- Map the pilot's supply chain/ value chain
- Determine agri-food chain key actors
- Farmer/ Rural women ----> Consumer (Direct relation)

Company's competitive advantage

- Using e-marketing to reach outside Med region.
- Preserving the high quality of Rob and using it as functional product.

Tynisia



Business Model(s) and Stakeholders

Business Operations:

- Integration: Combines traditional carob syrup production techniques with innovative processing technologies, like hydrodynamic cavitation and pulsed electric fields.
- Enhancement: Aims to improve product quality while preserving traditional methods.

Marketing Strategy:

- Focus: Highlights traditional roots, nutritional benefits, and sustainable production methods.
- Direct Sales: Markets directly to consumers through producers' homes or local establishments, avoiding intermediaries to control pricing.

Sourcing Inputs:

- Local Sourcing: Uses locally sourced carob pods, employing traditional agricultural methods.
- Technological Enhancement: Modern technologies enhance processing without compromising natural qualities.

Finance:

Mixed Funding: Utilizes self-funding by producers and potentially gains support from regional agricultural programs promoting sustainable practices. **Related Business Model – Fair Trade**:

• Fair Pricing and Distribution: Emphasizes fair pricing strategies allowing producers to control prices and receive a fair profit share, fostering direct, long-term trading relationships that exclude traditional middlemen.

Characteristics of Other Business Models:

- **Cooperative**: Features community-based production and direct sales, promoting mutual benefits and shared responsibilities.
- **Contract Farming**: Reflects in structured agreements with organizations managing technological inputs, ensuring consistent quality.
- Digital Farming: Potential future integration of digital tools to track production and enhance efficiency and quality control.







Sustainability, Health & Fairness

- Fair Pricing- Control: Producers set their prices between 24 to 40 euros per kg, ensuring equitable compensation and business sustainability.
- Revenue Distribution- Direct Sales: Sales directly from producers' homes or local sites, cutting out intermediaries, increasing profit retention and reducing supply chain layers.
- Community Impact- Local Support: Enhances local economic competitiveness and sustainability, fosters employment, and supports community resilience by maintaining traditional practices with new technologies.
- Environmental Practices- Sustainable Technologies: Incorporates hydrodynamic cavitation and pulsed electric fields to boost efficiency and sustainability, reducing environmental impact.
- Consumer Relationships- Direct Trading: Direct consumer sales promote long-term relationships, enhancing stability and fairness in trading.
- Quality and Safety- Enhancements: Technological advancements ensure traditional flavor and nutritional value while meeting high safety and quality standards.
- Transparency- Traceability Potential: The direct sales model and technology integration suggest a framework for traceable supply chains, enhancing transparency about the product's origin and process.

Food quality (Nutritional Analysis and Ch	emical profile)			
Energy	256.67 kcal/100 g of syrup			
Protein	2.66 g/100 g of syrup			
Carbohydrates	61.33 g/100 g of syrup			
 Sugars (total) 	59.00 g/100 g of syrup			
o Glucose	28.50 g/100 g of syrup			
 Fructose 	28.95 g/100 g of syrup			
Fat	0.10 g/100 g of syrup			
Ash	3.31 g/100 g of syrup			
Water	32.61 g/100 g of syrup			
Salt	0.660 g/100 g of syrup			
Polyphenols (total)	832.76 mg eq gallic acid/100 g of syrup			
Flavonoids (total)	37.86 mg quercetin/100 g of syrup			
Antioxidant capacity DPPH/FRAP	76.66%/7485.52 μM Trolox/100 g of syrup			
Hydroxy-methyl-furfural (HMF)	554.5 mg/100 g			
Prebiotic activity	62% of FOS* Prebiotic potential			
Bifidogenic activity	150% of FOS Bifidogenic potential			
*EOS - Erustaaligasaasbaridas from Chicary (Thorma Field	2 or Scientific LISA = 100% of problems and/or bifidegrapic activity			

Environmental attributes

- The environmental attributes identified are based on a Life Cycle Assessment (LCA). Key attributes are as follows:
 - The production of carob pods results in low area-related emissions compared to the reference products.
 - The product-related results show that processing is a major contributor to the total emissions of the carob products.





Figure: Climate Change in CO2-Equivalents for Carob Syrup and industrial scale reference products. The figure on the left shows cultivation emissions per area. The figure on the right shows emissions per kg product. Carob syrup is highlighted in orange. Note: The production of the "home-made" carob syrup is difficult to compare with a industrial scale production

Socio-Economic attributes

Success factors of Rural Women separated in the time periods past and future based on a socio-economic assessment

	Past		Future	
	Internal	External	Internal	External
Success Factors	 Way of life - Traditional family model, with one steady income and additional money from home grown products. Cultivation of different plants with different planting and harvesting periods. 	A stable number of customers who come back regularly and value the products because they are homemade and traditional.	 Years of experience in growing and handling the plants. Cultivation without mineral fertilizers or pesticides. 	 Improve processing technology with the help of BIOLIVAL to improve the quality and safety of the carob syrup. Increase on training opportunities for example by BIOLIVAL.







Value Proposition

Fairness

Equitable Pricing and Profit Control:

- Benefit: Ensures producers receive fair returns, supporting economic sustainability and just compensation.
- **Delivery**: Producers set prices between 24 to 40 euros per kg, reflecting the true value and quality of their product, enhancing autonomy and preventing undervaluation.

Community Economic Enhancement:

- Benefit: Bolsters local economy by improving competitiveness of small-scale industries, aiding economic development, and reducing rural poverty.
- Delivery: Merges innovative technologies with traditional methods to enhance carob syrup quality and marketability, increasing job opportunities and local entrepreneurship.

Environmental Sustainability:

- Benefit: Encourages practices that conserve resources and minimize ecological impact.
- Delivery: Utilizes advanced processing technologies like hydrodynamic cavitation and pulsed electric fields, optimizing resource use and reducing waste while maintaining traditional cultivation.

Direct Consumer Relationships:

- Benefit: Builds stronger ties between producers and consumers, promoting loyalty and trust through transparency and direct engagement.
- **Delivery**: Sales are made directly from producers' homes or local establishments, cutting out intermediaries and allowing producers to share their methods and product qualities firsthand.

Preservation of Cultural and Traditional Practices:

- Benefit: Upholds traditional carob syrup production methods, preserving cultural heritage and authenticity.
- Delivery: Adopts modern technologies to boost product quality and safety while keeping traditional harvesting and production methods intact, as well as maintaining the cultural essence of carob syrup making.

Socio-Economic aspects

• Strengthening of rural communities

- Local food production increases economic stability of the rural population and decreases the dependence on food imports
- Cultural heritage Growing and processing a variety of local food products contributes to food traditions preservation, at a time in which many people are switching from agriculture to other professions and no longer have as much time to cook these dishes themselves.
- Conservation/propagation of ancient (wheat) varieties
- Reduced economic vulnerability of farms through diversification of agricultural products

Environmental aspects

- Low input agriculture no or low use of fertilizer and/or pesticides, no use of aaricultural machinery
- Protection of biodiversity small field size combined with high structural diversity in landscape, as well as no use of fertilizers or plant protection agents
- promotion of agrodiversity cultivation of diverse varieties of local crops
- Reduced environmental vulnerability through resistance to pest and draught compared to the predominantly cultivated wheat varieties
- Protection of ground water (low input leads to low output of nutrients and pesticides)

Food quality

- Higher polyphenol & flavonoid content
- Characteristic caramel-like flavor of carob syrup, which comes from sugars' dehydration and non-enzymatic browning.
- High Prebiotic Activity: Carob syrups are able to foster the growth of beneficial intestinal bacteria, as well as to contain and reduce the growth of intestinal bacteria that give intestinal dysbiosis and diarrhea.
- High Bifidogenic Activity: Carob syrups adjuvate probiotic bifidobacteria, that live the intestinal tract and confers benefits to the consumer.

Outcomes

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- 1. Distribution of labelled opaque glass bottles indicating the chemical, phytochemical composition and antioxidant activity of carob Rob among the rural women in order to:
 - Contribute to social welfare by combining the know-how and expertise with scientific knowledge,
 - Enhance of the product value and ensure a persistent and high quality,
 - Attract more consumers with a beautiful packaging and understanding composition and biological benefit,
 - Standardization of the recipe of the preparation of Rob based on the biological analyses:
 - Improve the nutritional and biological quality,
 - Minimize the amount of the water used in preparation process,
 - Save energy consumed,
 - Exploit to the maximum of raw material of carob pods,
 - Minimize time,
- 3. Provision of an invented syrub maker designed according to the needs of rural women in order to make the preparation of syrup easier in complete cleanliness and maintaining better quality.
- 4. Organization of training to the rural women to share ideas and to break down barriers between them.







Improvement Strategy and Suggestions

Value Chain Functionality Enhancement:

• **Blockchain Technology**: Implement blockchain for real-time traceability and transparency, ensuring product authenticity and quality.

Business Model Adjustments:

• **Subscription Services**: Adopt a subscription model for regular deliveries, fostering steady demand and long-term relationships.

• **Product Line Expansion**: Introduce new variations like organic or flavored carob syrup to attract diverse market segments. **Food Quality, Fairness, and Sustainability**:

- **Quality Improvement Programs**: Collaborate with food scientists to refine production techniques, maintaining flavor and nutritional integrity.
- Fair Trade Certification: Obtain certification to emphasize ethical production and fair pricing.
- **Sustainable Packaging**: Transition to eco-friendly packaging to reduce environmental impact.

Community Engagement and Support:

• Local Initiatives: Support local employment and training, partnering with educational institutions to enhance agricultural and production skills.

Market Expansion and Diversification:

- Global Market Penetration: Target international markets with high demand for natural and sustainable products.
- **Digital Marketing**: Utilize digital platforms to promote the traditional methods and benefits of carob syrup, reaching a wider audience.





