

BUSINESS PLAN FOR MUSHROOM SHIMEJI DEHYDRATED PRODUCTION

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ABSTRACT: The objective of this work was to do a study about the economic feasibility for the production and marketing of dried Shimeji mushrooms in a property located in Itapetininga. Because it is a highly perishable food, the dehydration presents itself as a valuable alternative for the storage of edible mushroom, since it reduces considerably the growth of microorganisms. A business plan in order to analyze the risks to start a business while minimizing potential problems was developed. Aspects related to customers, suppliers and the market were analyzed, in addition to costs and revenues. The study resulted in the viability of the project due increase of consumption in Brazil, induced because of international market and low operating cost of production.

Keywords: Mushrooms. Costs. Viability.

1 INTRODUCTION

Since ancient times mushrooms are part of the history of various civilizations, being used as therapeutic food, with high nutritional value. According to Vilela (2004) mushrooms began to be cultivated on a commercial basis from the sixth century, where the atrium *Auricularia* species was the first developed, followed by *Flammulina velutipes* (enokitake) and thirdly, *Lentinula edodes* (shiitake) in China in mid-1100.

The use of mushrooms as food, medicine, poison or in religious rituals have been recorded in all cultures and regions in the world, however, it was in Asia that they began to be systematically cultivated for food and medicinal purposes (STURION; RANZANI, 2000).

The consumption of mushrooms in the country has expanded with the growth of eastern colonies (Chinese, Japanese and Korean). The habit of eating mushrooms was also assimilated by Brazilians, and today is a kind of food widely used in the preparation of everyday dishes, especially those more sophisticated.

Currently, there are over ten thousand known species of mushrooms, however, only about two thousand, belonging to 30 genera, are considered edible. Of these, 20 are grown commercially and less than 10 are industrialized (urben; Siqueira, 2003).

However, techniques are needed to reduce costs, increase productivity, add value to agricultural products and promote the development of agribusiness. Dehydration or drying food is a technique that is growing every day and currently it is common to find products made with dehydrated components in all types of markets and supermarkets.

Therefore, in order to increase the shelf life of mushrooms, the use of dehydration technique is proposed, besides being quite simple, it has low production cost. Thus, it is expected to meet the business opportunity, next to food market, getting back to the company.

2 METHODOLOGY

This business plan was prepared in the period from August to December 2013, through bibliographic research and data collection with producers from Mogi das Cruzes region. Using the SWOT analysis strengths, weaknesses, threats and opportunities of the business were described, to analyze the scenario of mushroom production in the region, and to identify and seize opportunities.

Studies were made of viability and profitability of the business plan, and from these analyzes the Net Present Value (NPV) was obtained, Internal Rate of Return (IRR) Discounted Payback and Profitability Index (IL), which are indicators viability, profitability and payback period in years. The NPV turns Future value at present value and shows whether the business plan is viable. Also, IRR measures the profitability of the business plan as a percentage, the Discounted Payback is the amount of time required to recoup the investment, evaluating the discounted cash flows, that is, considering the value of money over time and IL measures the percentage of profitability.

For the implementation of the business and to the calculations of viability, it should be noted that the owner has owned the land and equipment needed for project implementation.

3 RESULTS AND DISCUSSION

3.1 Study on production of mushrooms

The production of mushrooms can happen in a trunk or through substrate, in plastic bags or pots. The use of sawdust is also widely used with satisfactory results (Bononi et al., 1999).

An ideal setup for Shimeji cultivation consists of a nursery with electrical installations and HVAC equipment such as water meters and thermometers, sealers, refrigerators, stove

and packaging. The shed can be made of wood, masonry or plastic, with protection to avoid excessive wind.

The sterilization process of the substrate is of paramount importance to the cultivation of Shimeji as well as the cleaning of instruments used at the time of inoculation. The incubation process lasts for about five months. After sterilized, the bags with the following compounds have inoculated into a cold chamber where the temperature is maintained at 15 ° C and relative humidity 70% to 80%. For the process of fruiting, the bags require constant illumination. The optimal harvest time is when the hat is from 1 to 1.5 cm in diameter. But it is important to remember that the growth of Shimeji is very uneven. The bouquets are very fragile.

Regarding the preparation of the substrate, sawdust should be used, preferably from broadleaf trees or needle-like leaves and bran being the most widely used rice. The mixture of the substrate, i.e., the combination of bran and sawdust to be made in the ratio 1: 4 by volume, more water until moisture 62 to 65%. This moisture must be achieved in pure sawdust.

Sterilization is the key to success of cultivation, it can be made by autoclaving and sterilization chambers. After sterilizing the bottles when the internal temperature is less than 20 ° C, inoculation of the "seeds" is carried out under sterile conditions.

After 4 to 5 days there may be an increase in the substrate temperature, from 3 to 5 ° C above ambient temperature to allow the mycelium to be developed uniformly, it must maintain the temperature between 18 and 20 ° C.

For the pots to have uniformity during growth, one should perform the scraping of the substrate surface so it becomes flat. Soon after, fill the pot with water up to its edge. After 2-3 hours, cut up water, cover the container, so that the surface does not dry out and keep the temperature at 13-16 ° C. Five to seven days after the scraping begins the formation of primordia begins, then the container must be opened, increasing the relative humidity to 90%.

After seven days the mushrooms will be ready for harvest when the hat is from 1 to 1.5 cm in diameter. After harvesting the sawdust is removed from the base, and the fungi is placed on trays in portions of 150 grams for trade.

The dehydration according to APATI (2004), using a temperature of 60 ° C, it was observed that there is an increase in the drying rate compared to the temperatures of 40 and 50 ° C. This resulted in a reduction in 800 drying times up to 450 minutes when changed drying temperature of 40 to 60C, and 630 to 450 minutes when changed the temperature from 50 to 60 ° C, yielding 43 times reductions , 7% and 28.6%, respectively, for the two cases cited, this with relative humidity (RH) of 75%.

Production will be staggered, alternating the first crop of a shed (56 kg dry Shimeji), with the second crop of the other (50% lower). Thus, there is a greater distribution of production, resulting in 12 cycles, two crops per year in the two sheds.

3.2 Data ownership

The Duca farm will be a company and a producer of dehydrated Shimeji mushrooms (*Pleurotus ssp*), distributed directly to retailers in Itapetininga-SP region and food service companies that require this product. The property has three bushels, a shallow well and has two barns of 100 m², with floor area of 80 m², plus a main house, where the office will be established.

3.3 Strategic Planning

The company's mission is to produce dehydrated mushrooms of Shimeji variety in a controlled environment, combining sustainability and profitability with vision to become a leading supplier of dehydrated mushrooms in the city of Itapetininga and region.

Their values are quality, sustainability, integrity, trust and ethics, and its main objectives are the establishment of a company committed to the environment, providing quality products to customers from Itapetininga and conquering new markets in the region.

Its main strategies are to identify market opportunities for the product and what means for the public to have knowledge and access to the product, and raising the demand for mushrooms in the region.

The property produces and dehydrates mushrooms in a controlled environment, in white and brown color (gray). This is one of the most widespread mushrooms in the world and, like Shiitake is widely consumed in China and Japan. It grows in bunches, like a hat, and grows to about two feet in diameter. It also has high nutrient levels and low content of calories, making it ideal for diets. Thinking in terms of healthy eating, studies indicate that this mushroom can be effective in fighting cancer and cholesterol (PARK et al., 2003).

The advantages of cultivating this food are enormous: the growing period is shorter, the production is stable and can be spread throughout the year. The production of Shimeji is also an excellent alternative for small farms. Moreover, it has a faster return than other varieties of mushrooms, and you can get a great harvest in only 40 days (Bononi et al., 1999).

When dehydrated, these mushrooms are firm and fleshy when rehydrated and have the same characteristics as fresh mushroom, with its stronger flavor and with the advantage of being stored longer.

The final yield of mushrooms is closely connected with the quality of the compound inoculated with the seed, since this is the basic element of the whole production cycle. The compound of bags have offered on average 13 kg. Since productivity, i.e., the amount of mushrooms in natura per kilogram of compound, has an average yield of 18%.

Customers will be, both, food service businesses such as restaurants, pizzerias, cafeterias and outsourced companies, such as supermarkets and other retailers, in all of the region. Despite the low consumption, the amount of distributors compensates the volume produced, because it eliminates the middle of Sao Paulo, offering competitive prices and furthermore, value-added, since dehydrated shelf life increases, and allows an improvement of packing.

The production of edible mushrooms is concentrated in Mogi das Cruzes region. There are also small producers in the region of Sorocaba and Tatuí, but as the offer is not enough, there is a strong threat.

An important question when analyzing competitors is the role of dealers in the industry. Edible mushrooms resellers can be considered both customers, as buying the products for resale, as competitors for companies that also sell edible mushrooms to consumers. There are resellers serving individuals, ie retail and those who cater to companies such as restaurants, pizzerias etc., ie engaged in wholesale.

Substitute products are those that can perform the same function in the industry. Therefore, if there are more of these in market, there is more competitiveness.

In the case of edible mushrooms two different markets can be considered. The first includes consumers who appreciate features such as texture, odor, appearance and taste of mushrooms and seek purely gastronomic goal. In the first case there is no substitute products as only they can perform the function demanded by consumers. The second market comprises those looking for healthy foods or those who are in search of medicinal product characteristics. In this case direct substitute foods are high nutritional and also food supplements.

3.4 SWOT Analysis

To assess the business opportunity SWOT analysis was elaborated and it was found that the strengths of the business would be the low cost of production, the location of the property and ease of production intrinsic to the product. The weak points boil down to the inexperienced team in mushroom production area, and the short supply of inputs in the region. As opportunity is possible to point to the growing consumption of natural products, the increase in income of the population and the lack of competitors in the region, since the threats are the lack of consumer habits in the production of just one product and international competitors.

3.5 Financial plan.

Taking advantage of the increase in Brazilian consumption and low supply on the market, the company will provide for mushrooms region in dried form, which has added value by increasing the shelf life of the product and facilitating its distribution, which will be in

polystyrene trays (Styrofoam) wrapped in plastic PVC films a net weight of 150 grams. After comparative cost analysis in several regions, it came to the sale price of R \$ 22.00 for each package with 150 grams.

The estimated annual production is approximately 1,800 kilograms or 12,096 trays. In the first three years it was estimated 80% of sales, with revenue of R \$ 212,674.00 and 4 and 5 years, 90%, earning R \$ 239,492.00.

Facilities for production and processing already exist on the property, requiring purchase equipment such as shelves, nebulizers, cooling chambers, dehydrating and sealing, with a total value estimated at R \$ 23,000.00, which 80% will be financed by the line Modernization Program National Industrial Park (Modermaq) by BNDES, with a rate of 14.5% per year and 60 months to pay.

The property already has two warehouses of 100 m² in good condition for the implementation of mushroom cultivation, valued at R \$ 25,000.00. In addition to this, the property features a kitchen that will operate as processing room where the mushrooms collected will be dehydrated and packaged, valued at R \$ 15,000.00. Thus adding to the value of production facilities, processing and equipment, discounting the financing, we obtained an initial investment of R \$ 44,600.00.

The fixed cost mainly focuses on employees, depreciation of facilities and equipment, payment of financial obligations, electricity and cleaning products. The variable cost is represented by the inoculated compost and the packaging and labels. The total cost is the sum of the fixed cost and variable cost to 12,096 units in this way, the total cost represents:

$$R \$ 70,764.17 + R \$ 54,311.04 = R \$ 125,075.21$$

The working capital for short-term obligations will be provided from own resources.

Revenues, or entries, or even benefits, will be represented by the sale of dried mushrooms, in packs of 150 g the price of R \$ 22.00.

Thus, the net present value resulted in R \$ 372,721.89, applying a discount rate of 11% corresponding to the Selic rate, but without financial expenses. Strategically, it could be analyzed over another optical applying the equity in a CDI background with an income of 1% per month, which at the end of the year will give 12, 68%, noting then even then the investment is feasible.

The internal rate of return resulted in 198% when including annual depreciation and considered the total cost to produce the maximum (12,096 trays), though sales were estimated in the first three years in 9676.8 units (80%) and 4 and 5 year 10,886.4 units (90%).

However, it appears that the investment of R \$ 44,600.00 is already paid in the first year of operation. The profitability ranked 8.36, which means that the yield is about 800%. Thus, by means of the indicators presented, it appears that there is financial viability in the project.

4 CONCLUSION

The increased consumption of mushrooms provides the opening of business aimed at the health food market. Taking advantage of the low production cost, the location of the property, ease of production, intrinsic to the product and the lack of competitors in the region, it designed a plan for opening a company in this area.

The evaluation of financial indicators suggest that the opening of the project is feasible since the total operating cost of the project is estimated at R \$ 125,075.21 per year by selling 12,096 trays. With an initial investment of R \$ 44,600.00, the net present value of R \$ 314,663.43 and using a discount rate of 11% per annum, based on the Selic rate, we obtained the internal rate of return of 198% added to financial expenses.

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