

FEASIBILITY STUDY

**INNOVATIVE FREEZE-DRIED FOODS
PLANT in Levski, Bulgaria
(LYO PLANT PROJECT)**



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General Overview

According to the “Food and Agriculture Organization” of the United Nations, roughly one third of the food produced in the world for human consumption every year — approximately 1.3 billion tonnes — gets lost or wasted. Food losses and waste amounts to roughly US\$ 680 billion in industrialized countries and US\$ 310 billion in developing countries. Fruits and vegetables, plus roots and tubers have the highest wastage rates of any food.

Global quantitative food losses and waste per year are roughly 30% for cereals, 40-50% for root crops, fruits and vegetables, 20% for oil seeds, meat and dairy plus 35% for fish.

Every year, consumers in rich countries waste almost as much food (222 million tonnes) as the entire net food production of sub-Saharan Africa (230 million tonnes). Per capita waste by consumers is between 95-115 kg a year in Europe and North America, while consumers in sub-Saharan Africa, south and south-eastern Asia, each throw away only 6-11 kg a year.

According to the Bulgarian Food Bank the food waste in Bulgaria is 670 000 tonnes per year — more than 60 % are fresh vegetables, fruit, root crops, fresh meat, dairy products and fish.

Bulgaria is known for that within the framework of the Intercosmos programme was first to introduce the use of freeze-dried food for astronauts. Scientists from the Intercosmos team are involved in this project.

In recent years there has been increased demand and objective necessity of building a plant for freeze-dried foods in Bulgaria. Lyophilized foods can replace traditional preservation, but without the use of preservatives. The method has the following advantages:

- Fully preserved taste, nutritional, organoleptic properties and vitamins, without any harmful preservatives and additives. The dry-heat procedure retains only 50-60% of the original nutritional properties;
- Saving the form and color of freeze-dried products, unlike drying with hot air;
- Durability of storage under ambient conditions (room temperature) 5-15 years (residual humidity up to 2-5%). No need for storage in freezers and refrigerators and related costs during this long period;
- Rapid rehydration, unlike drying with hot air;
- Packaging in hermetic quality three-layer packaging materials with aluminum intermediate layer - vacuum packing and non-oxidative environment of protective gas - nitrogen or argon.
- Saves weight and volume of the metal cans and glass jars, and up to 90% of weight of the food itself.

Fruits are most often to be freeze-dried (strawberries, wild strawberries, apples, pears, melons, apricots, peaches, kiwi, watermelon, blueberries, wild blueberries, cherries, grapes, raspberries and blackberries, sliced lemons and oranges, fruit mix); vegetables (original,

patented varieties of Bulgarian high-quality tomatoes, cucumbers, gherkins, pickles, marinated cucumbers, peppers / pepper / asparagus, radishes, vegetable mix); grilled vegetables - peppers, courgettes, aubergines); ready-to-eat flavoured freeze-dried salads; seasonings (wild garlic - ramsons, horseradish) herbs, various types of meat and meat products (with minimal fat - reduces shelf life), fish, various cooked dishes - meat and vegetarian, vegetarian and vegan, soups, borscht ; dairy products - cheese, cottage cheese, yogurt – goat milk, sheep milk and yogurt starter; nuts (raw and roasted), a combination of mix nuts plus fruit mix and others.

The project aims to build a plant for freeze-dried food on own terrain in the municipality of Levski. The design built-up area of the plant will be - 5484 m² and the total built-up area - 5700 m².

The plant is planned to process and freeze-dry to 10 tonnes of food per day (raw and cured products) and kitchen ready cooked dishes using original recipes, recipes from the traditional Bulgarian cuisine and recipes developed by requirements of the applicant. The ratio of fresh to freeze-dried (lyophilized) strawberries for example, is 10:1, which means it is planned for a total of about one ton of lyophilized food a day.

It is envisaged that incoming food products to be mostly certified with bio - organic certificates, respectively lyophilized products to be so, which doubles the price of the products on the international market.

The plant includes industrial kitchens where 10 tons of nutritious meals per day can be cooked. These are about 33,000 portions per a day.

A fully equipped analytical laboratory is envisioned for all kinds of food research, which will be certified by all current EU Standards, in order to avoid relying on external laboratories. After the laboratory obtains certificate, it will be able to accept external orders for any kind of food analysis from all over Bulgaria, for remuneration.

The project provides BRV for the development and optimization of recipes for production of functional foods, foods with curative properties for recovery after hospitalization and postoperative aftercare (convalescence); energy-dense food for athletes and people with professions associated with high physical and psychological pressure, as well other innovative products in order to be always competitive.

Part of the development will be carried with the active support of the Research institutes of the Bulgarian Academy of Sciences (BAS) and the Agricultural Academy. Several original innovations, inventions and rationalisations will be implemented.

Products, raw materials and production technology

Product description:

The modern cryogenic technologies enable the development of highly efficient biotechnological production of foods with different composition and purpose:

Food for extreme conditions and for everyday use- development of various purpose and energy content freeze-dried food concentrates - fruits, vegetables, milk (and yogurt), soups, main dishes, desserts, juices in powder, granule and tablet form, and in the form of complete compressed modules and meals for extreme conditions. Food concentrates are intended for expeditions, military ration kits, cases of natural disasters, accidents and for everyday use.



Figure1. Freeze-dried cooked food

Objects of lyophilization:

2.1 Fruits: apples, peaches, apricots, strawberries, raspberries, blackberries, blueberries, chokeberry, elderberry, plums, melon, kiwi, banana, etc., except fruits containing high amounts of sugar.

Vegetables: tomatoes, red and green peppers, cabbage, Brussels sprouts, cauliflower, broccoli, celery, zucchini, carrots, potatoes, spinach, mushrooms, peas and green beans, pumpkins and more.

Fresh and fermented milk (cow, goat and sheep) and other dairy products- cheese, cottage cheese, whey.

Row meats – chicken and turkey fillet, veal, as they have the lowest fat content, which is important for the shelf life of lyophilized products.

Culinary processed foods - soups, main dishes, desserts, juices, and more.

The products obtained are highly efficient and are targeted to meet the daily energy needs and to help overcoming unhealthy changes in the body associated with extreme working conditions and lifestyle - stress, high neuro-psychological and physical stress, intoxication from different origins, increased radiation, due to human survival in unusual, extreme conditions and situations.

2.2 Food intended for prevention of a number of socially significant diseases and for improvement of quality of life and health status of the population.

Development of prescription formulas and technologies for production of functional organic products with high health potential. Based on natural fresh and fermented milk (cow, sheep and goat) and daily used food in the traditional nutrition, through incorporation in them of a new, non-specific components or through increasing their bioavailability with certain healthy ingredient, a raised healthy effect is achieved. The composition can be added medical and edible plants, wild fruits, apiculture products, etc., with incorporated biologically active substances, impacting positively on human health (enzymes, microorganisms of different origins, omega fatty acids, natural antioxidants, etc.)



Figure.2 Lyophilized synbiotic foods based on cow's and sheep's milk.

Lyophilized functional plant-based foods are entirely developed on the basis of Bulgarian herbal medicinal plants that have the highest content of biologically active substances and are environmentally friendly so they have this high quality and healthy effect.

2.3 Development of probiotic and synbiotic products with a balanced composition, high biological value. The concentration of live beneficial micro-organisms taken orally, mainly in the form of curdled products, determines their probiotic effect. As biological regulator of gastrointestinal microflora, a probiotic intake should provide the body over 10 billion active cells. This type of organic products are designed for prevention and alimentary influence of disbacteriosis, metabolic diseases: diabetes, obesity, hypertension, atherosclerosis, professional-protective nutrition (foods with antitoxic and radioprotective effect), gluten and lactose intolerance, allergies and more. The range of this group of products includes freeze-dried muesli with varied composition - milk ingredient, fruits, nuts, cereals, etc.

Enzymatically hydrolyzed organic products based on yogurt, rich in protein and free amino acids intended for convalescent and post-operative recovery of the body after a state of catabolic stress.



Figure 3. Enzymatically hydrolysed organic product based on yogurt

2.4 Freeze-dried natural products - biostimulants and supplements of fruit and cereal, fruit and herbal and vegetable grain-based foods for athletes and healthy people. Lyophilized biostimulants are food concentrates with high biological value and based on the activation of oxidative and restorative processes enhance immune resistance of the organism. Suitable for convalescent and post-operative nutrition and restore the body after a state of catabolic stress.

2.5 Freeze-dried extracts of herbs and super foods.

LYO Technology

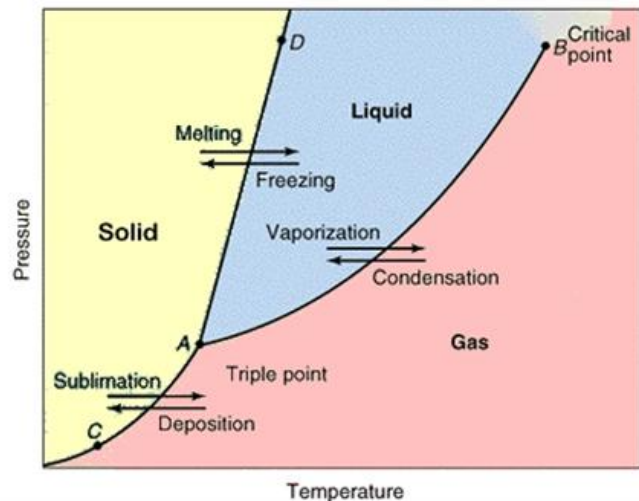
Process description

In recent years, freeze drying (lyophilization) was established as a modern biotechnological solution for healthy production. Sublimation is the process by which a substance passes from the solid in the gaseous state without melting. Extraction of moisture from the moisture-containing material by sublimation is called freeze drying.

Freeze-drying is not the only name of the process. Literature reveals names as molecular drying, based on the nature of the movement of water vapor to the material to be dried, also freeze-drying, i.e. drying in a frozen state. In medicine and biology, where originally was applied freeze drying, was introduced the term "lyophilization" and the dried product obtained in this processing- lyophilized.

The essence of the process freeze drying consists in the separation of the water substance from the solid matrix of the product at ambient pressure, less than the pressure of the triple point of water. The parameters of this section are 0.0098 oC- water temperature and partial pressure of water vapor - 4.58 mm Hg. The triple point could be treated as a boundary

between the normal in the industry, vacuum drying, wherein the separation of the aqueous substance of the product is carried out by evaporation of the liquid in vacuum and sublimation drying, in which moisture passes directly from the solid state into a gaseous, without liquefies. In order the freeze-drying to happen, water content in the product must be brought to the solid phase state. This can be expressed graphically in the following manner.



Phases of the process:

According to this subordination (for pure water) when supplying a heat to the substance in the solid state at a constant pressure lower than the pressure of the triple point (in which exist all three phases of a substance), occurs process of evaporation of the rigid body, which is called sublimation. Upon cooling the steam, the substance crystallizes directly from the vapor state (desublimation). In organic compositions, including food products, which are more complex systems of pure water (water solutions of organic and non-organic substances), the existence of an equilibrium system "ice-vapour" or "solution-vapour" is limited by other values of temperature and pressure because the point of the final freezing of the aqueous solutions (eutectic point) is lower than the freezing point of pure water, and the boiling point - higher.

Lyophilization is a multi-step process comprising:

- freezing the material to a low temperature - below the eutectic temperature;
- primary drying, wherein the crystals of ice sublime under the influence of the system brought into heat, under vacuum conditions;
- secondary drying in which, after separation of the ice, the residual moisture is desorbed from the material, in terms of the maximum high vacuum.

Drying by sublimation was first applied in biological research in the late 19th and early 20th century. The method of freeze-dried food is patented by Russian engineer G. Lappa - Starkenetskiy in 1921 and then after 15 years in the US and England. In 1946, Danish company

"Atlas" put into operation the first industrial installation for sublimation, and in 1949 in Aberdeen was built the first experimental factory for freeze drying, equipped with Danish installations.

Industrial implementation of freeze-drying is preceded by thorough theoretical studies that establish the basic laws of heat and mass transfer during drying, some features of the vacuum condensation and schemes of sublimation systems.

Currently, freeze-drying is widely used both in the laboratory and in industrial scale in various areas of science - biology, medicine, in chemistry at blood ingredients, blood substitutes and blood plasma preserving , as well as breast milk, hormonal and enzymatic , fermentable preparations, microbial cultures, antibiotics, biological and other thermos- unsustainable materials.

Freeze-drying is entering at a high pace in the food industry. Object of freeze-drying are all kinds of food with the exception of edible fats. The very first results show that freeze-dried products preserve superbly their nutritional and taste qualities, so they can be stored for years under normal conditions and possess much less mass. Later, to these qualities is added the possibility of reducing their volume in the form of tablets or briquette blocks.

Advantages of lyophilized (freeze-dried) concentrates:

The final products are with fine structure and consistency, with stored nutritional, biologically active substances and taste and aromatic complex. They deliver in absorbable form the necessary body nutrients and biologically active substances.

In this method of processing, proteins are not being denatured, the vitamins are preserved to the maximum extent and enzymes retain their activity.

Because of their lyophilic nature, freeze-dried foods are easily for recovering by rehydration to their baseline physical and organoleptic properties without requiring special conditions.

Low residual moisture content - within 2.5-5.0%, evenly distributed in the product's volume and ensure their long-term storage. The long-term reserve of freeze-dried food requires no special storage facilities for storage. They are stored in a ventilated area at a temperature of up to + 18 °C and a relative humidity up to 75 percent.

Supply chain

Supply of raw materials

It is envisaged that the raw materials (fruits, vegetables, milk, meat, medicinal and food plants, etc.) will be subjected to primary processing (through the method of freeze-drying) to be purchased from a licensed manufacturer of environmentally friendly organic foods. They will be transported and delivered to the reception room of the plant for freeze-dried foods and kept refrigerated until their final processing.

Processing (primary and secondary):

The technology of freeze-drying is suitable for food production for mass consumption, as well as for food concentrates and specialized foods and supplements. Freeze-drying involves the following milestones:

Selection and preparation of raw materials.

The pre-selection is necessitated by the fact that the properties of these products lay down the rules on lyophilization, packaging and storage. The choice of high quality raw material is a prerequisite when applying the method of freeze-drying. Pre-processing technology include the separation of healthy fruits and vegetables, washing, removal of the leaves, stalks, bark and seeds, cleaning the meat from the connective tissue and cartilage, filtration of milk and removal of impurities.

Depending on the need, the materials are used whole or cut into two halves of circles, slices or cubes, as the layer thickness must not exceed 1.5 -2 cm. If a milling of a powder for the preparation of tablets or compressed blocks is needed, they may be dried in the form of puree.

Heat treatment is included in the technological cycle only in certain materials, for vegetables (green beans, peas) is necessary milling of the crude product in hot water or direct steam at a temperature of 100 °C. Meat products and cooked dishes - soups, main meals are subjected to compulsory heat treatment in an autoclave at a pressure of 1.0 atm for 10-20 minutes, and the milk is pasteurized to 72 ° C for 10 minutes prior to its subsequent processing.

Refrigerated treatment. Freezing fresh or advance technologically processed raw materials is carried out in refrigerated forced circulation of air at a temperature in the chamber until -350 ° C, an average speed mode of freezing - 0,250S / min. The duration of freezing is most often from 18-24 hours, depending on the type of raw material.

Freeze drying. The drying process is carried out in the sublimation drying installation with contact heating of the slabs, consisting of a drying chamber with contact plates, desublimers, a vacuum system, heating and cooling system. The duration of one cycle of the freeze-drying medium is about 18 to 48 hours, depending on the content of total moisture and the structure of the product.

Packaging of finished product. The lyophilized products are packed in packages of three-layer aluminum - polyethylene - polyamide film allowed for food, which is light-resistant and damp-proof and guarantees long-term storage of products of 5 to 15 years under normal conditions (18-20 ° C).

Packing

For freeze-dried products and food storage, the type of packaging is especially important. It must meet the following conditions: to ensure full oxygen-resistance and impermeability, to prevent the loss of aroma and to avoid acquiring of a side flavor of the packaging material; to provide protection against mechanical damage due to embrittlement of freeze-dried products (when they are not in powder form). Best suited for dry crops are glass vials and ampoules, and for lyophilized probiotic products - triple polyamide-amide aluminum foil, where packaging air is replaced with vacuum or inert gas. Combining the environment with well chosen package minimizes the loss of cells during long term storage of dried cultures. The packaging under vacuum removes the air and the soft package covers tightly he product.

Packaging in an inert gas atmosphere equalize the internal pressure with the external and thus excludes the internal tension of the walls of the package. Using inert gas is widespread in the world practice for multilayer soft packaging as well as and for metal ones.

Recovery (rehydration) of the dried product

The initial water content was recovered by adding water or a solution. The degree of recovery of freeze-dried food is an indicator of the quality of the processes involved in their freeze-drying.

The speed of rehydration depending on the diameter and length of the capillaries, resulting from the drying, which depends on the histological structure of the material and the conditions of the preparation for drying. For the recovery, it is quite important the degree of hydration of the protein. The intensity of the modification of the hydrophilic properties depends on the source properties of the product - water content and reducing sugars; the conditions of storage - contact with air, the temperature and length of storage. The length of recovery depends on the relative surface too. In the crushed product is shorten the path of the migrating water and increasing the surface of contact of proteinaceous substances to the water, with the result that the speed increases. The water temperature also affects this process. It was found that by increasing the water temperature from 0 to 350 ° C the swelling increases. At temperature higher than 350 ° C the recovery rate decreases. The extent of rehydration depends on the reaction of environment. When pH above and below the isoelectric point, the degree of swelling increases. Freeze-dried products are more sensitive to microbiological standards as violation of the integrity of the cell wall facilitates the penetration of microorganisms. This requires their rehydration to be carried out immediately before use.

The recovery of the dried product is implemented in two ways:

A) with water at room temperature to 20 ° C, wherein the majority of fruits and vegetables (whole, in smaller sizes, and cut in half) and dairy products regain its original form after 3-5 minutes. Rehydration ratio is within 94-98%. Generally, the whole fruits recover more difficult than these cuted into pieces.

B) with boiling water- used in some fruits with a thicker skin such as black currant, chokeberry, blueberry, blackberry requiring about 0.5 to 1 hour rehydration in cold water, so to accelerate the process is used hot water, wherein the rehydration is carried out in just a few minutes. Meat products and culinary processed food also may be rehydrated with hot water, as previously they have been subjected to heat treatment and denaturation of the protein is not possible.

Requirements for storage and transportation

Lyophilized products placed in packs of aluminum foil-polyethylene have high durability, resistance to external influencing factors, they are compact and transportability and have long shelf life without the need for added preservatives and artificial additives from different backgrounds and do not require special storage conditions.

Storage of the dried product - finished products are stored in the warehouse, well ventilated, with a temperature of up to + 18 ° C and relative humidity to 75%.

Transportation:

When transporting, packets are placed in transport containers, according to BDS 9385 -86. Transport is carried out according to the requirements of Act № 1 of 26 January 2016 of the Ministry of Health and Ministry of Agriculture and Food concerning hygiene in closed cars. When dispatched, the packaging of foods must contain a transcript of the minutes drawn up by the supervisory authorities with the following information.

- Product type;
- Date of manufacture;
- Lot number;
- Qualitative indicators;
- Quality expert sheet.

Production Control Systems

The production of freeze-dried foods must comply with all sanitary and hygiene requirements for food-processing industry and the conditions for quality and safe food production of Act № 1 of 26 January 2016 of the Ministry of Health and the Ministry of Agriculture and Food.

Hygiene and health requirements - technological equipment is being cleaned, washed, and disinfected. Soap and other appropriate formulations are used as detergents. The floors of production premises are washed with warm solution of detergent. Workers must observe the standards of personal and industrial hygiene.

Production control - incoming, current, and outgoing in the system microbiological control of raw materials as well as of each consignment ready lyophilized product, also control over their quality indicators. Strict observance to the process control and hygiene requirements is applied . The results of the research are reflected in technological logbook of the assay laboratory.

Product marketing

Overview on the freeze-dried foods market - market insights

The global freeze-dried foods market in 2014 amounted to US \$ 44.5 billion. It is envisaged its sustainable development with an average annual growth of 7.2%. As of 2021 the market is expected to reach US \$ 66.4 billion.

A major positive factor for the market growth is the better quality of products than those produced by other technologies. Freeze-dried food is the best dehydrated food, due to its superior texture and sensory quality after rehydration. Fast growth in the last years is observed in the freeze-dried ingredient market. More and more global food producing companies use freeze dried ingredients (strawberries, raspberries, bananas etc.) in their breakfast cereal products giving rise to the freeze-dried ingredient producers.

A negative factor, slowing the development, is the existence of others, relatively cheaper and less energy intensive technologies (for dehydrating) and relatively higher prices of the freeze-drying equipment.

Market drivers

- Superior quality of the products when compared to other drying technologies. Excellent shelf-life (up to 25 years) without any added preservative;
- Profitability during its supply chain – appealing look, due to the retain of the original shape, much lower transport costs, possibilities for attractive, useful and friendly packing ;
- Cardinal changes in the diet and attitude of people (especially those from America, Europe and East Asia) to the food. Demand for healthy, containing no preservatives, flavors, colors, etc. foods (especially healthy snacks and yogurt products) , increased at a fast rate,
- Perfect storage conditions (long durability, light weight etc.),
- Perfect products, when travelling, adventuring, participating in military, rescue and other missions, due to the light weight, friendly packaging and the very little time for cooking.

Market segmentation

In a final product's perspective, the market is segmented as follows:

- Freeze-dried ready for eat meals – soups, desserts, main dishes, instant beverages (coffee, fruits beverages etc.). The relatively high prices of these products, compared to similar, produced by other technologies, long time justified their lower demand. In recent years, the trend markedly changed in a positive direction. The rapid increase in demand for healthy food products led to a significant change in the demanded assortment, especially in regions such as America, East Asia and Europe. Increasingly imposing paradigm for the purchase of foods is that "the quality justifies the price." Another cardinal change in people's behavior is the increased sense of insecurity and

fear of possible disasters, military conflicts, climate change, etc. Still harder is the striving for hoarding foods, and freeze-dried ready for eat meals are perhaps the most appropriate alternative for it. Last but not least freeze-dried ready for eat meals are ideal for adventurers, travelers, tourists and others. The assortment of the healthy ready to eat freeze-dried meals constantly develops by types and offers new perspective solutions – Bio products, pro biotic, Gluten free, Lactose free, Vegan, Halal etc. Special assortments for storage, rescue and military missions and adventurers is developed, diversified and improved continuously. Strong interest towards yogurt freeze-dried products, where natural extreme low calorie sweeteners (like stevia solution) are used, was shown within the last years. Globally, based on the last in-field researches, more, than 70% of the yogurt admirers prefer low calories solutions and Yogurt freeze-dried products are the best performer for it.

- Freeze-dried ingredients. The market share of freeze-dried ingredients is higher, than of the ready to eat FD meals, because of the much more existing and arising possibilities for their use in the production of many different ranges of food-stuffs (instant soups, snacks and biscuits, ice creams, herbal solutions and others). Global Companies like Kelloggs, Nestle, Mondelez Intl, Unilever , Asahi group etc. are now largely using in their productions technologies freeze-dried ingredients in order to obtain healthy and nutritionally answering to new trends of demand foods. Potentially big global companies are the best consumer of FD ingredients and their role in the FD market grows constantly. The limited yet capacity for FD ingredient production, due to the highly entry investment costs and the seasonal limitation for processing, is and will help relatively small FD producers to benefit this augmenting demand, by producing FD ingredients, using their own raw materials (fruits, vegetables etc.) or materials, supplied by the clients.

From a raw material perspective, the market is segmented as follows:

- Fruits, used mainly as FD ingredients for the production of desserts, snacks, biscuits etc. Fruits are heat sensitive products, which are more prone to loss of vitamins and minerals when exposed to high temperature. Freeze-drying technology preserves necessary vitamins and antioxidants during dehydration, which increases its importance among the drying techniques. Freeze-dried fruits market holds the largest share, followed by vegetables and beverages.
- Vegetables similarly to the FD fruits are mainly used as FD ingredients for the production of instant soups, bouillons, seasonings, spaces etc. After the FD fruits, they occupy second largest share.
- Meat and Seafood are used as FD ingredients for the production of FD meals, but also for direct cooking.

- Dairy products. Top selling FD dairy products in USA and Europe are FD cheese (cheese cream and mozzarella for pizza), FD Yogurt powder, FD dairy cultures and FD milk powder (especially from goat milk). The demand for these products grows rapidly. The FD dairy market shows a very high potential for sustainable development.

In regional perspective the FD market as a volume and potential for grow is segmented and ranged as follows:

- North American market which for the time being is the biggest one
- East Asian market (Japan, China, South Korea etc.) which is the most developing and in the near future will occupy first place
- European market with strong share of west Europeans countries (UK, Germany, France, Netherlands etc.) and a good potential for development in east European countries (with higher share of Poland).
- South American market.

Best market players – biggest producers and consumers of FD ingredients are global companies like Nestle, Switzerland, Unilever, UK, Asahi group, Japan, Mondelez International, USA and OFD foods Inc., USA.

Best producers in Europe of FD ingredients and Ready to eat FD meals are “European freeze dry”, UK, “Chaucer”, UK, “Titok distributions”, France, “Faliere nutrition”, France, “Lyophilise”, France, “Real field meal”, Norway, “Katadyn”, Switzerland, “Freeze dry foods”, Germany, “Lyovit”, Poland.

Main conclusions, based on the marketing overview and perspectives for the successful implementation and running of the LYO Project are:

- The Global FD market shows constant grow and sustainable demand for FD foods and ingredients. The highest entry investment costs are justified by the quick positive change of the consumer’s preferences for healthy and free of all kind of additives foods. The higher price is justified and tolerated by the improved health status and the better performance and self-confidence of the consumer.
- European FD market is posting a growing demand for more FD production capacity, due to the augmenting demand and the limited for the moment production. LYO Project will be successfully integrated in the innovative, high-tech and responsible European sustainable development.

- LYO Project will involve a highly competent and unique in certain sectors of the FD technology Bulgarian scientists. Few are countries (especially in Eastern Europe) with such of long term successful experience.
- Bulgaria has unique geographical, climatic and strategic position in Europe and in the World. It's a region with one of the best ecological performances in Europe. Combination of favorable climate conditions with sustainable water supply and traditionally high agricultural potential (agricultures, scientists, Agricultural and Scientific Institutions, endemic highly appreciated over the World sorts, technical specialists etc.) will contribute to positive results not only for those involved in the project implementation and execution, but for local population, scientific world, clients and final consumers.
- Bulgaria is situated in a very sensitive region. Unfortunately wars in the Middle East, terrorist menaces, the active presence of ISIS and other terrorist organizations , instability in Ukraine, the continuing migrant flow, uncertain future of Turkey etc. will continue for a long term period, and Bulgaria is near to the center of all disastrous regions and events. It puts in question the ability of the country to be prepared for all negative situations , for mitigating the negative consequences and supporting the human and peace actions. LYO Project will provide flexible, easy to handle, quick to implement and effective decisions for international and local rescue and military missions. Various menus and FD meal packages will be produced and proposed to the market and Institutions.

Potential users of freeze-dried foods:

- UNESCO - food to disaster areas, natural disaster, conflicts
- Red Cross, Red Crescent
- State Reserve – war-time stocks
- Military units, Special Forces
- Ships, submarines, remote bases
- Civil goals; expeditions; tourism
- Athletes, extreme sports.

Technical feasibility

Location of the plant

After extensive study and analysis, the construction of a plant for freeze-dried foods is decided to be in the town of Levski.

The town is located in Pleven ditrict, northern Bulgaria. It is the administrative and economic center of the municipality of Levski. The population to 2009 is 10 571 inhabitants. Levski is located on an area of 414 km² in the Danube plain, Tuchenishko-Dolnoosamski area. In the municipality the flat terrain is prevailing- Levski is located about 60 m. above sea level. The climate is moderate continental, favorable for the development of cereals, orchards, vegetable crops, industrial plants.

Levski is a major transportation hub from the main road Sofia – Varna. Here the trains link the town with Troyan, Lovech and Svishtov. Two third-class, but very lively republican roads pass through (total as directions) - Svishtov - Levski - Lovech – Troyan, and Nikopol - Levski - Pavlikem - Veliko Tarnovo. 8 km north of Levski passes the highway Sofia - (Rousse) - Varna. The route of the future highway "Hemus" will pass 10 kilometers south of Levski.

Traditional for municipality of Levski are food processing, machine building and light industry. Since about 2000 there is a revival in the economy. The investments, local business and foreign companies operating in the municipality are increasing.

The area of the future plant for freeze-dried foods is located in the southern part of the town of Levski, near the railway line and the railway station. The West border is a street and Vocational School, the East – an enterprise for pipes production, the South - an asphalt road and the North – a train plant.

Permanent purpose of the area is urban



Condition of the Infrastructure

For the building of the plant for freeze-dried foods a new landed estate will be formed with an area of 12 378 m², part of the existing railway plant in the town. The railway plant is built up with full infrastructure: rail tracks to individual workshops; switchyard with a capacity of 400 kW, which will be used by the plant for freeze-dried foods too; the property passes along a main water pipeline plumbing, which will also be used for the needs of the plant. For use of the necessary facilities, preliminary agreements with “Water Supply and Sewerage” and “Energy supply” –municipality of Levski will be concluded.

For the plant operation will be needed 4000 kW electricity power. It is envisaged construction of own water source and abatement equipment, necessary for the completion of production cycle of the plant. The plant is adjacent to two sides by asphalt roads, which will favor the supply of raw materials and transportation of finished products. The existing infrastructure of the plant and its further development is sufficient for its construction and operation.

Plant design

To meet the production needs of 10 tons a day freeze-dried foods, it is required the construction of a new main production building with floor space 5484 m² and total floor area 5700 m². In the main building technologically related workshops will be located. Along the building is established a ramp.

Raw materials entering the plant will be stored in the warehouse with five different functions, maintaining a certain temperature and air ventilation. It is envisaged that the warehouses to capacity, satisfying the needs of production for seven days ahead. Before entering the lyophilizer, the different food will be processed and stored in rooms equipped with freezers.

- The main production will be carried out using the eight lyophilizers with throughput of 1.2 tonnes a day, two pilot lyophilizers with output 0.5 t / day and one dryer.
- It is envisaged freeze-drying of cooked foods - for this purpose there is a kitchen equipped with autoclaves.
- There is also a separate workshop for packing of finished products and three warehouses for storage of finished goods before their dispatch.
- To the new building for main proceeding, an administrative part of the two-storey laboratory will be build.
- The property will be further developed with new auxiliary buildings such as wastewater treatment plant, operating cycles -оборотни цикли, portal, room for the guards and others.
- The production building will be with flat roof on which to deploy collectors to supplement the need for hot water and electricity.
- The construction of vertical layout will include parking, in-plant ways to power the production of raw materials, dispatch of finished products and landscaping.

The entire property will be fenced by providing two gates - one for freight and one for passenger cars

Freeze-dried foods Plant, Levski, Bulgaria

BoQ types of construction works

Key Indicators:

1.	Built up area	5484 m ²
2.	Actual area	5700 m ²
3.	Plot Area	12 378 m ²
4.	Landscaping area	6894 m ²

№	Type of construction work	Unit	Quantity	Single price in EUR	Total price in EUR
1.	Main building	m ²	5700,00	520,00	2964000,00
2.	Additional construction				
2.1.	Treatment facility for drinking water	No.	1,00	250000,00	250000,00
2.2.	Treatment facility for wastewater	No	1,00	500000,00	500000,00
2.3.	Closed cycle	No	1,00	350000,00	350000,00
3.	Auxiliary buildings (for security, Portal 2 for bottles under pressure for air conditioning, installation of biomass, garage, etc.)	m ²	300,00	480,00	144000,00
4.	Power substation	No	1,00	250000,00	250000,00
5.	Watercourse	No.	1,00	10000,00	10000,00
6.	Fences	m	630,00	80,00	50400,00
7.	Landscaping	m ²	6894,00	78,00	537732,00
8.	Auto trucks	No	5,00	30000,00	150000,00
Total construction:					5206132,00

Socio-economic effect / Macroeconomic and political environment

Levski municipality is the third largest in the region of Pleven. In Levski are developed number of sub-sectors of the Agro-Food Industry-meat, milling, etc. The locality is a municipal center with overt specialization in agriculture, which determines its business specialization. Levski is a major transportation hub from the main road Sofia – Varna. Here the trains link the town with Troyan, Lovech and Svishtov. Two third-class, but very lively republican roads pass through (total as directions) - Svishtov - Levski - Lovech – Troyan, and Nikopol - Levski - Pavlikem - Veliko Tarnovo. 8 km north of Levski passes the highway Sofia - (Rousse) - Varna. The route of the future highway "Hemus" will pass 10 kilometers south of Levski.

Traditional for municipality of Levski are food processing, machine building and light industry. Since about 2000 there is a revival in the economy. The investments, local business and foreign companies operating in the municipality are increasing

Leading industry is Agro-Food Industry. It produces about 25% of the Cash flow statement in the region and over 18% of the production for the industry in the country. According to this indicator, the region is leading in Bulgaria.

The economic situation in the North region in 2015 is determined by the impact of the global financial and economic crisis leading to adverse changes in the business climate and the development of individual businesses. Shrinking markets, reducing the volume of production and consumption of services, closure of businesses drastically reduce investment for new or expanding existing production forms the negative trends on the labor market, resulting in an increase in registered unemployment in separate municipalities and administrative districts in the area.

Most professions in demand by employers in the region during the period were: tailors, shop assistants, bartenders, waiters, accountants, doctors, nurses, paramedics, workers in the bakery, cooks, confectioners, logging workers, agricultural workers, electricians, welders, general workers and others.

According to data of the Employment Agency during the year most vacancies in the North region were in manufacturing (apparel, textiles, food, drinks, etc.) - 6139 (32.1 %); trade and repair of motor vehicles and household appliances -2 763 or 14.5% (mainly for sales assistants, warehouse workers, advertising agents, sales representatives, electricians, technicians, workers in vehicle service stations, etc.). in agriculture -1 903 or 10.0 percent, in education - 1291 or 6.8%, in construction - 1264 vacancies or 6.6 percent.

In the agricultural sector are revealed 1903 (10.0 %) jobs, the most numerous are the places for farm workers, tractor drivers, combine operators, gardeners and others.

Available workforce

The breakdown by economic sector of registered unemployed is as follows: the largest share of the activities is sector "Services" - 50.2 % (29, 043 people), with 45.0 % of them (13, 063) in the field of public administration and defense, 24.5 % (7126) in trade and repair of motor vehicles and household appliances and 6.0 % (1740) in hotels and restaurants.

Next in number are those exempt from sector "Industry" - 18.8 % (10,867 people). 73.0 % (7930) of them come from the manufacturing industry and 23.0 % (2494) – from the construction industry.

The proportion of registered exempt from the agricultural sector continues to be the lowest - 4.7 percent (2743 people), but in comparison with 2014, it increased by 1.1 %.

Most numerous of registered unemployed in North district in 2015 remains the group of unemployed without qualification and specialty - 53.5 % (33 049), followed by those with working profession - 30.2 % (18 675) and specialists -16.2 % (10 032).

The area of the future plant for freeze-dried foods is located in the Southern part of the town of Levski, near the railway line and the railway station. The West border is a street and Vocational School, the East – an enterprise for pipes production, the South - an asphalt road and the north – a train plant.

Building of a plant for freeze-dried food in the town will have a significant positive impact on the economy and prosperity of Levski and the region. It will provide conditions for accelerated economic growth, high levels of employment for workers with different professional experience, training and education. The plant will be a support for the region's competitiveness by investing in human resources and skills; it will achieve a smart, sustainable, inclusive and regionally balanced economic growth.

For the project implementation our team have envisaged the use of a completely new technology and entry into service of-the-art equipment for the production of freeze-dried foods. The plant will not only comply with environmental and hygiene standards of the European Union, but even will be substantially below the required norms. All planned activities under the project are in line with the principles of environmental protection in all its components as a condition for achieving sustainable development, and prioritize the environmental performance in all areas as a major criterion for their eligibility. At the same time, we will reduce the energy intensity, labour intensity and the costs of materials. The plant will become one of the significant symbolic sites in this area, not only in Bulgaria, but also in the Balkans.

Financial Analysis:

Brief summary of the financial analysis

Initial investment

In the table below one can find the assumed costs of the Investment in the LYO Project. Implementation is projected to start in the second half of Year 2017 and to end by the end of 2018. The plan is to have operational facility in the beginning of year 2019.

	2017	2018
1. Building works	-1,200.000	-3,856.132
	0.000	0.000
	-1,200.000	-3,856.132
	0.000	0.000
2. Purchase of machines and equipment	0.000	-9,032.760
	0.000	-8,353.90
3. Purchase of land	-400.000	0.00
4. purchase of specialized transportation vehicles	0.000	-329.70
Total longterm assets – A	-1,600.000	-13,218.592
<i>Expenses for designer's services</i>	-518.651	0.000
<i>Expenses for building and author's supervision</i>	-110.500	-111.779
<i>Expenses for consulting services</i>	-210.000	-308.651
<i>Expenses for other external services (legal, financial, expert and other)</i>	-40.300	-107.886
<i>Expenses related to the complete of the documentation of the Project</i>	-37.046	0.000
<i>Expenses, related to application for financing</i>	-37.046	0.000
<i>Expenses, related to the education of the personnel</i>	0.000	-74.093
<i>Expenses, related to information and publicity (info materials, Web etc)</i>	-30.100	-43.993
<i>Expenses, related to the obtain of building permission (taxes, expert advices, permissions etc.)</i>	-148.186	0.000
	0.000	0.000
Total starting expenses - B	-1,131.830	-646.401
	0.000	0.000

	0.000	0.000
Expenses for overhaul repairs and substitution of amortized equipment C	0.000	0.000
Total investment - A+B+C	-2,731.830	-13,864.993

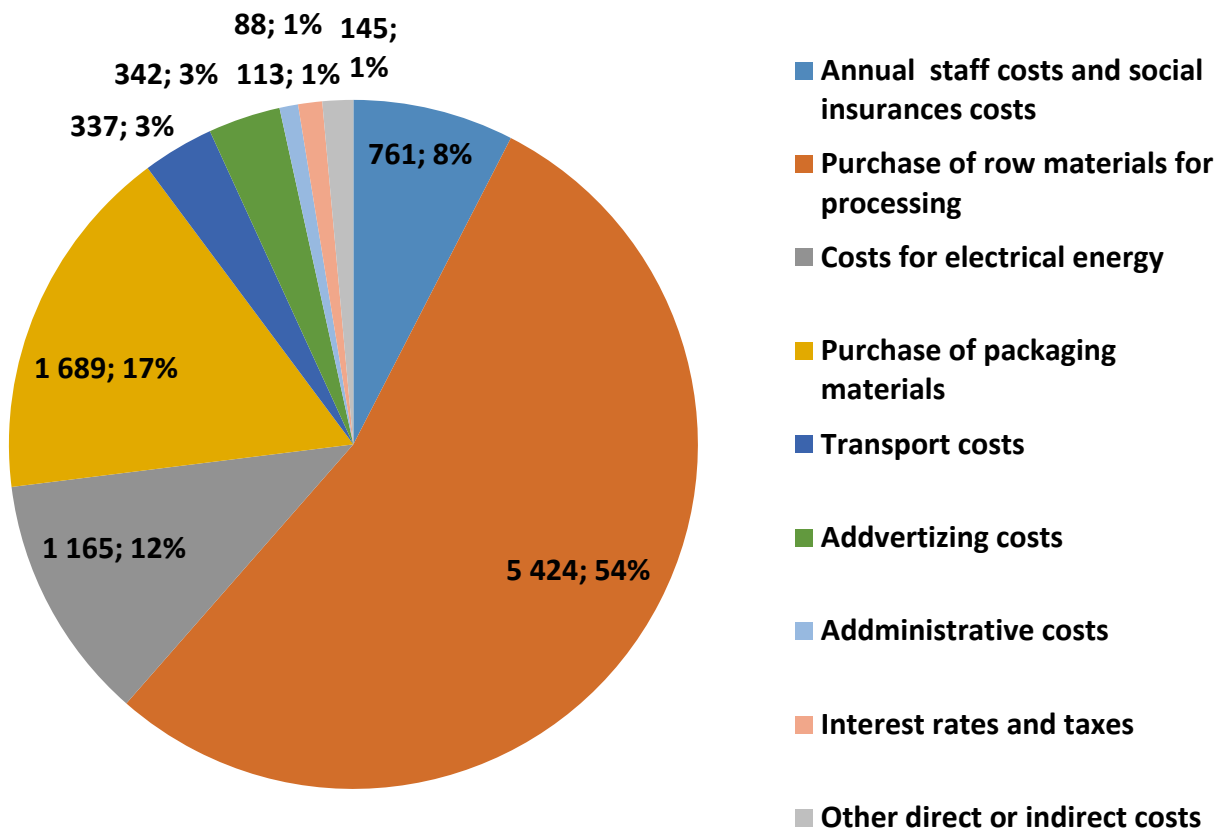
1. ANNUAL DEPRECIATION RATES:

- Buildings – 4%,
- Specialized transport vehicles – 10%
- Machines and equipment – 20%

2. OPERATIONAL EXPENSES:

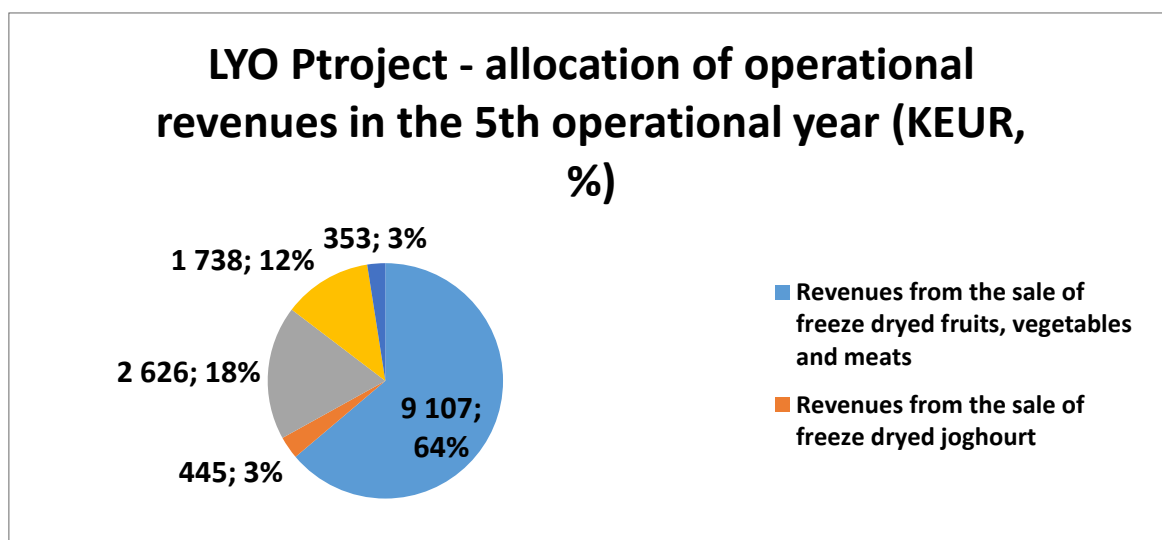
The projected allocation of the operational costs within the 5th operational year of the Project. Assumptions correspond to the recent operational Practices of similar facilities.

LYO Project - allocation of operational costs in the 5th operational year (KEUR, %)



3. OPERATIONAL REVENUES:

Allocation of operational revenues in the 5th operational year are presented below. Main inflow streams projected are from the production and sale of FD ingredients (fruits, vegetables and meats), production and sale of FD Yogurt, production and sale of ready to eat FD meals, production and sale of traditionally dehydrated products and production of FD products, with raw materials supplied from the client. An annual starting operational plan for the FD processing is elaborated and presented in the next tables. It can and will change within the next operational years, based on the changes of the market conditions and other factors. In any case, an appropriate marketing and production policy and solutions will be taken in order to procure the projected financial grow.



4. FINANCING

Private capital will participate in the investment process with about 52% of the initial project's investments costs. Expectance is to receive a collaborative and strong support from European funding mechanisms in order to receive a reasonable and flexible bank financing (preferably EIB Loan provision). Below one can see the projected financing of the initial investment of the LYO Project.

Private capital financing	1,365.91	6,932.50
Bank Loan	1,365.91	6,932.50
Private capital financing of initial financial expenses	103.04	224.06
Other sources:		
Direct revenues from the Project	0.00	0.00
Total sources for financing	2,834.87	14,089.05

5. FINANCIAL STABILITY OF THE PROJECT:

Expected accumulated cash flow is:

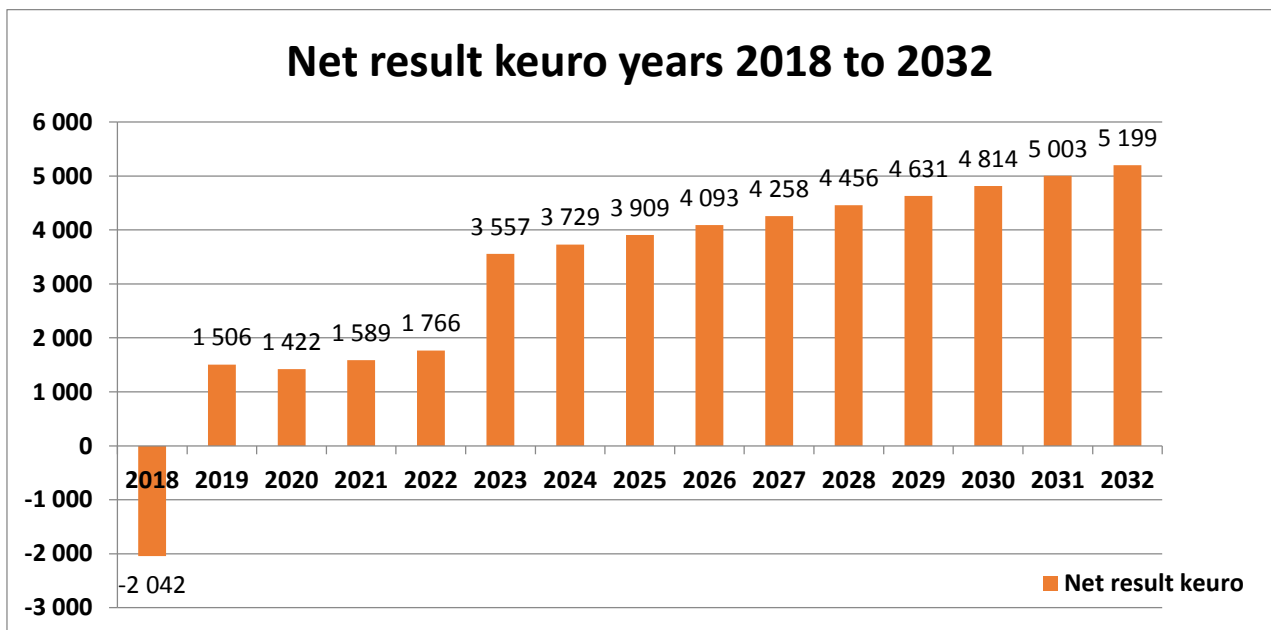
End of 5th operational year - Keur 13 289

End of 10th operational year - Keur 33 860

End of 15th operational year –Keur 63 173

6. PROFIT AND LOSS ACCOUNT

Expected projected net result for each operational year is presented below:



7. RETURN OF THE INVESTMENT

- Years projected: 2017 to 2033 (17 years period) Discount rate: 3%
- Financial internal rate of return of the total investment projected: 18.82%
- Financial Net Present Value of the Investment projected: Keur 29 873.
- The Investment is projected to be completely returned within the 11th operational year

8. RETURN OF THE PRIVATE CAPITAL

- Years projected: 2017 to 2033 (17 years period)
- Discount rate: 3%
- Financial internal rate of return of the total Private Capital Investment projected: 36.47%
- Financial Net Present Value of the Invested Private Capital projected: Keur 38 782.
- The Private Capital Investment is projected to be completely returned within the 6th operational year

9. ECONOMICAL RESULT FROM THE INVESTMENT

- Years projected: 2017 to 2033 (17 years period)
- Discount rate: 3%
- Economical internal rate of return of the total investment projected: 36.41%
- Economical Net Present Value of the Investment projected: Keur 71 112.
- Ratio benefits/costs – 1.71

<i>Expenses related to the complete of the documentation of the Project</i>	-37,046	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
<i>Expenses, related to application for financemnt</i>	-37,046	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
<i>Expenses, related to the education of the personnel</i>	0,000	-74,093	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
<i>Expenses, related to information and publicity (infomaterials, Web etc)</i>	-30,100	-43,993	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
<i>Expenses, related to the obtain of building permission (taxes, expertises, permissions etc.)</i>	-148,186	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Total starting expenses - B	-1131,830	-646,401	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Expenses for overhaul repairs and substitution of amortized equipmt C	0,000	0,000	0,000	0,000	0,000	0,000	90,328	-90,328	-90,328	-90,328	-90,328	-90,328	-90,328	-90,328	-90,328	-90,328	-90,328
Total investment - A+B+C	-2731,830	-13864,993	0,000	0,000	0,000	0,000	90,328	140,889	140,889	140,889	140,889	140,889	140,889	141,395	141,900	142,406	142,911

LYO PROJECT																		
Depreciation of long term assets																		
	YEARS																	Residual
Sort of longterm asset	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	value
Buildings																		
<i>Cost of the auired assets in keuro</i>	1200,000	5056,132	5056,132	5056,132	5056,132	5056,132	5056,132	5106,693	5157,255	5207,816	5258,377	5308,939	5359,500	5410,567	5462,139	5514,218	5566,801	
<i>Annual depreciation rate in %</i>	4%																	
<i>Depreciation in keuro</i>	8,000	202,245	202,245	202,245	202,245	202,245	202,245	204,268	206,290	208,313	210,335	212,358	214,380	216,423	218,486	220,569	222,672	
Residual value in keuro	192,000	864,132	651,641	449,396	247,151	044,906	842,660	638,393	432,102	223,790	013,455	801,097	586,717	370,294	151,809	931,240	708,568	
Specialized transportation vehicles																		
<i>Cost of the auired assets in keuro</i>	0,000	329,700	329,700	329,700	329,700	329,700	329,700	329,700	329,700	329,700	329,700	329,700	329,700	329,700	329,700	329,700	329,700	329,700
<i>Annual depreciation rate in %</i>	10%																	
<i>Depreciation in keuro</i>	0,000	32,970	32,970	32,970	32,970	32,970	32,970	32,970	32,970	32,970	32,970	32,970	32,970	32,970	32,970	32,970	32,970	0,000
Residual value in keuro	0,000	296,730	263,760	230,790	197,820	164,850	131,880	98,910	65,940	32,970	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Machines and equipment																		
<i>Cost of the auired assets in keuro</i>	0	9032,76	9032,76	9032,76	9032,76	9032,76	9123,0876	9213,4152	9303,7428	9394,0704	9484,398	9574,7256	9665,0532	9755,3808	9845,7084	9936,036	1002,636	
<i>Annual depreciation rate in %</i>	20%																	
<i>Depreciation in keuro</i>		806,552	806,552	806,552	806,552	806,552	18,066	32,518	44,080	53,329	60,729	66,649	71,385	75,173	78,204	80,629	82,569	
Residual value in keuro	0	226,208	419,656	613,104	806,552	0,000	72,262	130,072	176,319	213,318	242,916	266,595	285,538	300,693	312,816	322,515	330,274	
TOTAL RESIDUAL VALUE KEURO	192,000	090,340	071,297	062,500	053,703	044,906	914,922	768,464	608,422	437,107	256,371	067,692	872,255	670,987	464,625	253,755	038,842	1733,602

LYO PROJECT																	
Expected annual operational COSTS in keuro																	
	YEARS																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Annual staff costs and social insurances costs			702,97	717,03	731,37	746,00	760,92	776,14	791,66	807,49	823,64	840,11	856,92	874,05	891,54	909,37	927,55
Purchase of raw materials for processing			4 818,75	4 963,31	5 112,21	5 265,58	5 423,55	5 586,25	5 753,84	5 926,45	6 104,25	6 287,38	6 476,00	6 670,28	6 870,39	7 076,50	7 288,79
Costs for electrical energy			1 076,11	1 097,63	1 119,58	1 141,98	1 164,82	1 188,11	1 211,87	1 236,11	1 260,83	1 286,05	1 311,77	1 338,01	1 364,77	1 392,06	1 419,90
Purchase of packaging materials			1 560,52	1 591,73	1 623,56	1 656,03	1 689,15	1 722,94	1 757,40	1 792,54	1 828,39	1 864,96	1 902,26	1 940,31	1 979,11	2 018,69	2 059,07
Transport costs			324,07	327,31	330,58	333,89	337,23	340,60	344,00	347,44	350,92	354,43	357,97	361,55	365,17	368,82	372,51
Addvertising costs			303,53	312,64	322,01	331,67	341,63	351,87	362,43	373,30	384,50	396,04	407,92	420,16	432,76	445,74	459,12
Administrative costs			84,37	85,22	86,07	86,93	87,80	88,68	89,57	90,46	91,37	92,28	93,20	94,13	95,08	96,03	96,99
Interest rates and taxes	103,04	224,06	224,06	220,46	188,15	150,81	113,47	76,13	38,78	5,04	0,00	0,00	0,00	0,00	0,00	0,00	
Other direct or indirect costs			139,55	140,94	142,35	143,78	145,21	146,67	148,13	149,61	151,11	152,62	154,15	155,69	157,25	158,82	160,41
Total operational costs in keuro:	103,04	224,06	9 233,92	9 456,26	9 655,90	9 856,66	10 063,77	10 277,38	10 497,68	10 728,46	10 995,01	11 273,87	11 560,18	11 854,17	12 156,05	12 466,03	12 784,33

LYO PROJECT																	
Operational revenues in keuro																	
	YEARS																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Revenues from the sale of freeze dried fruits, vegetables and meats			8 252,0 7	8 334,59	8 584,63	8 842,17	9 107,44	9 380,66	9 662,08	9 951,94	10 250,50	10 558,01	10 874,75	11 201,00	11 537,03	11 883,14	12 239,63
Revenues from the sale of freeze dried yoghurt			403,2 0	407,23	419,45	432,03	444,99	458,34	472,09	486,26	500,84	515,87	531,35	547,29	563,70	580,62	598,03
Revenues from the sale of freeze dried meals			2 379,3 8	2 403,17	2 475,26	2 549,52	2 626,01	2 704,79	2 785,93	2 869,51	2 955,59	3 044,26	3 135,59	3 229,66	3 326,55	3 426,34	3 529,13
revenues from freeze drying of products, supplied by the client			1 575,0 0	1 590,75	1 638,47	1 687,63	1 738,26	1 790,40	1 844,12	1 899,44	1 956,42	2 015,11	2 075,57	2 137,83	2 201,97	2 268,03	2 336,07
Revenues from the sale of dehydrated fruits, vegetables and species			339,1 3	342,52	345,95	349,41	352,90	356,43	359,99	363,59	367,23	370,90	374,61	378,36	382,14	385,96	389,82
Initial financing of financial expenses	103,0 4	224,06															
TOTAL REVENUES IN KEURO:	0,00	0,00	12 609,6 5	12 735,74	13 117,82	13 511,35	13 916,69	14 334,19	14 764,22	15 207,14	15 663,36	16 133,26	16 617,26	17 115,77	17 629,25	18 158,13	18 702,87

LYO PROJECT																	
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Operational costs and revenues in keur																	
	YEARS																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Annual staff costs and social insurances costs	0	0	702,96 96	717,0289 92	731,369 5718	745,99 69633	760,91 69025	776,13 52406	791,65 79454	807,49 11043	823,64 09264	840,11 37449	856,91 60198	874,05 43402	891,53 5427	909,36 61356	927,55 34583
Purchase of raw materials for processing	0,00	0,00	4 818,75	4 963,31	5 112,21	265,58	423,55	586,25	753,84	926,45	104,25	287,38	476,00	670,28	870,39	076,50	288,79
Costs for electrical energy	0,00	0,00	1 076,11	1 097,63	1 119,58	141,98	164,82	188,11	211,87	236,11	260,83	286,05	311,77	338,01	364,77	392,06	419,90
Purchase of packaging materials	0,00	0,00	1 560,52	1 591,73	1 623,56	656,03	689,15	722,94	757,40	792,54	828,39	864,96	902,26	940,31	979,11	018,69	059,07
Transport costs	0,00	0,00	324,07	327,31	330,58	333,89	337,23	340,60	344,00	347,44	350,92	354,43	357,97	361,55	365,17	368,82	372,51
Addvertizing costs	0,00	0,00	303,53	312,64	322,01	331,67	341,63	351,87	362,43	373,30	384,50	396,04	407,92	420,16	432,76	445,74	459,12
Addministrative costs	0,00	0,00	84,37	85,22	86,07	86,93	87,80	88,68	89,57	90,46	91,37	92,28	93,20	94,13	95,08	96,03	96,99
Interest rates and taxes	103,0 4	224,0 6	224,06	220,46	188,15	150,81	113,47	76,13	38,78	5,04	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Other direct or indirect costs	0,00	0,00	139,55	140,94	142,35	143,78	145,21	146,67	148,13	149,61	151,11	152,62	154,15	155,69	157,25	158,82	160,41
Total operational costs:	103,0 4	224,0 6	9 233,92	9 456,26	9 655,90	856,66	063,77	277,38	497,68	728,46	995,01	273,87	560,18	854,17	12 156,05	12 466,03	12 784,33
Revenues from the sale of freeze dried fruits, vegetables and meats	0	0	8252,0 725	8334,593 225	8584,63 1022	8842,1 69952	9107,4 35051	9380,6 58103	9662,0 77846	9951,9 40181	10250, 49839	10558, 01334	10874, 75374	11200, 99635	11537, 02624	11883, 13703	12239, 63114
Revenues from the sale of freeze dried joghourt	0	0	403,2	407,232	419,448	432,03 24288	444,99 34017	458,34 32037	472,09 34998	486,25 63048	500,84 3994	515,86 93138	531,34 53932	547,28 5755	563,70 43276	580,61 54575	598,03 39212
Revenues from the sale of freeze dried meals	0	0	2379,3 75	2403,168 75	2475,26 3813	2549,5 21727	2626,0 07379	2704,7 876	2785,9 31228	2869,5 09165	2955,5 9444	3044,2 62273	3135,5 90141	3229,6 57845	3326,5 47581	3426,3 44008	3529,1 34328
revenues from freeze drying of products, supplied by the client	0	0	1575	1590,75	1638,47 25	1687,6 26675	1738,2 55475	1790,4 0314	1844,1 15234	1899,4 38691	1956,4 21851	2015,1 14507	2075,5 67942	2137,8 3498	2201,9 7003	2268,0 29131	2336,0 70005
Revenues from the sale of dehydrated fruits, vegetables and species	0	0	339,13	342,5213	345,946 513	349,40 59781	352,90 00379	356,42 90383	359,99 33287	363,59 3262	367,22 91946	370,90 14865	374,61 05014	378,35 66064	382,14 01725	385,96 15742	389,82 11899
Initial financing of financial expenses	103,0 4	224,0 6															
Total operational revenues:	103,0 4	224,0 6	12 948,78	13 078,27	13 463,76	13 860,76	14 269,59	14 690,62	15 124,21	15 570,74	16 030,59	16 504,16	16 991,87	17 494,13	18 011,39	18 544,09	19 092,69
Net operational result	0,00	0,00	3 714,86	3 622,01	3 807,86	4 004,09	4 205,83	4 413,24	4 626,53	4 842,27	5 035,58	5 230,29	5 431,68	5 639,96	5 855,34	6 078,06	6 308,36

Profit and loss account in keuro																	
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Revenues	103,04	224,06	948,78	078,27	463,76	860,76	269,59	690,62	124,21	570,74	030,59	504,16	991,87	494,13	011,39	544,09	092,69
Costs	0,00	0,00	009,86	235,80	467,75	705,85	950,30	201,25	458,90	723,42	995,01	273,87	560,18	854,17	156,05	466,03	784,33
Commercial result	103,04	224,06	938,91	842,46	996,02	154,90	319,30	489,37	665,31	847,32	035,58	230,29	431,68	5 639,96	855,34	6 078,06	6 308,36
Depreciation	8,00	041,77	041,77	041,77	041,77	041,77	253,28	269,76	283,34	294,61	304,03	279,01	285,76	291,60	296,69	301,20	305,24
Operational result	95,04	817,71	897,15	800,69	954,25	113,14	066,01	219,61	381,97	552,70	731,54	951,29	145,92	5 348,36	558,65	5 776,86	6 003,12
Interests and taxes	103,04	224,06	224,06	220,46	188,15	150,81	113,47	76,13	38,78	5,04	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Net result before corporate tax	-8,00	041,77	673,09	580,24	766,10	962,33	952,55	143,49	343,19	547,66	731,54	951,29	145,92	5 348,36	558,65	5 776,86	6 003,12
Corporate tax	0,00	0,00	167,31	158,02	176,61	196,23	395,25	414,35	434,32	454,77	473,15	495,13	514,59	534,84	555,87	577,69	600,31
NET FINAL RESULT	-8,00	041,77	505,78	422,21	589,49	766,09	557,29	729,14	908,87	092,90	258,39	456,16	631,33	4 813,53	002,79	5 199,18	5 402,81

LYO PROJECT																	
Evaluation of the financial Net Present Value and financial Internal Rate of Return of the investment keuro																	
	YEARS																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<i>Total operational revenues</i>	103,04	224,06	948,78	078,27	463,76	860,76	269,59	690,62	124,21	570,74	030,59	504,16	991,87	494,13	011,39	544,09	092,69
Total cash revenues	103,04	224,06	948,78	078,27	463,76	860,76	269,59	690,62	124,21	570,74	030,59	504,16	991,87	494,13	011,39	544,09	092,69
<i>Total operational costs</i>	103,04	224,06	233,92	456,26	655,90	856,66	063,77	277,38	497,68	728,46	995,01	273,87	560,18	854,17	156,05	466,03	784,33
<i>Total investment costs</i>	731,83	864,99	0,00	0,00	0,00	0,00	90,33	140,89	140,89	140,89	140,89	140,89	140,89	141,39	141,90	142,41	142,91
<i>Loan repayments</i>	0,00	0,00	0,00	691,53	383,07	383,07	383,07	383,07	383,07	691,53	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Total cash costs	834,87	089,05	233,92	147,79	038,97	239,73	537,16	801,34	021,64	560,89	135,90	414,76	701,07	995,57	297,95	608,43	927,24
Net cash flow	-2 731,83	-13 864,99	3 714,86	2 930,47	2 424,79	2 621,02	2 732,43	2 889,29	3 102,57	4 009,85	4 894,69	5 089,41	5 290,79	5 498,56	5 713,44	5 935,66	6 165,45
Discount rate	3,00%																
Financial IRR of the investment							18,82%										
Financial NPV of the investment							29 872,73										

LYO PROJECT																
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Evaluation of the Net Present Economical Value of the investment costs

	Conve	YEARS																
	rs	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
	ratio																	
<i>Evaluation of the additional revenues, due to better nutrition quality of the population, better health status and the diminution of the expenses for health services and medicine</i>			0,00	98,40	108,00	192,00	224,00	272,00	360,00	396,00	450,00	468,00	486,00	486,00	540,00	540,00	560,00	560,00
<i>Evaluation of the additional revenues for the city of Levski, du to augmented economical base and at least 64 new opened working places</i>			0,00	3,35	3,46	3,58	3,69	3,81	3,93	4,06	4,19	4,32	4,45	4,59	4,73	4,88	5,02	5,18
<i>Evaluation of the additional revenues for the city of Levski from the augmented economical activity (Augmented number of visitors to hotels, reastaurants, institutions etc.)</i>			0,00	105,00	135,00	165,24	168,54	171,92	175,35	248,42	253,39	258,45	263,62	268,90	274,27	279,76	319,60	349,27
Total external benefits		0,00	0,00	206,75	246,46	360,82	396,24	447,73	539,29	648,48	707,57	730,77	754,08	759,49	819,01	824,64	884,62	914,45
<i>Revenues from the sale of freeze dried fruits, vegetables and meats</i>	1	0,00	0,00	252,07	334,59	584,63	842,17	107,44	380,66	662,08	951,94	250,50	558,01	874,75	201,00	537,03	883,14	239,63
<i>Revenues from the sale of freeze dried joghourt</i>	1	0,00	0,00	403,20	407,23	419,45	432,03	444,99	458,34	472,09	486,26	500,84	515,87	531,35	547,29	563,70	580,62	598,03
<i>Revenues from the sale of freeze dried meals</i>		0,00	0,00	379,38	403,17	475,26	549,52	626,01	704,79	785,93	869,51	955,59	044,26	135,59	229,66	326,55	426,34	529,13
<i>revenues from freeze drying of products, supplied by the client</i>	1	0,00	0,00	575,00	590,75	638,47	687,63	738,26	790,40	844,12	899,44	956,42	015,11	075,57	137,83	201,97	268,03	336,07
<i>Revenues from the sale of dehydrated fruits, vegetables and species</i>		0,00	0,00	339,13	342,52	345,95	349,41	352,90	356,43	359,99	363,59	367,23	370,90	374,61	378,36	382,14	385,96	389,82
Total operational revenues		0,00	0,00	948,78	078,27	463,76	860,76	269,59	690,62	124,21	570,74	030,59	504,16	991,87	494,13	011,39	544,09	092,69
Total revenues		0,00	0,00	155,53	13	13	14	14	15	15	16	16	17	17	18	18	19	20

<i>Evaluation of the additional costs for ecology and infrastructure of the city of Levski</i>																		
			0,00	12,61	12,74	13,12	13,51	13,92	14,33	14,76	15,21	15,66	16,13	16,62	17,12	17,63	18,16	18,70
			0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Total external expenses		0,00	0,00	12,61	12,74	13,12	13,51	13,92	14,33	14,76	15,21	15,66	16,13	16,62	17,12	17,63	18,16	18,70
<i>Annual staff costs and social insurances costs</i>	0,6	0,00	0,00	702,97	717,03	731,37	746,00	760,92	776,14	791,66	807,49	823,64	840,11	856,92	874,05	891,54	909,37	927,55
<i>Purchase of raw materials for processing</i>		0,00	0,00	818,75	963,31	112,21	265,58	423,55	586,25	753,84	926,45	104,25	287,38	476,00	670,28	870,39	076,50	288,79
<i>Costs for electrical energy</i>	1	0,00	0,00	076,11	097,63	119,58	141,98	164,82	188,11	211,87	236,11	260,83	286,05	311,77	338,01	364,77	392,06	419,90
<i>Other direct or indirect costs</i>	1	0,00	0,00	139,55	591,73	142,35	143,78	145,21	146,67	148,13	149,61	151,11	152,62	154,15	155,69	157,25	158,82	160,41
					327,31													
					312,64													
					85,22													
Total operational costs		0,00	0,00	737,38	094,86	105,52	297,33	494,49	697,16	905,50	119,67	339,83	566,16	798,83	038,03	283,93	536,74	796,65
Total investment costs		731,83	864,99	0,00	0,00	0,00	0,00	90,33	140,89	140,89	140,89	140,89	140,89	140,89	141,39	141,90	142,41	142,91
Total costs:		731,83	864,99	749,99	107,60	118,64	310,84	598,74	852,39	061,16	275,77	496,39	723,18	956,34	196,54	443,46	697,31	958,27
Net cash flow		-2 731,83	-13 864,99	6 405,54	4 217,13	6 705,94	6 946,16	7 118,58	7 377,52	7 711,53	8 002,55	8 264,98	8 535,06	8 795,02	9 116,60	9 392,56	9 731,40	10 048,87
Discount rate		3,00%																
Economical IRR of the investment							36,41%											
Economical NPV of the investment							71 112,21											
Ratios benefits/costs							1,71											

LYO PROJECT

Economical additional benefits and losses, due to the project																	
	YEARS																
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
<i>Projected number of consumers of freeze-dried bio foods</i>			8 200	9 000	12 000	14 000	17 000	20 000	22 000	25 000	26 000	27 000	27 000	27 000	27 000	28 000	28 000
<i>Annually saved expenses in euro from the reduced use of medical services and drugs</i>			12,00	12,00	16,00	16,00	16,00	18,00	18,00	18,00	18,00	18,00	18,00	20,00	20,00	20,00	20,00
<i>Realization of additional revenue from improved nutrition's policy of the population, respectively improved health status and reduced use of medical services and medicines in Keuro</i>	0,00	0,00	98,40	108,00	192,00	224,00	272,00	360,00	396,00	450,00	468,00	486,00	486,00	540,00	540,00	560,00	560,00
<i>Average working salary region of Pleven in euro</i>			370,00	373,70	377,44	381,21	385,02	388,87	392,76	396,69	400,66	404,66	408,71	412,80	416,93	421,09	425,31
<i>Total average number of employees at the factory</i>			64,00	64,00	64,00	64,00	64,00	64,00	64,00	64,00	64,00	64,00	64,00	64,00	64,00	64,00	64,00
<i>Average salary monthly salary in the freeze dry factory</i>			649,17	662,15	675,39	688,90	702,68	716,73	731,07	745,69	760,60	775,81	791,33	807,16	823,30	839,77	856,56
<i>Additional annual revenue due to better wages and provision of greater employment rate in KEur</i>			3,35	3,46	3,58	3,69	3,81	3,93	4,06	4,19	4,32	4,45	4,59	4,73	4,88	5,02	5,18
<i>Expected growth in business and tourist visits in the city, due to increased economic activity after the implementation of the project - number of additional visits</i>			7 000	9 000	9 180	9 364	9 551	9 742	9 937	10 135	10 338	10 545	10 756	10 971	11 190	11 414	11 642
<i>Expected average revenue from additional business and tourist visitors to the city in euro</i>			15,00	15,00	18,00	18,00	18,00	18,00	25,00	25,00	25,00	25,00	25,00	25,00	25,00	28,00	30,00
<i>Additional revenues from the growth of business and tourist visitors to the city in KEuro</i>			105,00	135,00	165,24	168,54	171,92	175,35	248,42	253,39	258,45	263,62	268,90	274,27	279,76	319,60	349,27
TOTAL PROJECTED ADDITIONAL REVENUES IN KEUROS	0,00	0,00	206,75	246,46	360,82	396,24	447,73	539,29	648,48	707,57	730,77	754,08	759,49	819,01	824,64	884,62	914,45
<i>Additional costs for ecological and infrastructure support of the city - 0.1% of the production volume</i>			12,61	12,74	13,12	13,51	13,92	14,33	14,76	15,21	15,66	16,13	16,62	17,12	17,63	18,16	18,70
TOTAL ADDITIONAL COSTS KEURO		0,00	12,61	12,74	13,12	13,51	13,92	14,33	14,76	15,21	15,66	16,13	16,62	17,12	17,63	18,16	18,70

LYO PROJECT						
Investments						
No.	Kind of investment	Unit	qu/ty	Price eur	Value eur	Technical characteristics
	Direct investment costs					
1	Purchase of land	m2	20 000,00	20	400 000,00	
2	Construction of a factory building	m2	5 700,00	520,00	2 964 000,00	As per detailed Quantity-value account (QVA)
3	Improvement of the surrounding area and small-scale infrastructure	m2	6 894,00	78,00	537 732,00	As per detailed QVA
4	Return cycle	pcs	1,00	350 000,00	350 000,00	As per detailed QVA
5	Construction of a complete power station, connecting to the grid and UPS system	pcs	1,00	250 000,00	250 000,00	6300 Kw and As per detailed QVA
6	Wastewater treatment plantincl. Ultrasonic decontamination, electroless, 5m3 / h	pcs	1,00	500 000,00	500 000,00	As per detailed QVA
7	Wastewater treatment plant for drinking water incl. Ultrasonic activation 5m3 / h		1,00	250 000,00	250 000,00	As per detailed QVA
8	Construction of fence	ml	630,00	80,00	50 400,00	As per detailed QVA
9	Construction of auxiliary buildings	m2	300,00	480,00	144 000,00	As per detailed QVA
10	Water supply, own well - drilling and joining the WWTP plant	pcs	1,00	10 000,00	10 000,00	As per detailed QVA
11	Belt Washing machine for delicate fruits and vegetables - strawberries, raspberries, blueberries and others.	pcs	1,00	5 000,00	5 000,00	Capacity of 500 kg / h, active power 1.5 kW
12	Brush washing machine for coarse fruits and vegetables - potatoes, peppers, cucumbers and others.	pcs	1,00	3 000,00	3 000,00	Capacity of 800 kg / h, active power 1.1 kW
13	Line for crushing fruits and vegetables	pcs	1,00	7 000,00	7 000,00	600 kg / h active power 0.8 kW

14	Machine for blanching vegetables	pcs	1,00	15 000,00	15 000,00	Capacity of 1 - 1.5 tonnes per hour active power 15 KV
15	Extractor - for obtaining herbal extracts, and other (from the leaves, stems, roots, etc.).	pcs	1,00	75 000,00	75 000,00	processing capacity of a 200 kg / hour
16	Machine for slice cutting fruit and vegetables	pcs	1,00	5 900,00	5 900,00	capacity to 300-500 kg / h with a slice thickness of 1 to 10 mm, active power 1.5 kW
17	Pepper roaster - line baking and peeling peppers, eggplants and others	pcs	1,00	18 000,00	18 000,00	capacity up to 170 kg / h, active power 25 kW
18	Fermenters and Pasteurizers of milk and other liquid (fruit nectars, creams, etc.)	pcs	2,00	24 000,00	48 000,00	Capacity - 230 liters stainless steel, active power 12 KW
19	Line for the production of a pasteurized milk and yogurt	pcs	2,00	25 000,00	50 000,00	compact machine with a capacity of 250 liters of pasteurized milk and yogurt, 6 KW
20	Air conditioning and filtro-ventilative systemsincl. dewatering systems up to 20% relative humidity in a freeze-drying and packaging plant with heat recovery (total value remains the same)	pcs	1,00	750 000,00	750 000,00	120 KW
21	Automatic Dosing machine to packaging machine	pcs	2,00	100 000,00	200 000,00	As per add. Specification, 16 KW
22	Distribution system for cups and trays for №24	pcs	1,00	60 000,00	60 000,00	As per add. Specification, 1 KW
23	Packaging conveyer system - soft packs (sachets) and another for trays or buckets with a fivefold heating to 160 degrees C	pcs	1,00	150 000,00	150 000,00	As per add. Specification, 15 KW
24	Packaging conveyer system - for trays or pots, dual vacuum pump	pcs	1,00	150 000,00	150 000,00	As per add. Specification, 20 KW
25	Machine for manual vacuum packing	pcs	2,00	3 500,00	7 000,00	As per add. Specification, 4 KW

26	Automatic control scales required by the regulation for packaged foods with a computer connection to the storage system of the plant	pcs	2,00	20 000,00	40 000,00	As per add. Specification, 1 KW
27	Metal detectors for food packaging	pcs	2,00	20 000,00	40 000,00	As per add. Specification, 1 KW
28	X-ray inspection equipment for prepackaged foods	pcs	1,00	100 000,00	100 000,00	As per add. Specification, 5 KW
29	Equipment for analytical laboratory for comprehensive analysis of the different types of food	total	1,00	365 000,00	365 000,00	As per add. Specification, 10 KW
30	Meat Cutter	pcs	1,00	8 000,00	8 000,00	volume 330 liters, 140 KW
31	fryer	pcs	2,00	470,00	940,00	As per add. Specification, 7.5 KW
32	Tabletting press machine	pcs	1,00	3 360,00	3 360,00	As per add. Specification, 1 KW
33	Spiral mixer for 80 kg dough with 3 attachments 2 speeds	pcs	1,00	5 300,00	5 300,00	As per add. Specification, 4 KW
34	Planetary Mixer dough 80 liters with 4 attachments variable speed	pcs	1,00	6 900,00	6 900,00	As per add. Specification, 4 KW
35	Dough divider with rounder, combined unit	pcs	1,00	5 360,00	5 360,00	As per add. Specification, 1 KW
36	Roll unit	pcs	1,00	3 000,00	3 000,00	As per add. Specification, 1 KW
37	Press hydraulic with heaters	pcs	1,00	3 360,00	3 360,00	As per add. Specification, 6 KW
38	Preparatory refrigeration table	pcs	2,00	900,00	1 800,00	As per add. Specification, 2 KW
39	Kitchen furniture and appliances (Melamine tables, trolleys, measuring instruments, tools, etc.)	pcs	1,00	45 000,00	45 000,00	As per add. Specification

40	Ovens for foodstuffs preparation (kit including oven, trays and moveable rack for trays)	pcs	1,00	43 000,00	43 000,00	Capacity - 40 trays 535x325 mm or 20 mm 650x530 trays, about 500 liters food, 4 types of cooking (steam partial steam regenerators, convect), active power kW 64.5
41	Cauldrons autoclave for food preparation	pcs	2,00	28 000,00	56 000,00	Capacity - up to 480 liters three switches (0.50%, 100%), active power 48 kW, stainless steel 316L, automatic control, dual explosion protection
42	Line to wash trays	pcs	1,00	10 000,00	10 000,00	
43	Refrigerating units	pcs	4,00	10 000,00	40 000,00	Room volume - 265 m3, active power 14 KW, minimum temperature of -20 degrees C
44	Low temperature refrigeration units- freezers deep freeze	pcs	4,00	5 000,00	20 000,00	to -42 and -86 degrees C. According to further specification, Active Power 10 kW
45	Complete system for lyophilisation from 10 to 12 tonnes of raw product	pcs	1,00	5 200 000,00	5 200 000,00	4 lines for lyophilisation included (each of them with a processing capacity of a 2.5 to 3 tonnes of raw product). The system includes a control unit, tunnel freezers, aluminum trays, facility for transport trays, freeze-drying systems, thawing equipment, evaporation equipment. Expected active power equipment - 1500 W.

						Capacity of dehydration - batches of up to 480 kg active power - 63 kW
46	Dehydrator	pcs	1,00	18 000,00	18 000,00	
47	Pilot dehydrator	pcs	2,00	1 100,00	2 200,00	as per add. specification
48	HR IR camera for technological control and testing heat losses	pcs	1,00	65 000,00	65 000,00	as per add. specification
49	Infrared thermometers for remote measurement of high and low temperatures	pcs	1,00	7 700,00	7 700,00	as per add. specification
50	Measurement equipment of the technological departments - type automatic weather station with remote control - Automatic Weather Station	pcs	2,00	5 500,00	11 000,00	as per add. specification
51	Automatic control scales to measure the individual weight of each package according to regulatory requirements	pcs	2,00	20 000,00	40 000,00	as per add. specification
52	Line for vacuum packaging of large packages	pcs	1,00	20 000,00	20 000,00	packing capacity of 2.5 to 10 kg
53	Storage equipment for raw and finished products	total	1,00	30 000,00	30 000,00	as per add. specification
54	Inward equipment - Electric cars	pcs	3,00	29 900,00	89 700,00	capacity 1800 kg
55	Specialized vehicles - refrigeration vans, trucks, vans	pcs	4,00	60 000,00	240 000,00	as per add. specification
56	Integrated System for internal and external video surveillance and video and audio recordings; 2 automatic barriers (as per specification) Certification under ISO / IEC 27001 - Information security management !!!	pcs	1,00	250 000,00	250 000,00	as per add. specification

57	Administrative and office equipment incl. laboratory furniture made of Melamine	total	1,00	100 000,00	100 000,00	as per add. specification
58	Freeze dry Pilot system for optimization of the technology and development of new recipes	pcs	1,00	280 000,00	280 000,00	acctive power 75 KW
59	Diesel-electric generator for emergency power supply in a standard 40 ft container train	pcs	1,00	220 000,00	220 000,00	1000 KW generation
60	UPS systems with AVR (automatic voltage regulator)	pcs	1,00	85 000,00	85 000,00	up to 1000 kVA, as per add.. Specification
61	BIOGAS GENERATOR 2 tons / day	pcs	1,00	220 000,00	220 000,00	as per add. specification
62	Computer equipment - computer workstations	pcs	12,00	950,00	11 400,00	as per add. Specification, 6 KW
63	Monitors	pcs	12,00	270,00	3 240,00	3 kw
64	Laptops	pcs	12,00	1 200,00	14 400,00	i7 6700 processor, 16GB DDR4, 2TB HDD 7200rpm, Under further specification, a total of 4 KB
65	Industrial server and monitor	pcs	1,00	6 900,00	6 900,00	as per add. Specification, 2KW
66	Multifunction laser unir for workgroups A3	pcs	2,00	3 500,00	7 000,00	Multifunctional Laser Color Printer (All-in-One) for Workgroups A3 , 4 KW
67	Other miscellaneous equipment (unplanned above)	total	1,00	100 000,00	100 000,00	Total 10 KW
			TOTAL:		14 818 592,00	

Other Investment Expenses						
1	Expenses for designer's services	as per contract	1,00	518 650,72	518 650,72	3,5% of direct costs
2	Expenses for building and author's supervision	as per contract	1,00	222 278,88	222 278,88	1,5% of direct costs
3	Expenses for consulting services	as per contract	1,00	518 650,72	518 650,72	3,5% of direct costs
4	Expenses for other external services (legal, financial, expert and other)	as per contract	1,00	148 185,92	148 185,92	1% of direct costs
5	Expenses related to the complete of the documentation of the Project	as per contract	1,00	37 046,48	37 046,48	<u>0,25% of direct costs</u>
6	Expenses, related to application for financement	as per contract	1,00	37 046,48	37 046,48	<u>0,25% of direct costs</u>
7	Expenses, related to the education of the personnel	as per contract	1,00	74 092,96	74 092,96	<u>0,5% of direct costs</u>
8	Expenses, related to information and publicity (infomaterials, Web etc)	as per contract	1,00	74 092,96	74 092,96	<u>0,5% of direct costs</u>
9	Expenses, related to the obtain of building permission (taxes, expertises, permissions etc.)	pcs	1,00	148 185,92	148 185,92	<u>1% of direct costs</u>
			TOTAL		1 778 231,04	
				TOTAL:	16 596 823,04	

LYO Project - Energy balance and cost of electrical energy within the first year										
No	Kind of equipment	active power KW	Average daily working hours	Average daily power consumption kW / h	Average monthly working days	Average monthly energy consumption	Price eur/KWh	Average monthly expenditure euro	Number of months	Average annual cost euro
1	Belt Washing machine for delicate fruits and vegetables - strawberries, raspberries, blueberries and others.	1,50	8	12,00	25	300,00	0,08	24,00	9,00	216,00
2	Brush washing machine for coarse fruits and vegetables - potatoes, peppers, cucumbers and others.	1,10	8	8,80	25	220,00	0,08	17,60	9,00	158,40
3	Line for crushing fruits and vegetables	0,80	4	3,20	25	80,00	0,08	6,40	9,00	57,60
4	Machine for blanching vegetables	15,00	3	45,00	25	1 125,00	0,08	90,00	9,00	810,00
5	Extractor - for obtaining herbal extracts, and other (from the leaves, stems, roots, etc.).	5,00	3	15,00	15	225,00	0,08	18,00	5,00	90,00
6	Machine for slice cutting fruit and vegetables	1,50	8	12,00	25	300,00	0,08	24,00	9,00	216,00
7	Pepper roaster - line baking and peeling peppers, eggplants and others	25,00	6	150,00	25	3 750,00	0,08	300,00	3,00	900,00
8	Fermenters and Pasteurizers of milk and other liquid (fruit nectars, creams, etc.)	24,00	3	72,00	15	1 080,00	0,08	86,40	9,00	777,60
9	Line for the production of a pasteurized milk and yogurt	12,00	8	96,00	25	2 400,00	0,08	192,00	12,00	2 304,00
10	Air conditioning and filtro-ventilative systemsincl. dewatering systems up to 20% relative humidity in a freeze-drying and packaging plant with heat recovery (total value remains the same)	120,00	6	720,00	30	21 600,00	0,08	1 728,00	12,00	20 736,00
11	Automatic Dosing machine to packaging machine	32,00	6	192,00	25	4 800,00	0,08	384,00	12,00	4 608,00
12	Distribution system for cups and trays for №24	1,00	6	6,00	25	150,00	0,08	12,00	12,00	144,00
13	Packaging conveyer system - soft packs (sachets) and another for trays or buckets with a fivefold heating to 160 degrees C	15,00	4	60,00	25	1 500,00	0,08	120,00	9,00	1 080,00
14	Packaging conveyer system - for trays or pots, dual vacuum pump	20,00	4	80,00	25	2 000,00	0,08	160,00	9,00	1 440,00
15	Machine for manual vacuum packing	4,00	8	32,00	25	800,00	0,08	64,00	12,00	768,00
16	Automatic control scales required by the regulation for packaged foods with a computer connection to the storage system of the plant	2,00	8	16,00	25	400,00	0,08	32,00	12,00	384,00

17	Metal detectors for food packaging	2,00	8	16,00	25	400,00	0,08	32,00	12,00	384,00
18	X-ray inspection equipment for prepackaged foods	5,00	8	40,00	25	1 000,00	0,08	80,00	12,00	960,00
19	Equipment for analytical laboratory for comprehensive analysis of the different types of food	10,00	2	20,00	25	500,00	0,08	40,00	12,00	480,00
20	Meat Cutter	140,00	4	560,00	25	14 000,00	0,08	1 120,00	9,00	10 080,00
21	fryer	15,00	4	60,00	25	1 500,00	0,08	120,00	9,00	1 080,00
22	Tabletting press machine	1,00	4	4,00	25	100,00	0,08	8,00	9,00	72,00
23	Spiral mixer for 80 kg dough with 3 attachments 2 speeds	4,00	4	16,00	25	400,00	0,08	32,00	9,00	288,00
24	Planetary Mixer dough 80 liters with 4 attachments variable speed	4,00	4	16,00	25	400,00	0,08	32,00	9,00	288,00
25	Dough divider with rounder, combined unit	1,00	2	2,00	12	24,00	0,08	1,92	9,00	17,28
26	Roll unit	1,00	2	2,00	12	24,00	0,08	1,92	9,00	17,28
27	Press hydraulic with heaters	6,00	2	12,00		0,00	0,08	0,00		0,00
28	Preparatory refrigeration table	4,00	2	8,00		0,00	0,08	0,00		0,00
29	Ovens for foodstuffs preparation (kit including oven, trays and moveable rack for trays)	64,50	6	387,00	25	9 675,00	0,08	774,00	9	6 966,00
30	Cauldrons autoclave for food preparation	96,00	12	1 152,00	25	28 800,00	0,08	2 304,00	9	20 736,00
31	Line to wash trays	1,00	6	6,00	25	150,00	0,08	12,00	12	144,00
32	refrigerating units	64,00	16	1 024,00	30	30 720,00	0,08	2 457,60	12	29 491,20
33	Low temperature refrigeration units- freezers deep freeze	40,00	16	640,00	30	19 200,00	0,08	1 536,00	12	18 432,00
34	Complete system for lyophilisation from 10 to 12 tonnes of raw product	1 500,00	23	34 500,00	25	862 500,00	0,08	69 000,00	12	828 000,00
35	dehydrator	63,00	22	1 386,00	25	34 650,00	0,08	2 772,00	12	33 264,00
36	pilot dehydrator	5,00	8	40,00	25	1 000,00	0,08	80,00	12	960,00
37	HR IR camera for technological control and testing heat losses	1,00	2	2,00	25	50,00	0,08	4,00	12	48,00
38	Infrared thermometers for remote measurement of high and low temperatures	1,00	24	24,00	25	600,00	0,08	48,00	12	576,00
39	Measurement equipment of the technological departments - type automatic weather station with remote control - Automatic Weather Station	2,00	24	48,00	25	1 200,00	0,08	96,00	12	1 152,00
40	Automatic control scales to measure the individual weight of each package according to regulatory requirements	1,00	12	12,00	25	300,00	0,08	24,00	12	288,00
41	Line for vacuum packaging of large packages	9,00	6	54,00	25	1 350,00	0,08	108,00	12	1 296,00

45	Freeze dry Pilot system for optimization of the technology and development of new recipes	75,00	16	1 200,00	25	30 000,00	0,08	2 400,00	12	28 800,00
49	Computer equipment - computer workstations	72,00	14	1 008,00	25	25 200,00	0,08	2 016,00	12	24 192,00
50	Monitors	36,00	14	504,00	25	12 600,00	0,08	1 008,00	12	12 096,00
51	Laptops	48,00	14	672,00	25	16 800,00	0,08	1 344,00	12	16 128,00
52	Industrial server and monitor	2,00	24	48,00	25	1 200,00	0,08	96,00	12	1 152,00
53	Multifunction laser unir for workgroups A3	4,00	2	8,00	25	200,00	0,08	16,00	12	192,00
54	Other miscellaneous equipment (unplanned above)	10,00	16	160,00	25	4 000,00	0,08	320,00	12	3 840,00
	TOTAL:			45 151,00		1 139 273,00		91 141,84		1 076 109,36

LYO Project - Staff salaries and benefits first year																
Month	Management staff			Science and IT staff			Workers in the processing - highly qualified			Workers in the processing - executors			Support staff			
	Number	Average monthly salary	Total salary euro	Number	Average monthly salary	Total salary euro	Number	Average monthly salary	Total salary euro	Number	Average monthly salary	Total salary euro	Number	Average monthly salary	Total salary euro	
January	6	500,00	9 000,00	8	1 000,00	8 000,00	8	650,00	5 200,00	28	450,00	12 600,00	14	380,00	5 320,00	
Feb	6	500,00	9 000,00	8	1 000,00	8 000,00	8	650,00	5 200,00	28	450,00	12 600,00	14	380,00	5 320,00	
March	6	500,00	9 000,00	8	1 000,00	8 000,00	8	650,00	5 200,00	28	450,00	12 600,00	14	380,00	5 320,00	
April	6	500,00	9 000,00	8	1 000,00	8 000,00	8	650,00	5 200,00	28	450,00	12 600,00	14	380,00	5 320,00	
May	6	500,00	9 000,00	8	1 000,00	8 000,00	8	650,00	5 200,00	28	450,00	12 600,00	14	380,00	5 320,00	
June	6	500,00	9 000,00	8	1 000,00	8 000,00	8	650,00	5 200,00	28	450,00	12 600,00	14	380,00	5 320,00	
July	6	500,00	9 000,00	8	1 000,00	8 000,00	8	650,00	5 200,00	28	450,00	12 600,00	14	380,00	5 320,00	
August	6	500,00	9 000,00	8	1 000,00	8 000,00	8	650,00	5 200,00	28	450,00	12 600,00	14	380,00	5 320,00	
Sept	6	600,00	9 600,00	8	1 200,00	9 600,00	8	700,00	5 600,00	28	510,00	14 280,00	14	380,00	5 320,00	
Oct	6	600,00	9 600,00	8	1 200,00	9 600,00	8	700,00	5 600,00	28	510,00	14 280,00	14	380,00	5 320,00	
Nov	6	600,00	9 600,00	8	1 200,00	9 600,00	8	700,00	5 600,00	28	510,00	14 280,00	14	380,00	5 320,00	
Dec	6	600,00	9 600,00	8	1 200,00	9 600,00	8	700,00	5 600,00	28	510,00	14 280,00	14	380,00	5 320,00	
TOTAL:			110 400,00			102 400,00			64 000,00			157 920,00		63 840,00	498 560,00	
									SOCIAL AND OTHER INSURANCES:				41%		204 409,60	
								TOTAL SALARIES AND SOCIAL INSURANCES:							702 969,60	

Envisaged production volumes by months and types freeze drying																																		
No	Product	Jan	Feb	M	Apr	M	Jun	Jul	Aug	Sept	Oct	Nov	Dec	TOTAL tons:	Purchase price eur/kg	Value euro	Ready made product	Sale's price eur/kg	Value eur	% from the sale's price for packaging	Packaging costs	% from the sale's price for transportation	Transportation costs	% from the sale's price for addvrtizing	Addvrtizing costs	% from the sale's price for administration costs	Addmin costs	% from the sale's price for other costs	Oth costs					
1	Aples	20	10							10	30	30	30	130,00	0,50	65 000,00	10,40	16,20	168 480,00	12,00%	20 217,60	2,50%	4 212,00	2,00%	3 369,60	0,50%	842,40	1,00%	684,80					
2	Apricots							10	10					20,00	0,70	14 000,00	1,60	38,50	61 600,00	12,00%	7 392,00	2,50%	1 540,00	2,00%	1 232,00	0,50%	308,00	1,00%	616,00					
3	Blackberries							20	20					40,00	1,40	56 000,00	3,60	30,80	110 880,00	12,00%	13 305,60	2,50%	2 772,00	2,00%	2 217,60	0,50%	554,40	1,00%	108,80					
4	Black currant							10	20					30,00	1,20	36 000,00	3,00	20,00	60 000,00	12,00%	7 200,00	2,50%	1 500,00	2,00%	1 200,00	0,50%	300,00	1,00%	600,00					
5	Blueberries							5	10	10				25,00	3,00	75 000,00	2,25	63,00	141 750,00	12,00%	17 010,00	2,50%	3 543,75	2,00%	2 835,00	0,50%	708,75	1,00%	417,50					
6	Cheries							30	20					50,00	1,00	50 000,00	3,75	26,90	100 875,00	12,00%	12 105,00	2,50%	2 521,88	2,00%	2 017,50	0,50%	504,38	1,00%	008,75					
7	Figs							5	10	10				25,00	0,90	22 500,00	2,25	29,20	65 700,00	12,00%	7 884,00	2,50%	1 642,50	2,00%	1 314,00	0,50%	328,50	1,00%	657,00					
8	Melons									20	20	15		55,00	1,50	82 500,00	3,85	73,00	281 050,00	12,00%	33 726,00	2,50%	7 026,25	2,00%	5 621,00	0,50%	405,25	1,00%	810,50					
9	Watermelons									10	10	10		30,00	0,40	12 000,00	1,80	15,40	27 720,00	12,00%	3 326,40	2,50%	693,00	2,00%	554,40	0,50%	138,60	1,00%	277,20					
10	Peaches							20	20					40,00	0,70	28 000,00	3,20	39,20	125 440,00	12,00%	15 052,80	2,50%	3 136,00	2,00%	2 508,80	0,50%	627,20	1,00%	254,40					
11	Plums								20	30				50,00	0,75	37 500,00	4,00	20,80	83 200,00	12,00%	9 984,00	2,50%	2 080,00	2,00%	1 664,00	0,50%	416,00	1,00%	832,00					
12	Raspberries								30	30				60,00	2,50	150 000,00	5,40	30,70	165 780,00	12,00%	19 893,60	2,50%	4 144,50	2,00%	3 315,60	0,50%	828,90	1,00%	657,80					
13	Strawberries			40	30	30								100,00	1,20	120 000,00	9,00	38,40	345 600,00	12,00%	41 472,00	2,50%	8 640,00	2,00%	6 912,00	0,50%	728,00	1,00%	456,00					
14	Grapes								20	30				50,00	0,70	35 000,00	4,50	19,20	86 400,00	12,00%	10 368,00	2,50%	2 160,00	2,00%	1 728,00	0,50%	432,00	1,00%	864,00					
15	Cucumbers			10	10	30	15	5	5	5				75,00	0,60	45 000,00	6,75	41,50	280 125,00	12,00%	33 615,00	2,50%	7 003,13	2,00%	5 602,50	0,50%	400,63	1,00%	801,25					
16	roasted zucchini						30	20	5	5	5			65,00	0,55	35 750,00	3,90	20,00	78 000,00	12,00%	9 360,00	2,50%	1 950,00	2,00%	1 560,00	0,50%	390,00	1,00%	780,00					
17	parsnip									20	30			50,00	1,50	75 000,00	4,00	16,90	67 600,00	12,00%	8 112,00	2,50%	1 690,00	2,00%	1 352,00	0,50%	338,00	1,00%	676,00					
18	Peas				30	30								60,00	1,20	72 000,00	5,40	13,00	70 200,00	12,00%	8 424,00	2,50%	1 755,00	2,00%	1 404,00	0,50%	351,00	1,00%	702,00					
19	Pumpkin									20	20	10		50,00	0,35	17 500,00	3,00	11,50	34 500,00	12,00%	4 140,00	2,50%	862,50	2,00%	690,00	0,50%	172,50	1,00%	345,00					
20	Oignon								10	10	10			30,00	0,30	9 000,00	2,40	15,40	36 960,00	12,00%	4 435,20	2,50%	924,00	2,00%	739,20	0,50%	184,80	1,00%	369,60					
21	Red pepper									20	30	30		80,00	0,60	48 000,00	5,60	36,10	202 160,00	12,00%	24 259,20	2,50%	5 054,00	2,00%	4 043,20	0,50%	010,80	1,00%	021,60					
22	Tomatoes							10	10	10	10	10		50,00	0,55	27 500,00	4,50	20,00	90 000,00	12,00%	10 800,00	2,50%	2 250,00	2,00%	1 800,00	0,50%	450,00	1,00%	900,00					
23	Basil							5	5					10,00	4,50	45 000,00	2,70	34,60	93 420,00	12,00%	11 210,40	2,50%	2 335,50	2,00%	1 868,40	0,50%	467,10	1,00%	934,20					

No	Product	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL tons:	Purchase price eur/kg	Value euro	Ready made product tons	Sale's price eur/kg	Value eur	% from the sale's price for packaging	Packaging costs	% from the sale's price for transportation	Transportation costs	% from the sale's price for advertising	Advertising costs	% from the sale's price for administration costs	Administration costs	% from the sale's price for other costs	Other costs
1	Mixed fruits	11,25	11,25	2,25			5	5	5	5	5	5	5	59,75	1,20	71 700,00	5,08	32,00	162 520,00	10,00%	16 252,00	2,50%	4 063,00	1,00%	1 625,20	1,00%	1 625,20	1,00%	1 625,20
2	Mixed vegetables			9	11,25	11,25	4	4	4	4	4	4	4	59,50	0,90	53 550,00	4,76	24,00	114 240,00	10,00%	11 424,00	2,50%	2 856,00	1,00%	1 142,40	1,00%	1 142,40	1,00%	1 142,40
3	Herbs and spices						2,25	2,25	2,25	2,25	2,25	2,25	2,25	15,75	3,00	47 250,00	1,42	44,00	62 370,00	10,00%	6 237,00	2,50%	1 559,25	1,00%	623,70	1,00%	623,70	1,00%	623,70
	TOTAL:	11,25	11,25	11,25	11,25	11,25	11,25	11,25	11,25	11,25	11,25	11,25	11,25	135,00		172 500,00	11,26		339 130,00		33 913,00		8 478,25		3 391,30		3 391,30		3 391,30

The EIB loan - CONDITIONS, INTEREST, CHARGES AND PRINCIPAL									
Loan amount euro	8 298,41	Year	No.mon th	Balance on principa l	Principal payment s	Interes t	Annual charge for managem ent	Annual principa l paid	Annual interest and charge s paid
		2017	1	8 298,41	0,00	0,00	16,60		
Term of the credit months	108		2	8 298,41	0,00	17,29			
			3	8 298,41	0,00	17,29			
Interest rate	2,50%		4	8 298,41	0,00	17,29			
			5	8 298,41	0,00	17,29			
Grace period months	36		6	8 298,41	0,00	17,29		0,00	103,04
		2018	7	8 298,41	0,00	17,29			
			8	8 298,41	0,00	17,29			
Management charge	0,20%		9	8 298,41	0,00	17,29			
			10	8 298,41	0,00	17,29			
			11	8 298,41	0,00	17,29			
Repayment of principal	equal monthly repayments		12	8 298,41	0,00	17,29			
			13	8 298,41	0,00	17,29	16,60		

				8					
			14	298,41	0,00	17,29			
Start of the Loan	II half of 2017 г.			8					
			15	298,41	0,00	17,29			
				8					
			16	298,41	0,00	17,29			
				8					
			17	298,41	0,00	17,29			
				8					
			18	298,41	0,00	17,29		0,00	224,06
				8					
			19	298,41	0,00	17,29			
				8					
			20	298,41	0,00	17,29			
				8					
			21	298,41	0,00	17,29			
				8					
			22	298,41	0,00	17,29			
				8					
			23	298,41	0,00	17,29			
				8					
			24	298,41	0,00	17,29			
				8					
			25	298,41	0,00	17,29	16,60		
				8					
			26	298,41	0,00	17,29			
				8					
			27	298,41	0,00	17,29			
				8					
			28	298,41	0,00	17,29			
				8					
			29	298,41	0,00	17,29			
				8					
			30	298,41	0,00	17,29		0,00	224,06

		2020	31	8 298,41	0,00	17,29			
			32	8 298,41	0,00	17,29			
			33	8 298,41	0,00	17,29			
			34	8 298,41	0,00	17,29			
			35	8 298,41	0,00	17,29			
			36	8 298,41	0,00	17,29			
			37	8 298,41	115,26	17,29	16,60		
			38	8 183,16	115,26	17,05			
			39	8 067,90	115,26	16,81			
			40	7 952,64	115,26	16,57			
			41	7 837,39	115,26	16,33			
			42	7 722,13	115,26	16,09		691,53	220,46
			2021	43	7 606,88	115,26	15,85		
		44		7 491,62	115,26	15,61			
		45		7 376,37	115,26	15,37			
		46		7 261,11	115,26	15,13			
		47		7 145,85	115,26	14,89			
		48		7 030,60	115,26	14,65			

				6					
			49	915,34	115,26	14,41	13,83		
			50	800,09	115,26	14,17			
			51	684,83	115,26	13,93			
			52	569,58	115,26	13,69			
			53	454,32	115,26	13,45			
			54	339,06	115,26	13,21		1	
								383,07	188,15
			55	223,81	115,26	12,97			
			56	108,55	115,26	12,73			
			57	993,30	115,26	12,49			
			58	878,04	115,26	12,25			
			59	762,79	115,26	12,01			
			60	647,53	115,26	11,77			
			61	532,27	115,26	11,53	11,06		
			62	417,02	115,26	11,29			
			63	301,76	115,26	11,05			
			64	186,51	115,26	10,81			
			65	071,25	115,26	10,57			
			66	956,00	115,26	10,32		1	
								383,07	150,81

			2023	67	4 840,74	115,26	10,08				
				68	4 725,48	115,26	9,84				
				69	4 610,23	115,26	9,60				
				70	4 494,97	115,26	9,36				
				71	4 379,72	115,26	9,12				
				72	4 264,46	115,26	8,88				
				73	4 149,21	115,26	8,64	8,30			
				74	4 033,95	115,26	8,40				
				75	3 918,69	115,26	8,16				
				76	3 803,44	115,26	7,92				
				77	3 688,18	115,26	7,68				
				78	3 572,93	115,26	7,44		1 383,07	113,47	
				2024	79	3 457,67	115,26	7,20			
					80	3 342,42	115,26	6,96			
			81		3 227,16	115,26	6,72				
			82		3 111,90	115,26	6,48				
			83		2 996,65	115,26	6,24				
			84		2 881,39	115,26	6,00				

					2							
				85	766,14	115,26	5,76	5,53				
				86	650,88	115,26	5,52					
				87	535,63	115,26	5,28					
				88	420,37	115,26	5,04					
				89	305,11	115,26	4,80					
				90	189,86	115,26	4,56			1	383,07	76,13
				91	074,60	115,26	4,32					
				92	959,35	115,26	4,08					
				93	844,09	115,26	3,84					
				94	728,84	115,26	3,60					
				95	613,58	115,26	3,36					
				96	498,32	115,26	3,12					
				97	383,07	115,26	2,88	2,77				
				98	267,81	115,26	2,64					
				99	152,56	115,26	2,40					
				100	037,30	115,26	2,16					
				101	922,05	115,26	1,92					
				102	806,79	115,26	1,68			1	383,07	38,78

		2026	103	691,53	115,26	1,44			
			104	576,28	115,26	1,20			
			105	461,02	115,26	0,96			
			106	345,77	115,26	0,72			
			107	230,51	115,26	0,48			
			108	115,26	115,26	0,24			
			109	0,00	0,00	0,00	0,00		
			110	0,00	0,00	0,00			
			111	0,00	0,00	0,00			
			112	0,00	0,00	0,00			
			113	0,00	0,00	0,00			
			114	0,00	0,00	0,00		691,53	5,04
			2027	115	0,00	0,00	0,00		