

Financial Feasibility Analysis of Product Modification Katuk and Spinach Brownies Tartlet as an Alternative Breastfeeding Mother's Snack

RA.Hangesti Emi Widyasari^{1*}, *Mela* Nurdialy², and *Jihan* Fadhilah³

¹ Food Service and Nutrition Industry Management, College of Vocational Studies – IPB University, Kampus IPB Cilibende, Bogor 16151, Indonesia

²Accounting, College of Vocational Studies – IPB University, Kampus IPB Cilibende, Bogor 16151, Indonesia

³Student of Food Service and Nutrition Industry Management, College of Vocational Studies-IPB University, Bogor 16151, Indonesia

Abstract. Katuk and spinach brownies tartlet products from katuk leaves as a source of galactagogue and spinach, rich in iron, can help breastfeeding mothers in exclusive breastfeeding for six months. This study aims to modify the katuk and spinach brownies tartlet products and analyze these products' financial feasibility. This research makes brownies tartlet. This tartlet uses katuk leaves and spinach. This study indicates that the energy content in one product is 288 cal, carbohydrate 30.2 g, Protein 5.2 g, fat 17.9 g, and iron 0.8 mg. Financial feasibility analysis results showed that BEP of production of 37.820 pieces, BEP of sales of IDR 189.102.195; Return on Sales of 23.4%; Return on Investment (ROI) of 189.5%; NPV of IDR 91.831.077 and PBP during 0.55 year, Discounted Payback Period (DPBP) of 0.60 years, Profitability Index of 2.38 and Accounting Rates of Returns (ARR) of 52.6%. Based on scenario analysis, katuk and spinach brownies tartlet is feasible for business if minimum sales of 72% of products. Based on the financial feasibility analysis comparison data above, katuk and spinach brownies tartlets are more profitable than pineapple carrot juice business; chocolate spread with coconut ingredients business, and banana chips

1 Background

A breastfeeding mother is one of the groups in the life cycle that need attention. Breastfeeding is a process of giving breast milk which is the best source of nutrients with a bioactive composition that can improve the health status of mother and child. According to [1], 80% of a child's brain development starts in the womb until age 3, known as the golden period. Therefore, at this time, it is necessary to give exclusive breast milk for six months that can protect the infant against invasive infections [2]. One of the global nutrition targets of Sustainable Development Goals is to promote the rate of mothers performing exclusive breastfeeding within six months up to at least 50% in 2025 [3]. WHO and UNICEF emphasize keeping exclusive breast milk feeding in the first six months of life [4].

Based on the research results conducted in the United States, babies who get exclusive breast milk six months lower have ISPA (respiratory tract infection) by 72% and have diabetes by 30%. In addition, breast milk can reduce the risk of SIDS (sudden infant death syndrome) by 36% [5]. According to data monitoring nutritional status in Indonesia in 2017,

* Corresponding author: hangesti@apps.ipb.ac.id

the scope of exclusive breastfeeding for the first six months by a mother to her baby is still low. 65% of babies are not exclusively breastfed for six months at birth. This figure is quite far from the target of exclusive breast milk coverage in 2019 set by WHO or the Ministry of Health, 80% [6]. One of the most common factors associated with the failure of exclusive breastfeeding practices is that the breast milk factor has not come out in the first week after birth [7].

The use of galactagogue is one way to increase the secretion and production of breast milk. Developing local food crops that function as galactagogue can be one strategy to overcome the failure of exclusive breastfeeding due to the low secretion and production of breast milk.

Katuk and spinach brownies tartlet is a modified product development of brownies tartlet. In general serves as a sweet snack (dessert) that is currently popular as an alternative snack for breastfeeding mothers—fortifying local foodstuffs in this product by adding katuk leaves and spinach. Katuk leaves (*Sauropus androgynus*) have been known in traditional medicine in South and Southeast Asia as a breast milk-enhancing drug because it contains galactagogue compounds to help stimulate, maintain or increase breast milk production. In addition, Spinach (*Amaranthus Viridis*) is a superfood that contains many nutrients, so it to refer to as the king of vegetables.

This research aims to modify katuk and spinach brownies tartlet products as an alternative snack for breastfeeding mothers. While the main objective is to calculate the energy and nutritional content of the product and analyze the business and production cost of katuk and spinach tartlet brownies.

2 Literature Review

2.1 Tartlet

Tart derived from French can be translated as pie or tart or any baked dish filled with something sweet or savory such as custard or pastry cream and then decorated on the top (topping). A tart is a form of rigid pastry, thick filling that does not overflow [8]. The main ingredients of tart from wheat flour and eggs. Tartlet refers to a mini tart that has a thickness of less than 1 inch (2.5 cm) made according to individual portions. In general, this food is a dessert. There are many types of tarts, with popular varieties including Tart Treacle, Tart Meringue, Tart Tatin, and Tart Bakewell.

2.2 Brownies

Brownies are one of the most popular cake-based wheat flour, a chocolate cake with attractive colors, a delicious aroma, and a less-fluffy texture [9]. The recipes of brownies first appeared in the book Home Cookery called Service Club Book in 1904. Brownies are initially chocolate cakes that fail because the texture does not expand and is slightly wet on the inside, unlike cakes in general that are soft and porous. But in reality, brownies turned out to be well received by consumers.

2.3 Katuk leaf (*Sauropus androgynus*)

One of the traditional medicinal plants in Indonesia that facilitates breastfeeding is katuk. *Sauropus androgynus* is known as cekur manis (Malaysia), Pak-Wanban (Thailand), rou ngot (Vietnam), or a multivitamin plant (India). Katuk leaf contains galactagogue that can stimulate the mother's breast milk gland by increasing the mammary's secretion cells [10]. A

mother commonly consumes galactagogue after birth. A regular or delayed production occurs in this stage since progesterone decreases sharply after placenta removal as prolactin, cortisol, and insulin levels increase [11]. Breast milk production increases because katuk leaves contain alkaloids and sterol [12]. Based on the table of List Food Composition, every 100 g of katuk leaves have of 59 cal energy, protein 4.8 g, fat 1 g, carbohydrate 11 g, calcium 204 mg, phosphor 83 mg, iron 2.7 mg, vitamin A 103,705 SI, vitamin D 0.1 mg, vitamin C 239 mg, and water 81 g. Recent studies indicated that katuk, a traditional medicinal plant to facilitate breastfeeding, proved beneficial as an antioxidant. The leaves are an antioxidant because they contain vitamin C. Vitamin C in katuk leaves is relatively high, approximately 85.65% 92.43 to 92.18 mg / 100g [13]. They were consuming katuk leaf extract equivalent to 2 g of simplistic in capsule form based on research. A dose of 2x1 for 15 days can increase breast milk production in breastfeeding mothers [14].

2.4 Spinach (*Amaranthus Viridis*)

Spinach belongs to the Chenopodiaceae family (also known as goosefoot), a family of nutritional powerhouses including beets, chard, and quinoa. People have used spinach in various cultures throughout history, notably in the Mediterranean, Middle-Eastern, and South-East-Asian cuisines. It is cheap and easy to prepare [15]. Spinach is a type of leaf vegetable that is much in demand by the community. According to data obtained at ADS (Agribusiness Development Station), there is a trend of spinach demand that has increased every year since 2013. Based on World Healthiest's Food Rating results, spinach is a green vegetable rich in various nutrients, especially iron (Fe), which is good to consume for breastfeeding mothers. The recommended iron adequacy rate for breastfeeding mothers per day is 18 mg [16]. Based on the table of List Food Composition that in every 100 g, raw spinach contains 36 cal energy, protein 3.5 g, fat 0.5 g, carbohydrate 6.5 g, calcium 267 mg, phosphor 67 mg, iron 3.9 mg, vitamin A 6090 SI, vitamin B1 0.08 mg, vitamin C 80 mg, and water 80.9 g.

2.5 Breastfeeding Mother

During breastfeeding, a mother needs additional energy to improve the quality and quantity of breast milk. The calculation of energy need of breastfeeding mother using the Harrist Benedict method results was obtained plus 500 kcal for the first six months and 550 kcal for the second 6 months. Based on [16], the average energy need of adult women is 2000 cal, so the energy need of a breastfeeding mother is about 2500-2550 cal per day. The macronutrients of breastfeeding mothers are carbohydrates 60-70% of the energy, protein 12-15%, fat 15-25%, and enough vitamins and minerals, especially Fe. The secretion of breast milk averages 800-850 ml per day and contains 60-65 kcal, protein 1-1.2 g, and fat 2.5-3.5 g every 100 ml. These substances are from the mother's body, and a daily food supply can replace them [17]. According to WHO and FAO, the recommended iron for breastfeeding mothers is 10-30 mg/day [18]. Exclusive breastfeeding for up to 6 months without iron supplementation may compromise the hematologic status of children [19]. Snacking for breastfeeding mothers can improve the quality and quantity of breast milk [20]. The snack needed by breastfeeding mothers takes 15%-20% of the energy required a day or about 375 cal-500 cal. If the mother lacks the mother's energy and nutritional need, apart from the quality of breast milk and maternal health is disturbed, it will affect the period for the mother to produce breast milk.

2.6 Financial Feasibility

According to Investopedia [21], financial analysis is a process to evaluate businesses, projects, budgets, and other finance-related transactions to determine their performance and suitability. Financial feasibility assessment using capital budgeting analyses changes with long-term effects that vary over time [22]. There are several techniques available to analyze to evaluate the feasibility of a business by considering the time value of money, risk, and rate of return on investment. Return on Investment (ROI) is one of the most popular performance measurement and evaluation metrics used in business analysis. The project's feasibility depends on analyzing the cash flows generated by the project and its costs. The analyst can use capital budgeting methods such as Payback Period, Net Present Values, Internal Rates of Returns, Accounting Rates of Returns, and Profitability Index to evaluate the financial feasibility [23]. The analytical techniques to determine and predict risk and influence are sensitivity analysis and scenario analysis [24]. Scenario analysis is a behavioral technique that uses multiple potential alternate results to assess the variability of the measured return by NPV when asking what-if questions [25], [26]. The commonly used scenario approach to estimate NPV is along with pessimistic (worst), most likely (base), and optimistic (best) cash inflow estimates [25], [26], [27].

3 Research Method

3.1 Time and Place Observation

The research was conducted on June 8, 2021, aiming to work from home during the pandemic in Subang West Java.

3.2 Type and How to Retrieval Data

Type and how to retrieve data in table 1 as below:

Table 1 Type and how to retrieve data

No	Data	Type of Data	Method of Retrieval Data
1.	Literature	Secondary	Via the internet
2.	Production process	Primary	Active participation by preparing the need for tools and ingredients
3.	Energy content and nutrients	Secondary	Via table of list food composition
4.	Production cost	Primary	Analysis directly

3.3 Need of Tools

The need for tools for users to make katuk and spinach brownies tartlet is in table 2 as below:

Table 2 Need of tools Source of primary data 2021

Name of Tool	Specification	Amount
Preparation Tool		
Big bowl	Porcelain	2
Spatula	Plastic	1
Small sieve	Stainless	1
Side plate	Porcelain	3
Tartlet mold	Stainless	15
Paintbrush	Wood	1
Scale	Plastic	1
Fork	Stainless	1
Knife	Stainless	1
Processing Tool		
Mixer	Stainless	1
Oven	Stainless	1
Flat baking sheet	Stainless	1
Balon whisk	Stainless	1
Presentation Tool		
Cake cup	Paper	15
Small mica	Plastic	15

3.4 Need of Ingredients

Need of Ingredients for used to make katuk and spinach brownies tartlet is in table 3 as below:

Table 3 Need of ingredients Source of primary data 2021

Ingredients	Unit Price (Rp)	Size	Total Price (Rp)
Spinach	3,000/tie	35 g	1,500
Katuk leaves	2,500/tie	25 g	625
Low protein wheat flour	8,000/kg	200 g	1,600
Medium protein wheat flour	10,000/kg	100 g	1,000
Yolk	2,000/ egg	2 eggs	4,000

Egg	2,000/ egg	1 egg	2,000
Sugar	13,000/kg	130 g	1,690
Margarine	5,500/sachet 250 g	150 g	3,300
Milk powder	2,500/sachet 27 g	27 g	2,500
White chocolate	12,500/stem 250 g	150 g	7,500
Cooking oil	13,000/kg	40 g	520
Almond	12,500/1/4ons	15 g	3,750
Total Price			29,985

3.5 The Flow of Production Process Plan

Based on figure 1, the flow of production process plan katuk and spinach brownies tartlet starting from the procurement of foodstuffs to serving. The total time needed in the production process flow is 2 hours over 25 minutes.

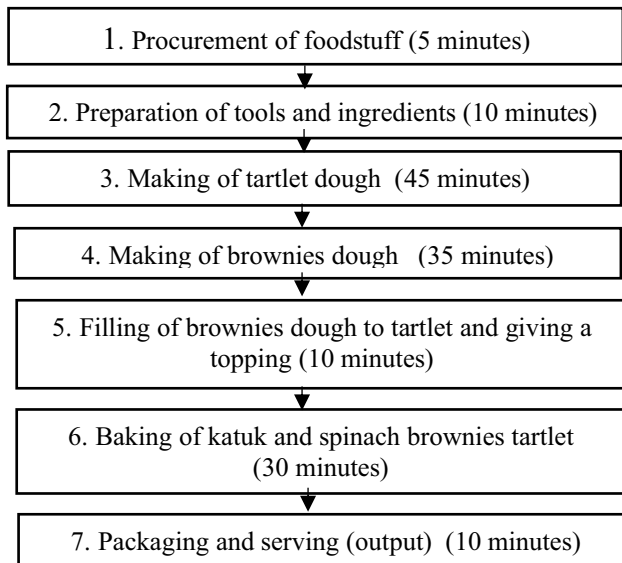


Fig. 1. The flow of the production process plan

3.6 Financial Analysis

This research was quantitative descriptive. The data was collected in the form of primary data and secondary data. Primary data was obtained by observation and interviews. At the same time, secondary data was obtained from various kinds of literature. The data analysis method used was an analysis of financial feasibility. Financial feasibility is an analytical tool to evaluate an investment's economic viability. Financial feasibility is a tool for examining the financial decision has expected return and risk [28]. This study will assess the financial feasibility of the Katuk and spinach brownies tartlet business based on the investment criteria

of Break-Even Point (BEP), Return on Investment (ROI), Net Present Value (NPV), Internal Rate of Return (IRR), Payback Period (PBP), Discounted Payback Period (DPBP), Profitability Index and Accounting Rates of Returns (ARR). The results of the financial feasibility analysis will provide information on whether this business is feasible or not to be undertaken. The data analysis divide into four steps.


The first step is to construct pro forma financial statements, consisting of each account assumption determined and transformed into pro forma financial statements. To calculate depreciation by using the straight-line method. The second step is to calculate Break-Even Point (BEP). The third step is to conduct the feasibility analysis using Return on Investment (ROI), NPV, IRR, Payback period, Discounted Payback Period (DPBP), Profitability Index, and Accounting Rates of Returns (ARR). The fourth step is to perform the risk assessment. Although the project can evaluate in step 3 based on its feasibility, we need to consider the risk to deal with the assumptions' uncertainty. The sensitivity analysis calculates risk assessment by changing the variable input by creating five scenarios.

4 Result and Discussion

4.1 Description of Katuk and Spinach Brownies Tartlet Product

Katuk and spinach brownies tartlet is a form of modified product development by changing the appearance, color, taste, texture, and aroma and adding energy and nutrients to brownies tartlet. This product is as a dessert. The processing technique is baking. The way of serving is before processing in the form of one piece with a natural weight of 30 g while the ripe weight is 27 g. This product is an alternative snack for breastfeeding mothers because it uses an additional 25 g of katuk leaves and 35 g of spinach. Based on the research [29], this is reinforced by 50 panelists of breastfeeding mothers who were given katuk biscuits as much as 4 g/day for 42 days showed that giving katuk biscuits helped increase breast milk production and supported the achievement of exclusive breastfeeding weight loss < 8%. The characteristic of katuk and spinach brownies tartlet is in table 4 as below:

Table 4 Characteristic of product Source of primary data 2021

Characteristic	Katuk and Spinach Brownies Tartlet
Appearance	
Colour	Yellow has a green spot
Taste	Sweet, savory
Aroma	The smell of cake and vegetable
Texture	Crunchy (tartlet), less-fluffy (brownies)

4.2 The Superior Value of Katuk and Spinach Brownies Tartlet

The Superior value of katuk and spinach brownies tartlet products are :

- a. Developing snacks for breastfeeding mothers tare hat rare in society
- b. The popular dessert that can improve mood and provide satiety when consuming
- c. As an idea of utilizing local ingredients at economical prices that can create more interesting products
- d. Using the katuk leaves serves as a galactagogue, and spinach is rich in iron good for breastfeeding mothers.
- e. One of the products contains energy that can fulfill the needs of a daily snack for breastfeeding mothers.
- f. It has a long shelf life, can last for two weeks if stored in the refrigerator at 5 ° C - 10 ° C and one week in an airtight jar at 25 ° C

4.3 Production Process

Standard operating procedures for katuk and spinach brownies tartlet production start from the procurement of foodstuffs to the presentation of dishes. The production process of katuk and spinach brownies tartlet is as follows :

- a. Based on figure 2, Procuring of foodstuff takes about 5 minutes. This process includes the entire preparation and selection of ingredients needed and selected strictly in quality, size, freshness, and legal completeness, so the products produced to follow the quality standards determined. The purchase of ingredients once when going through the production process (conventional production system). Foodstuff consists of dry ingredients and wet ingredients.



Fig. 2. Procuring of foodstuff.

- b. Based on figure 3, Preparing tools and ingredients takes about 10 minutes. This process consists of washing the ingredients and weighing the ingredients according to the structured recipe and the amount produced.



Fig. 3. Preparing of tools and ingredients

- c. After the preparation process, the next is chopping katuk leaves and spinach. It takes about 5 minutes, so the following results are :



Fig. 4. The result of chopped leaves katuk and spinach

- d. Based on figure 5, making tartlet takes about 45 minutes, including dough, printing dough, and baking dough



Fig. 5. Tartlet

- e. Based on figure 6, making brownies takes about 35 minutes. First, beat the sugar and eggs until dissolved and cool. After that, mix the melted chocolate, oil, margarine, and additional wheat flour and milk powder.



Fig. 6. Brownies

- f. Based on figure 7, the following process is filling brownies dough into a tartlet and giving a topping of chopped spinach and almonds that takes 5 minutes.



Fig. 7. Filling of brownies dough to tartlet and giving a topping

- g. Based on figure 8, the process of baking *katuk and spinach brownies tartlet* in the oven with a temperature of 150°C for 30 minutes until ripe



Fig. 8. Process of baking

- h. Based on figure 9, the process of packaging takes 5 minutes. Packaging of katuk and spinach tartlet brownies product use plastic mica size 6x and paper cake cup with a diameter of 4 cm with the following result.



Fig. 9. Serving (output)

4.4 The Energy and Nutrient Content

Based on the table, the method of calculating the nutritional value of the product can be seen from the table of the Food Ingredients List or now known as the Indonesian Food Ingredients Table. The energy and nutrient content of katuk and spinach tartlet brownies in 1 recipe (15 pieces) contains the energy of 4,324 cal, 77.9 g of protein, 268 g of fat, and 453.4 g of carbohydrate. In comparison, one part of the product contains the energy of 288 cal, 5.2 g of protein, 17.9 g of fat, 30.2 g of carbohydrate, and 0.8 mg of iron.

Table 5 The energy and nutrient content

Source of primary data 2021

No	Name of ingredient	Weight (g)	Energy (Cal)	P (g)	L (g)	KH (g)	Fe (mg)
1.	Spinach	35	13	1,2	0,2	2,3	1,4
2.	Katuk leaves	25	15	1,2	0,3	2,8	0,7
3.	Wheat flour	300	1,095	26,7	3,9	231,9	3,6
4.	Yolk	110	397	17,9	35,0	0,8	0,9
5.	Egg	55	89	7,0	6,3	0,4	1,5
6.	Sugar	130	473	-	-	122	0,1
7.	Margarine	150	1,080	0,9	121,5	0,6	-
8.	Powder milk	27	137	6,6	0,1	9,8	0,2
9.	White chocolate	150	572	13,5	52,5	80,4	3,0
10	Cooking oil	40	361	-	40,0	-	-
11.	Almond	15	92	2,9	8,2	2,4	0,5
Total one recipe (15 pieces)			4,324	77,9	268	453,4	11,9
Total one piece			288	5,2	17,9	30,2	0,8

4.5 Energy Contribution

Based on table 6, katuk and spinach brownies tartlet in one serving contribute energy by 11.5% to the needs of nursing mothers < six months and by 11.3% contribute energy to the needs of nursing mothers ≥ six months. Consumption a day is enough. One product already fulfills the energy need of a breastfeeding mother's snack (15%)

Table 6 Energy contribution

Source of primary data 2021

Category of Breastfeeding Mother	AKE (Cal)	Energy Contribution (%)
Breastfeeding mother < six months	2500	11,5
Breastfeeding mother ≥ six months	2550	11,3

4.6 The Result of Financial Analysis

The initial investment is the funds needed to start a business. The initial investment is IDR 66,520,750, clustered into machinery & equipment, legal cost, and Halal Certificate and Pre Operating Expense. These assumptions for financial feasibility analysis on interviews and relevant secondary data.

- The project lifetime is four years.
- The capacity of production per day is 360 pieces (= 3 x 7 pans x @ 20 tartlets = 28 recipes). Assumptions: there are 5% defective goods.
- Twenty-five workdays in a month.
- The price of tartlet is assumed to be fixed based on the market price at IDR 6,00 per piece for four years.
- Revenue growth/year is 5%.
- Inflation is assumed to be 4%
- Salvage Value is 10%
- The cost of capital is assumed to be 10%
- This business is subject to a final tax of 0.5% of turnover.
- The owner deposited 30% initial capital and 70% from a loan with an interest rate of 10%.
- Owner rents space for business

4.6.1 Project Proforma Financial Statements

Using the assumptions described previously, 75% of products sold and the projected proforma financial statements are :

Table 7 Income statement

Sources: author analysis

Income Statement				
	Year 1	Year 2	Year 3	Year 4
Projected Sales	538,650,000	565,582,500	593,861,625	623,554,706
Less : Cost of Goods Sold	299,736,750	430,821,622	446,624,243	449,872,325
Gross Profit	238,913,250	134,760,878	147,237,382	173,682,381
Operating Expenses				
Salaries (Indirect Labour)	30,000,000	31,050,000	32,136,750	33,261,536
Rent	30,000,000	31,050,000	32,136,750	33,261,536
Utilities	600,000	621,000	642,735	665,231
Telephone	1,320,000	1,366,200	1,414,017	1,463,508
Marketing & Promotion	24,000,000	24,840,000	25,709,400	26,609,229
Depreciation	1,305,000	1,305,000	1,305,000	18,000,000
Distribution	18,000,000	18,630,000	19,282,050	19,956,922
Office Supplies	300,000	310,500	321,368	332,615
Interest Rate	4,656,453	3,653,123	2,549,460	1,335,432
Total Operating Expenses	110,181,453	112,825,823	115,497,530	134,886,009
Earnings Before Interest and Taxes (EBIT)	128,731,798	21,935,055	31,739,852	38,796,372
Tax (0.5%)	2,693,250	2,827,913	2,969,308	3,117,774
Net Profit	126,038,548	19,107,143	28,770,544	35,678,599

Income statement data show this business has always generated a profit since the first year. Return on Sales is 23.4%. The following projected statement of financial position is :

Table 8 Balance sheet

Sources: author analysis

Balance Sheet					
	Year 1	Year 2	Year 3	Year 4	
Assets					
Cash	126,038,548	19,107,143	28,770,544	35,678,599	
Inventory	99,912,250	82,727,343	64,217,100	44,309,799	
Total Current Assets	225,950,798	101,834,486	92,987,644	79,988,398	
Equipment	15,800,000	12,470,000	9,140,000	5,810,000	
Less: Accumulated Depreciation	3,330,000	3,330,000	3,330,000	3,330,000	
Intangible Goods	10,000,000	7,500,000	5,625,000	3,750,000	
Less: Accumulated Amortization	2,500,000	1,875,000	1,875,000	1,875,000	
Total Fixed assets	19,970,000	14,765,000	9,560,000	4,355,000	
Total Assets	245,920,798	116,599,486	102,547,644	84,343,398	
Liabilities and Stockholder's Equity					
Liabilities	36,531,229	25,494,604	13,354,316	0	
Stockholder's Equity	209,389,568	91,104,881	89,193,327	84,343,398	
Total Liabilities and Stockholder's Equity	245,920,798	116,599,486	102,547,644	84,343,398	

Cash at the end of the year is always positive. It means cash flow from income is more than cash out, and the amount continues to increase. Average Cash Flow is (IDR) 46,587,577. The projected cash flows are as follows :

Table 9 Cash flow

Sources: author analysis

Cash Flow					
	Year 0	Year 1	Year 2	Year 3	Year 4
Cash Flow from Operating Activities					
Cash In Flow					
Loan	46,564,525				
Capital	19,956,225				
Net Profit + Depreciation		131,868,548	24,937,143	34,600,544	41,508,599
Cash OutFlow					
Machinery & Equipment	14,800,000				
Legal cost and Halal Sertificate	10,000,000				
Other Civil Work					
Payment of Priciple Loan		10,033,296	11,036,625	12,140,288	13,354,316
Pre Operating Expense	41,720,750				
Total Cash Outflow	66,520,750	10,033,296	11,036,625	12,140,288	13,354,316
Net Cash In Flow - Cash Out Flow	-	121,835,252	13,900,517	22,460,256	28,154,282
Cash Flow Beginning		-	121,835,252	135,735,769	158,196,025
Cash Balance End	-	121,835,252	135,735,769	158,196,025	186,350,308
Annual Cash Flow	-	121,835,252	13,900,517	22,460,256	28,154,282
Average Cash Flow		46,587,577			

4.6.2 Break-Even Point (BEP)

The Break-even point is the point with sales revenue is equal to total cost and zero profit [30]. Table 10 shows the point of sale when it reaches the break-even point and the number of units produced each year. Break-even analysis determines the sales needed to break even [31]. This business will get a break-even point when sales go IDR 189,102,195 and 37,820 units in the first year. The profit margin in sales per unit was 58,27% in the first year.

Table 10 Break-even point (BEP)

Sources: author analysis

Break - Even Point				
	Year 1	Year 2	Year 3	Year 4
Sales (IDR)	718,200,000	754,110,000	791,815,500	831,406,275
Fixed Cost (IDR)	110,181,453	112,825,823	115,497,530	134,886,009
Variable Cost (IDR)	299,736,750	430,821,622	446,624,243	449,872,325
Contribution Margin Ratio	58.27%	42.87%	43.59%	45.89%
BEP - Sales (IDR)	189,102,195	263,180,142	264,933,519	293,932,097
BEP - Unit (units)	37,820	52,636	52,987	58,786

Financial analysts frequently divide costs into two types: variable costs and fixed costs. Variable costs change as the output changes, and they are zero when production is zero. Cost of direct labor and raw materials are examples of variable costs [31]. The cost must be issued in fixed amounts during a specific period. The size is not dependent on the size of operating volume or production volume during the period is the fixed cost [32].

4.6.3 The Feasibility Analysis

A feasibility study is an analysis that considers all of a project's relevant factors—including economic, technical, legal, and scheduling considerations—to ascertain the likelihood of completing the project successfully. Whether a project is feasible can depend on several factors, including the project's cost and return on investment, meaning whether the project generated enough revenue or sales from consumers.[33].

According to Investopedia [34], ROI is a performance measure used to evaluate the efficiency of an investment or to compare the efficiency of some different investments. Return on Investment (ROI) calculates the benefit (return) divided by the investment's cost. The capital budgeting method analyses and evaluates the feasibility of long-term investments to maximize the owner's wealth over a certain period [25], [35]. ROI analysis (when applied correctly) is a powerful tool for evaluating existing information systems and making informed decisions on software acquisitions and other projects [36].

According to Investopedia [37], the gross profit margin is metric analysts use to assess a company's financial health by calculating the amount of money leftover from product sales after subtracting the cost of goods sold (COGS).

Net Present Value (NPV) measures profitability on investment by calculating the present value of future cash flows minus the present value of the cost of the investment. The project is profitable if the net cash flow value is greater than zero [31].

The Internal Rate of Return (IRR) is the discount rate that makes a zero NPV of the investment. In other words, IRR is the expected compound annual rate of return that will earn on a project or investment [25], [26], [38].

The Payback period offers a rough measure of the investment's liquidity [28]. The company subjectively determines the maximum length of acceptable payback time based on project type, product circumstances, and project perceived risk [25].

According to Investopedia [39], the discounted payback period is a capital budgeting procedure used to determine the profitability of a project. A discounted payback period gives the number of years it takes to break even from undertaking the initial expenditure by discounting future cash flows and recognizing the time value of money. The metric is used to evaluate the feasibility and profitability of a given project.

According to Investopedia [40], the profitability index (PI) measures a project's or investment's attractiveness. The PI calculates by dividing the present value of future expected cash flows by the initial investment amount in the project. A PI greater than 1.0 is deemed a good investment, with higher values corresponding to more attractive projects. Under capital constraints and mutually exclusive projects should be selected, only those with the highest PIs.

According to Corporate Finance Institute [41], the accounting Rate of Return (ARR) is the average net income an asset is expected to generate divided by its average capital cost, expressed as an annual percentage. The ARR is a formula used to make capital budgeting decisions. It is used in situations where companies decide whether or not to invest in an asset (a project and an acquisition.) based on the future net earnings expected compared to the capital cost.

According to the feasibility analysis results from table 11, all the results met the criteria. The business of katuk and spinach brownies tartlet is feasible.

Table 11 Feasibility analysis

Sources: author analysis

Technique	Value	Acceptance Criteria	Result
-----------	-------	---------------------	--------

Return on Investment ROI)	189.47%	Positive ROI (ROI > 0)	Accept
Gross Profit Margin	44.35%	Positive gross margin (GM > 0)	Accept
NPV (IDR)	91,831,077	Positive NPV (NPV > 0)	Accept
IRR	106.1%	IRR > interest rate	Accept
Payback Period	0.55 year = 6.6 months	Before the project's lifetime (4 years)	Accept
Discounted Payback Period (DBP)	0.60 year = 7.2 months	Before the project's lifetime (4 years)	Accept
Profitability Index	2.38	> 1 acceptable, < 1 not acceptable	Accept
Accounting rate of return (ARR)	52.6%	> 50% acceptable, < 50% not acceptable	Accept

Table 12 Comparison of financial feasibility analysis

Sources: author analysis

Technique	Katuk and spinach brownies tartlet's value	Pineapple carrot juice's value	Chocolate spread with coconut ingredient's value	Banana Chips
Return on Investment ROI)	189.47%			
Gross Profit Margin	44.35%			
IRR	106.1%	17.29%	1526%	8.25%
NPV (IDR)	91,831,077	102,128,626	20,389,635.9	31,024,617
Payback Period	6.6 months	2,7 months	1.93 years	2 months
Discounted Payback Period (DBP)	7.2 months			
Profitability Index	2.38			
Accounting rate of return (ARR)	52.6%			

Based on the financial feasibility analysis comparison data above, katuk and spinach brownies tartlets are more profitable than pineapple carrot juice business [42]; chocolate spread [43] with coconut ingredients business and banana chips [44].

4.6.4 The Scenario Analysis

Risk in capital budgeting is defined as uncertainty regarding the cash flows generated by the project or the degree of cash flow variability [25]. The feasibility analysis was carried out on the assumption of current conditions, which may change in the future. Thus, risk assessment

is necessary. We use sensitivity analysis in financial modeling to analyze how the different values of independent variables affect a specific dependent variable under certain conditions [45]. Sensitivity analysis is uncertainty analysis by altering variables assumed from a base case to evaluate how they affect the measured results of the project [38]. If the NPV show to be highly sensitive to relatively small changes in the projected value, the forecast risk involved with the variable is significant [26]. Sensitivity analysis is carried out based on assumptions that have been described previously by making five scenarios. From scenario analysis that calculates the risk assessment, this business is feasible if it can sell at least 72% of its products. By conducting a risk assessment of several scenarios, if it can sell products at least 72%, all the results meet the criteria, and the business is feasible.

Table 133 Scenario analysis

Sources: author analysis

Sensitivity on Revenue					
% of Products Sold	71%	72%	75%	80%	85%
Return on Sales	19.1%	20.2%	23.4%	28.2%	32.4%
Return on Investment ROI)	146.5%	157.2%	189.5%	243.2%	296.9%
Gross Profit Margin	41.2%	42.0%	44.4%	47.8%	50.9%
Average Cash Flow (IDR)	15,787,036	23,487,171	46,587,577	85,088,253	123,588,930
IRR	<i>not applicable</i>	42.7%	106.1%	180.9%	246.0%
NPV (IDR)	(5,237,337)	19,029,767	91,831,077	213,166,595	334,502,112
Payback Period	0.71 years	0.66 years	0.55 years	0.42 years	0.34 years
Discounted Payback Period (DBP)	0.78 years	0.73 years	0.60 years	0.46 years	0.38 years
Profitability Index	0.92	1.29	2.38	4.20	6.03
Accounting rate of return (ARR)	40.7%	43.7%	52.6%	67.6%	82.5%

5 Conclusions and Suggestions

5.1 Conclusions

1. Based on the energy and nutrient content in 1 piece of katuk and spinach brownies, tartlet product contains the energy of 288 cal, 5.2 g protein, 17.9 g of fat, 30.2 g of carbohydrate, 0.8 mg of iron.
2. The analysis of business and cost of production of *katuk and spinach brownies tartlet* is feasible with a minimum of 72% of products sold.

5.2 Suggestions

1. Based on the energy and nutrient content result, katuk and spinach brownies tartlet has fulfilled the mother's daily snack to be an alternative snack for breastfeeding mothers.

2. Katuk and spinach brownies tartlet can be an alternative healthy food business.
3. Financial feasibility analysis results showed that BEP of production of 37.820 pieces, BEP of sales of IDR 189.102.195; Return on Sales of 23.4%; Return on Investment (ROI) of 189.5%; NPV of IDR 91.831.077 and PBP during 0.55 year, Discounted Payback Period (DPBP) of 0.60 years, Profitability Index of 2.38 and Accounting Rates of Returns (ARR) of 52.6%. Based on scenario analysis, katuk and spinach brownies tartlet is feasible for business if minimum sales of 72% of products.
4. Based on the financial feasibility analysis comparison data above, katuk and spinach brownies tartlets are more profitable than pineapple carrot juice business; chocolate spread with coconut ingredients business and banana chips.

References

1. The Indonesian Ministry of Health. Exclusive Breastfeeding Situation and Analysis. Jakarta (ID): Infodatin. (2014)
2. Agostoni C, Braegger C, Desci, Kolacek, Koletzko. Breast-feeding: A Commentary by the ESPGHAN Committee on Nutrition. *Journal of Pediatric Gastroenterology and Nutrition* 49:112–125. (2009)
3. W. Schultink. Why nutrition and breastfeeding are crucial to sustainable development. (2015). <https://blogs.unicef.org/blog/author/wernerschultink/>.(accessed August 27, 2021)
4. Hoseini L, Vakili R, Khakshour A, Saeidi M. Maternal Knowledge and Attitude toward Exclusive Breast Milk Feeding (BMF) in the First 6 Months of Infant in Mashhad. *International Journal of Pediatrics*, Vol.2, N.1, Serial No.3 (2014)
5. American Academy of Pediatrics. Breastfeeding and the Use of Human Milk. *Journal of American Academy of Pediatrics*.Vol.129 (3): 827-841 (2012)
6. Ministry of Health RI. Nutritional Status Monitoring Pocket Book 2017. Jakarta (ID): Healthy living Community Movement. (2017)
7. Syarief H, Damanik M, Sinaga T. Utilization of Bangun-bangun Leaf in the Development of Functional Supplementary Food Products for Breastfeeding Mothers. *Indonesian Journal of Agricultural Sciences: SSN 0853 – 4217* Vol. 19 (1): 38-42. (2014)
8. Luxita S, Puneeta A. 2019. Organoleptic and Physicochemical Properties of Tarts Developed from Quinoa, Chickpea, and Oats Flour and Their Ranking by Topics Method. *Journal food and nutrition of Amity University: No. (2) 2019, 457-468.* (2019)
9. Wahyuni S, Holilah, Asranudin, Noviyanti. Estimation of shelf life of Wikau Maombo Brownies Cake Using Accelerated Shelf Life Testing (ASLT) Method with Arrhenius Mode. *IOP Conf. Series: Earth and Environmental Science* 122 (2018) 012082. (2018)
10. Ilmi B, Arini A, Novriyanti B. Formulation of Snack Bar from Torbangun Leaf as Food Source for Iron and Calcium. *Indonesian Journal of Nutritional Science*, Vol.01, No.1 (2021): 21–26. (2021)
11. Ngadiardi I, Agusta N, Srimati M, Fayasari A. Sauropus androgynus, Papaya Leaves, and Mung Beans as Mixed Galactagogue Drink for Urban Postpartum Mothers. *Binawan university: Food Nutrition Journal* 16 (2):101-10. (2019)
12. Rahmanisa, S, and Tara. The Effectiveness of Extraction Alkaloids and Sterols from Katuk leaves (*Sauropus androgynus*) on breast milk production. *Majority* Vol.5 (1):117-121.(2016)

13. Hayati A, Arumingtyas L, Indriyani S, Hakim L. Local Knowledge of Katuk (*Sauropus androgynus* (L.) Merr) in East Java, Indonesia. *University of Islam Malang: International Journal of Current Pharmaceutical Review and Research*; 7(4); 210-215. (2016)
14. Rosdianah, Irma S. Giving Katuk Leaf Extract to Breast Milk Smoothness in Breastfeeding Mothers. *JKM (Journal of Midwifery Malahayati)*, Vol 7(2): 45-50. (2021)
15. Al-gumbos N, Abu-Naser S. Spinach Expert System: Diseases and Symptoms. Al-Azhar University: *International Journal of Academic Information Systems Research (IJASIR)* ISSN: 2000-002X Vol., Pages: 16-22 9. (2019)
16. AKG. The Recommended Nutritional Adequacy Rate for The Indonesian People. Regulation of The Ministry of Health Republic Indonesia Number 28. (2019)
17. Zahro W, Pangestuti R, Widajanti R. Patterns of Breastfeeding and Nutritional Status of Breastfeeding Mothers in The Work Area of Kedung Mundu Public Health Center. Semarang (ID). *Journal of Public Health e-Journal: Vol 4 (3)*. (2016)
18. Mangaroni, Cetin I, Verduce E, Canzone G, Glovannini. Maternal Diet and Nutrient Requirements in Pregnancy and Breastfeeding. An Italian Consensus Document. MDPI: Review. (2016)
19. Rosa, Marques, Jose, Taddei, Fabio, Lopez. Breastfeeding Exclusively and Iron Deficiency Anemia During the First 6 Months of Age. *Rev Assoc Med Bras*: 60 (1):18-22. (2014)
20. Noviyanti. S, Swamilaksita D, Angkasa D. The Potential of Fenugreek Seed Cookies with Variations of Red Bean Flour, Whole Wheat as a Companion Snack for Breastfeeding Mothers. Jakarta (ID): *Journal of Esa Unggul University*. (2015)
21. Financial analysis. In Investopedia. Retrieved August 23, 2021, from <https://www.investopedia.com/>. (2021)
22. Christensen, L. P. Raisin Production Manual. UCANR Publications. (2000)
23. Menya, S. O., & Gichinga, L. The Effects of Capital Budgeting Techniques on the Growth of Micro-Finance Enterprises in Mombasa, 4 (5), 6. *International Journal of Science and Research (IJSR)*. Volume 4. (2015)
24. Karanovic, G., Barca, S., & Bogdan, S. Techniques For Managing Project Risk In Capital Budgeting Process, 1(2), 13. (2010)
25. Gitman, L. J., Zutter, C. J. Principles of managerial finance. The Pearson Series in finance (Fourteenth edition.). Boston: Pearson. (2015)
26. Ross, S. A., Westerfield, R. W., Jordan, B. D. Fundamentals of Corporate Finance, 922. Mc Graw Hill. (2003)
27. Brigham, E. F., & Houston, J. F. Fundamentals of financial management (12th ed.). Mason, OH: South-Western Cengage Learning. ((2009)
28. Fabozzi, F. J., & Peterson, P. P. Financial Management and Analysis (2nd edition.). (2003)
29. Pinem Br S, Ginting Br S, Simamora L. Effect of Consumption Biscuits and Oxytocin Massage on the Succes of Exclusive Breastfeeding for Breastfeeding Mothers at Simalingkar Health Center in 2019. *Health Dynamics Journal of Midwifery a Nursing* Vol 10 No.2 2019 (ISSN: 2086-3454 EISSN: 2549-4058) url: <http://ojs.dinamikakesehatan.unism.ac.id> DOI: <https://doi.org/10.33859/dksm.v10i2> (2019)
30. D.R. Hansen, M.M. Mowen. Accounting Managerial 8th edition. Cengage Learning. (2006)

31. S. A. Ross, R. W. Westerfield, J. Jaffe, Corporate Finance, 9th edition. (2010)
32. Kastaman, R. Engineering Economics for Entrepreneurial Development. Pustaka. (2001)
33. Feasibility Study. (2021). In Investopedia. Retrieved March 27, 2022, from <https://www.investopedia.com/terms/f/feasibility-study.asp>
34. Return on investment – ROI. (2011). In Investopedia. Retrieved August 23, 2021, from <https://www.investopedia.com/>. (2021)
35. Clark, J. J., Hindelang, T. J., & Pritchard, R. E. Capital Budgeting: Planning and Control of Capital Expenditures. (1989)
36. Alexei Botchkarev & Peter Andru, (2011). A Return on Investment as a Metric for Evaluating Information Systems: Taxonomy and Application. Available from: https://www.researchgate.net/publication/216356259_A_Return_on_Investment_as_a_Metric_for_Evaluating_Information_Systems_Taxonomy_and_Application [accessed August 23, 2021]
37. Gross Profit Margin. (2022) In Investopedia. Retrieved February 2, 2022, from https://www.investopedia.com/terms/g/gross_profit_margin.asp.
38. Van Horne, J. C., & Wachowicz, J. M. Fundamentals of financial management (13th ed.). Harlow, England ; New York: Financial Times/Prentice Hall. (2008)
39. Discounted Payback Period. (2022). In Investopedia. Retrieved February 2, 2022, from <https://www.investopedia.com/terms/d/discounted-payback-period.asp>.
40. Profitability Index. (2021) In Investopedia. Retrieved August 23, 2021, from <https://www.investopedia.com/>.
41. Accounting Rate of Return. (2022) In Corporate Finance Institute. Retrieved February 2, 2022, from <https://corporatefinanceinstitute.com/resources/knowledge/accounting/arr-accounting-rate-of-return/>.
42. M. Sari, A. Nurmaydha, D. U. M. Rohmah. Financial Feasibility Analysis of Pineapple Carrot juice Business. Journal of Physics: Conference Series. IOP Publishing. 1381 (2019) 012034. doi:10.1088/1742-6596/1381/1/012034. (2019)
43. Dyah Ayu Savitri, Herlina, Noer Novijanto. Financial Feasibility Analysis of Chocolate Spread with Coconut Ingredients as Agroindustrial Product. Journal La Bisecoman. Vol. 02, Issue 02 (014-024), (2021)
44. Ruswajia, Puguh Cahyono. Analysis of Business Feasibility of Banana Chips. Journal of Humanities and Social Studies. Volume 04, Number 02, September 2020, Page 197 – 200. e-ISSN: 2598-120X; p-ISSN: 2598-117X.
45. Sensitivity analysis. (2021). Retrieved August 23, 2021, from <https://corporatefinanceinstitute.com/>.