Banana Ice Cream as an Eco-Friendly Social Enterprise Product for Helping Cancer Patients During Treatment

Janne Hillary
Plantation Management, State Polytechnic of Pontianak, Indonesia

hillaryjanne@gmail.com

ABSTRACT

Purpose: Banana ice cream is a fun food to eat and has both functions. The use of banana as main component of ice cream is expected to be a sustainable food, which is supporting Sustainable Development Goals (SDGs). The business of banana ice cream can be run for social purposes that make a profit, which will circle back for the needs of cancer patients.

Design/methodology/approach: Break even point analysis used to determine economic feasibility of the business plan. Break even point would be reached when the total unit of selling banana ice cream as much as 3,024 scoops with sales value was 15,120,000 Indonesian Rupiah. The minimum time for recovering the initial investment was 151 days or 5 months. Banana ice cream business is feasible to be run.

Findings: Cancer treatments often cause adverse effects at different levels. The adverse effect can greatly affect the patient's daily activities that may impair quality of life. New food products shall be developed to improve patient nutrition and reduce side effects from therapies.

Originality/value: This paper is original

Paper type: Research paper

Keyword: Cancer Treatments, Food Development, Nutritional Supplement, Social Enterprise Product, Sustainable Product

Received: August 11th
Revised: September 6th
Published: September 30th

I. INTRODUCTION

The primary goal of cancer treatment is to achieve a cure, which is assessed by tumour control and patient survival (Casas et al., 2012). Cancer treatments, such as chemotherapy and radioteraphy may have many side effects. It occurs when a therapy damages healthy cells. Some of the more common side effects caused by cancer treatments are nausea, vomiting, diarrhea, constipation, mucositis, xerostomia, taste disorders, and changes in food preferences (Molly Brummond et al., 2016; Vieira et al., 2020).

Those side effects are also related to the reduction of food intake and followed by worsening of the nutritional status (Casas et al., 2012; Vieira et al., 2020). Bad dietary status can give a negative impact on tolerance and effectiveness of treatment. Malnutrition can reduce tumour control and decrease survival (Casas et al., 2012).

To overcome acute malnutrition in cancer patients, diet by increasing the energy and protein density through food or synthetic nutritional supplements is required. Although synthetic nutritional supplement can help to overcome bad nutritional status, they have low acceptance, high cost, and excluded the sensory pleasures. Therefore, new food products shall be developed (Casas et al., 2012; Vieira et al., 2020).

Food texture and temperature influence a desire to eat among cancer patients during treatments. They prefer to eat something liquid and chilled foods made from fruits, such as fruit juice, and ice cream (Vieira et al., 2020). There are some researchers who have researched about benefits of ice cream for cancer patients during their medication. In 2011, Trinidade et al. studied the acceptance of fortified ice cream among some cancer patients. Their sample, head and neck patients rated the ice cream as nutritional supplement during their
treatments with high acceptance. Ice cream could ease symptoms associated with surgery, including odynophagia, xerostomia, oral soreness and painful post-treatment oral candidiasis.

Casas et al. (2012; Vieira et al. (2020) have proven similar results of the previous research by did a similar research among cancer patients in general. Combination of the soft texture, consistency, taste, and the food’s temperature may relate to the high acceptance of the ice cream. Papers of those studies shown the acceptance of ice cream in cancer patients during particular treatments. There were no complaints about unpleasant sensations from ice cream from patients with evidence of mucositis who have done Post-radiotherapy. Cooling of the mouth can be induced by the gradual breakdown of melting ice. It may give a benefit for preventing oral troubles during chemotherapy.

Ice cream can give several psychology benefits, such as: sensation of freshness, satiation and even a symbolic sense of happiness (Casas et al., 2012). Those characteristics make ice cream be eaten not only by cancer patients, but also by common society. This is also the advantage on social aspect. A food product with high acceptability by individuals of both groups, can minimize the negative social impact of the diet adopted in treatment (Casas et al., 2012; Vieira et al., 2020). Trinidad et al. (2012) found that patients in the early post-operative period were happier to finish their helpings of ice-cream than protein-energy drinks. It proved that ice cream help to boost patients’ psychic.

Banana can be an ingredient to make ice cream, a nutritional and fun food for cancer patients (Sampath Kumar et al., 2012). This fruit is very available since it is one of the most affordable fruits in the marketplace and can be easily found nearly everywhere in the world. As the fifth most important agricultural food crop in terms of world, it contains several bioactive compounds which are very needed in the diet due to its positive effects on human health and well-being (Singh et al., 2016).

Since it is directly obtained from plant, it tends to safe and effective for all stages of the life cycle, from pregnancy and lactation, to childhood, to old age. Banana can enhance the health of society, reduce the risk of chronic diseases, and prevent nutritional deficiencies (Craig et al., 2021). Its essential nutrients can be used for facing some effects of cancer therapies. Moreover, banana is easily found since Indonesia is one of the largest banana-producing countries in the world (Danty et al., 2015; Nadya Nurul H, 2016).

On the other hand, the abundance of bananas in Indonesia give a problem. It contributes to organic waste. The fact, the fraction of organic waste in the low income countries that comes from daily food is high. Organic waste in Indonesia accounts 62 % of the total municipal solid waste (Srivastava et al., 2015). The habit of society who likes picky eating can be one of the reasons. Indonesian people tend to prefer banana with yellow-green skin without black spots (Rumapea et al., 2021). As a result, bananas that do not match people’s preferences can become waste (Muar et al., 2020).

The use of banana as main component of ice cream can become a win-win solution for those problems (D & D, 2020). It is expected not only to find a new healthy food innovation for cancer sufferers, but also become a sustainable food. A food can be defined as a sustainable food when supporting SDGs, that can be available, accessible, and affordable to all (Story et al., 2009). Therefore, banana ice cream can be sold as a social business product at a low price, so everyone can reach it. Then, the profit generated by the business can circle back for the needs of cancer patients.

The success of new business enterprises or new products can be measured by the achievement of financial stability. Break Even Point (BEP) analysis is one of the tools to plan and manage a business’s financial performance, particularly during the initial phase of operation. Once the company surpasses the BEP, the company can start making a profit (Rambo, 2013).

The aim of this study was to provide informations about banana ice cream as nutritional supplement for cancer patients during treatment. In addition, the aim was to determine the feasibility of social business of banana ice cream.

II. METHODOLOGY

Benefits of adapting ice cream as a nutritional food in cancer patients during treatments and banana for its ingredient, were known by literature review. Snyder (2019) state that literature review ia one of research method which is collecting and synthesizing previous research. This method creates a firm foundation for advancing knowledge and facilitating theory development. It can be a powerful method since integration of findings and perspectives from many empirical findings can address research questions with a power that no single study has.

A simple trial that is house hold scale of making banana ice cream was done to plan a social business and determine the market's price. Feasibility analysis of social enterprise products used BEP analysis. Calculation of BEP in unit and BEP in sales value followed formulas below (Beierlein et al., 2014).
A. Adapted Ice Cream as A Nutritional Supplement for Cancer Patients During Treatments

Most of cancer patients during treatments are often not get their normal diet immediately. Therefore, nutrition is supplemented with energy drink or food that recommended for caloric intake. Unfortunately this method is not too be liked. The food that can effectively do the job of the nutritional supplement, which is also tasty and familiar that can improve their immediate quality of life, is needed (Trinidade et al., 2012). Trinidade et al., (2012) have done a research about fortified ice cream acceptance among head and neck cancer patients. They gave a feedback, both verbally and in written from the patient satisfaction survey, that the introduction of the ice cream has been accepted. All the patients enjoyed the taste of ice-cream, with 77% of them describing the taste as excellent. Ice cream eased symptoms associated with surgery, including odynophagia, xerostomia, oral soreness and painful post-treatment oral candidiasis. Eating became less pleasurable for laryngectomy patients than in other head and neck cancer patients, presumably because of their decreased capacity of smelling. Despite this, they all still rated the ice cream highly acceptance.

Similar results have been proven by Casas et al., (2012; Vieira et al., (2020) that have done a similar research among cancer patients in general. The high acceptance of the ice cream may be related to a combination of the soft texture, consistency, taste, and the food’s temperature. Those studies shown results about ice cream acceptance in cancer patients during particular treatments. Patients under chemotherapy preferred frozen foods. Post-radiotherapy group with evidence of mucositis were no complaints about unpleasant sensations from ice cream. The gradual breakdown of melting ice induces cooling of the mouth, which may give a benefit for preventing oral mucositis during chemotherapy.

Ice cream produces a sensation of freshness, satiation and even a symbolic sense of happiness (Casas et al., 2012). Its characteristics indicate that ice cream can be eaten not only by cancer patients, but also by the general population. This is certainly related to social aspect. A food product with high acceptability by individuals of both groups, can minimize the negative social impact of the diet adopted in treatment (Casas et al., 2012; Vieira et al., 2020). It also helped to boost patients morale in the early post-operative period. Patients were happier to finish their belongings of ice-cream than protein-energy drinks (Trinidade et al., 2012).

B. Banana as A Main Ingredient

Banana is a beneficial nutritious fruit. Its texture, convenience and easiness to eat, taste as well as nutritional values, are advantages that makes banana be number one dessert fruit (Nadya Nurul H, 2016). It is the most consumed fruit in cancer patients since it is safe for consumption, not cause gas, and can decrease constipation as a side effect of some therapies. Instead of causing indigestion, banana tend to strengthen the digestive system. A flavonoid contained in banana, leucocyanidin, has been found to significantly increase the thickness of the mucous membrane layer of the stomach. It even help to neutralize acidity, so banana can be the great way to get rid of heartburn (Sampath Kumar et al., 2012). Its soft texture helps cancer patients that have trouble swallowing during their treatments. Furthermore, banana contains some compounds cancer patients needed (Danty et al., 2015; Epstein & Huhmann, 2011).

Natural carbohydrates in banana are helpful for energy and proteins for endurance. Banana is high in calories (200 cal) and carbs (51 gm). Those nutrients can keep patients strength up during treatments (Price et al., n.d.; Sampath Kumar et al., 2012). Vitamin B6 and derivatives contained in banana assist patients to alleviate nausea and vomit. This vitamin is known more effective than other newer drugs in reducing the severity of nausea (Pleuvry, 2006). Iron which is also contained inside banana, along with B6 are important for creating hemoglobin. Eating banana is the natural way to treat anemia that may directly caused by myelosuppressive effect of therapies (Hunter III, 2014).

Banana also contain a rich of vitamin C. This compound help to boost the immune system and acts as a natural anti inflammatory agent. It heals and defends against infections (Fauntleroy, 2017). Bananas aid in
vitality, which means that people who eat it, will have more energy both mentally and physically. In fact, bananas can help improve mood due to the work of tryptophan, one of some essential amino acids can be found in banana (Hulskens et al., 2013; Sampath Kumar et al., 2012). Although this amino acid is obtained through the diet, different from serotonin, tryptophan is able to cross blood-brain barrier. Based on this advantage, tryptophan is well absorbed from consuming banana, with about 70 percent ending up in the bloodstream and easily moved to the central nervous system. As the serotonin precursor, existence of tryptophan in the central nervous system effectively increases brain serotonin. Brain serotonin levels have an important role in the regulation of sleep, depression, anxiety, aggression, appetite, temperature, sexual behavior, and pain sensation (Birdsall, 1998; Jenkins et al., 2016; Sampath Kumar et al., 2012). However, consumption of banana must be reduced before therapies will be done. Some treatments trigger production of intestinal serotonin. Excessive amounts of serotonin in the intestine can increase nausea and vomiting (Du Bois et al., 1996).

C. Social Business Plan

A simple social business plan was made for running a startup enterprise. As a beginning, it was assumed to use only a bunch of bananas per day as the main ingredient in making ice cream. A bunch of bananas was expected to produce 30 ice cream scoops. Of 30 ice cream scoops produced, it was assumed that 20 were for sale and 10 were free for cancer sufferers. Therefore, for the calculation, business capital was calculated for production capacity of 30 per day while income was the sales result of 20 ice creams per day.

The calculation was carried out to budget the expenses. Production costs, manufacturing costs and fix costs are presented in Table 1.

Table 1. Production costs, manufacturing costs and fix costs

<table>
<thead>
<tr>
<th>No</th>
<th>Production units</th>
<th>Quantity for 30 scoops</th>
<th>Price/unit (IDR)</th>
<th>Costs / day (IDR)</th>
<th>Total costs in 1 year (IDR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Production costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Banana</td>
<td>1 bunch</td>
<td>25.000</td>
<td>25.000</td>
<td>9.000.000</td>
</tr>
<tr>
<td>2</td>
<td>Mint leaves</td>
<td>1 bundle</td>
<td>5.000</td>
<td>5.000</td>
<td>1.800.000</td>
</tr>
<tr>
<td>3</td>
<td>Honey</td>
<td>2 bottles</td>
<td>100.000</td>
<td>3.333</td>
<td>1.200.000</td>
</tr>
<tr>
<td>4</td>
<td>Milk</td>
<td>80 ml</td>
<td>8.000</td>
<td>8.000</td>
<td>2.880.000</td>
</tr>
<tr>
<td>5</td>
<td>Chococips</td>
<td>1 pack</td>
<td>5.000</td>
<td>5.000</td>
<td>1.800.000</td>
</tr>
<tr>
<td>6</td>
<td>Ice cream cup</td>
<td>30 cups</td>
<td>1.000</td>
<td>30.000</td>
<td>10.800.000</td>
</tr>
<tr>
<td>7</td>
<td>Ice cream spoon</td>
<td>30 spoons</td>
<td>200</td>
<td>6.000</td>
<td>2.160.000</td>
</tr>
<tr>
<td>B</td>
<td>Manufacturing costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Electricity, water, line</td>
<td></td>
<td>-</td>
<td>-</td>
<td>600.000</td>
</tr>
<tr>
<td>2</td>
<td>Depreciation on equipments</td>
<td></td>
<td>-</td>
<td>-</td>
<td>967.164</td>
</tr>
<tr>
<td></td>
<td>Total Variable Costs (TVC)</td>
<td></td>
<td>82.333</td>
<td></td>
<td>31.207.164</td>
</tr>
<tr>
<td>C</td>
<td>Fix costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Equipments</td>
<td></td>
<td></td>
<td>6.382.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Fix Costs (TFC)</td>
<td></td>
<td>6.382.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Costs (TC)</td>
<td></td>
<td></td>
<td>37.589.164</td>
<td></td>
</tr>
</tbody>
</table>

Equipments used, costs and their economic life are shown in Table 2.

Table 2. Equipment costs

<table>
<thead>
<tr>
<th>No</th>
<th>Equipments</th>
<th>Quantity</th>
<th>Price (IDR)</th>
<th>Economic life</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Blender</td>
<td>1</td>
<td>150.000</td>
<td>2 years</td>
</tr>
<tr>
<td>2</td>
<td>Hand Mixer</td>
<td>1</td>
<td>200.000</td>
<td>2 years</td>
</tr>
<tr>
<td>3</td>
<td>Knife</td>
<td>1</td>
<td>10.000</td>
<td>3 years</td>
</tr>
</tbody>
</table>
Those costs data were used for analysing BEP and PP. Result of BEP and PP analysis are presented in Table 3.

<table>
<thead>
<tr>
<th>Components</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price per scoop (P)</td>
<td>5.000 IDR</td>
</tr>
<tr>
<td>Income per day (TR)</td>
<td>100.000 IDR</td>
</tr>
<tr>
<td>BEP in sales value</td>
<td>15.120.014,03 IDR</td>
</tr>
<tr>
<td>BEP in unit</td>
<td>3.024 units</td>
</tr>
<tr>
<td>PP</td>
<td>151 days or 5 months</td>
</tr>
</tbody>
</table>

From feasibility analysis above, several facts can be discovered: banana ice cream business only requires simple tools and materials so that it can be done at home by everyone; although the sales plan is small and there are several ice creams for free, the startup enterprise can get a quick return on investment; the business is able to provide profits after 5th month’s sales of banana ice cream. According to Businesses (2012), a payback period of three years or less is desirable. If the business’s payback period is less than a year, it can be said that the business is essential. Based on that statement, banana ice cream business is feasible. Furthermore, profits earned by the enterprise can circle back for the needs of cancer patients.

IV. CONCLUSION

Ice cream and banana can be combined as a nutritional supplement for cancer patients during their treatment. This formula provides high quality, rich of nutrition, safe and comfort to swallow, and a pleasure. The trial of making banana ice cream is still limited to a home scale, it has not been done on a larger scale yet. Taste trial, preference test and evaluation test have also not been done on cancer patients yet. For further research, author suggest to do all of those tests to give more and deeper information.

ACKNOWLEDGMENTS

Lord Jesus Christ for His richest grace and mercy for the accomplishment of this paper. Mother for providing moral and material support. Dr. Ir. Wiludjeng Rossali, M.Si., for supervising this study.

REFERENCES


Banana Ice Cream as an Eco-Friendly Social Enterprise Product for Helping Cancer Patients During Treatment

Janne Hillary
