



## Feasibility Study of Black Garlic's Home Industry in Ngestiharjo Village

Anjar Kistia Purwaditya<sup>1</sup>, Noor Aulia Asrul Muliana<sup>1</sup>, Reza Ulfi Shahrul<sup>1</sup>,  
Reza Ulfi Shahrul<sup>1</sup>, Satria Bhirawa Anoraga<sup>1</sup>

<sup>1</sup>Diploma Program of Agroindustry, Bio-resource Technology and Veterinary Department, Vocational College, Universitas Gadjah Mada, Yogyakarta, Indonesia

Corresponding Author: [anjar.k.p@ugm.ac.id](mailto:anjar.k.p@ugm.ac.id)

### ARTICLE INFO

### ABSTRACT

#### Keywords

B/C ratio;  
Black garlic;  
NPV;



[10.12928/jafost.v2i1.388](https://doi.org/10.12928/jafost.v2i1.388)

0

*Garlic production in Indonesia is quite large. So far, we have known that many garlic are sold raw without being processed. But lately garlic is widely developed processing garlic into other products like black garlic that being produced by Mrs. Vetie Kusumaningsari, S.E. in Yogyakarta. The objective of this study is to analyze the feasibility of Black Garlic's Home Industry. The method being used in this study are break even point (BEP), net present value (NPV), benefit/cost (B/C) ratio, and payback period to analyze the data being collected. The result of this study indicates that BEP can be reached 334 cups product, with 7% of interest NPV indicate positive at Rp 10.713.817,8, B/C ratio was at 0,7 and payback period (PP) at 0,045 year. In conclusion regarding to the study, black garlic's home industry feasible to run and develop.*

This work is licensed under a [Creative Commons Attribution-Share Alike 4.0](https://creativecommons.org/licenses/by-sa/4.0/)



## 1. INTRODUCTION

Lately home industry or we all known as small medium enterprises (SMEs) grow rapidly in Indonesia. Regarding to Ministry of Cooperatives and SMEs of The Republic of Indonesia in 2017-2018 the growth reached 2,02%. Herbal SMEs are one of many that started to grow especially in 2020 in the middle of pandemic era. Specifically is black garlic that widely known to have high amount of antioxidants.

According to Aini et al. (2018) garlic (*Allium sativum* Linn.) is one of the horticultural plants with many benefits. Garlic is useful as a spice and medicine for diseases such as respiratory infections, and can be used to maintain endurance. It is possible because of the high content of antioxidants that can fight pathogenic bacteria in the body. Garlic contains 33 components of sulfur, 17 amino acids, and high amounts of minerals. The main

content in garlic which has antibacterial and therapeutic potential is sulfur. other contents are *Diallyl thiosulfinate* (allicin) and *Diallyl disulfide* (ajoene).

Advanced process from raw garlic is made into black garlic. Black garlic is a product being processed from garlic through heat processing at 70°C for about 30-40 days with 70-80% of humidity without any intervention (Nelwida et al., 2019). Putri et al. (2020) said that black garlic has black in appearance, soft texture with sweet taste, and has a distinctive aroma, but not so strong just like raw garlic. Good quality black garlic is greatly influenced by the heating process.

According to Agustina et al. (2020), the change in color from garlic to black garlic is caused by the Maillard reaction. This heating process of garlic will convert allicin compounds into S-Allylcysteine, tetrahydro- $\beta$ -carbolines, biologically active alkaloids, and flavonoid-like compounds. These compounds play a role in the antioxidant activity of black garlic, resulting in reduced pungent aroma in black garlic. This distinctive aroma in black garlic is caused by an increase in polyphenols, flavonoids, and ascorbic acid content during the heating process (Pramitha et al, 2020). One of the SMEs that is engaged in processing garlic into black garlic is a home industry managed by Mrs. Vetic Kusumaningsari, S.E. in Yogyakarta.

Home industry run by Mrs. Vetic Kusumaningsari, S.E. established in February 2019. This business engaged in processing single garlic into black garlic. The black garlic production place is located in the village of Ngestiharjo, Kasihan, Bantul, Special Region of Yogyakarta. The initial idea of making black garlic products began with black garlic being recognized by Indonesian as a snack with high antioxidant content. The black garlic product of home industry owned by Mrs. Vetic Kusumaningsari, S.E. sold for IDR 35,000 in a 100 grams plastic cup packaging.

Financial analysis is needed to assess the viability of this black garlic production business. Financial analysis is used to determine good policies for the future, as well as evaluate existing performance. Financial analysis that can be used is Break Even Point (BEP), Net Present Value (NPV), B/C Ratio, and Payback Period (PP). Furthermore, these calculations can be used in analyzing the feasibility of a business being run. The objectives of this study were to determine the feasibility of a black garlic home business by calculating the Break Even Point and Net Present Value, B/C Ratio, and Payback Period. This analysis is used to find out profits and loss of the SMEs within the next 10 years.

## 2. MATERIALS AND METHODS

The object of this research is the Black Garlic Home Industry which was held on August 23, 2020 which is located in Onggobayan, Ngestiharjo, Kasihan, Bantul, Special Region of Yogyakarta. The method used in this study to collect data is the interview. The interview was conducted by giving several questions to Mrs. Vetic Kusumaningsari, S.E. as the owner of the Black Garlic Home Industry regarding economic problems. The data used in this research use primary data and secondary data. Primary data were obtained from interviews with the owners of the Black Garlic Home Industry. Secondary data were obtained using literature sources available on the internet. The variables observed include components for increased investment and capital expenditures, as well as components for additional revenue. The financial feasibility of the Black Garlic Home Industry business based on financial performance can be seen from the calculation:

- a. Cost Benefit Ratio, which is the balance between total revenue and total costs, which is described by the level of industry income per certain period (Utari, 2016).
- b. NPV is a method for calculating the difference between the present value of an investment and the present value of net cash receipts (Yasuha et al., 2017). The method of calculating the NPV is as follows.

$$NPV = E \times \frac{1}{(1+R)^n} \dots \dots \dots (1)$$

Information:

E = period 0 interest and tax income

R = national interest index

n = n<sup>th</sup> year

- c. Net Benefit Cost Ratio (B / C Ratio) is a comparison value between positive net benefits and negative net benefits (Anwar, 2018).
- d. Break Even Point or BEP is the point where a business does not experience loss or gain (Choiriyah, 2016). The amount of BEP can be calculated through formula as follows.

$$\text{BEP in volume} = \frac{\text{Fixed Cost}}{(\text{harga produk} - (\text{Variable Cost} / \text{jumlah produk}))} \dots \dots \dots (2)$$

$$\text{BEP in time} = \frac{\text{BEP volume}}{\text{jumlah produk}} \dots \dots \dots (3)$$

$$\text{BEP in money} = \frac{\text{Fixed Cost}}{\% \text{ Margin Income}} \dots \dots \dots (4)$$

Criteria for Break Even Point Production according to Asnidar and Asrida (2017), as follows.

- 1.) If BEP Production < total production, then the business gets a profit.
  - 2.) If the BEP of Production = the amount of production, then the business is at the breakeven position, meaning that it does not get any profit or loss.
  - 3.) If BEP Production > amount of production, then the business will not get a profit
- e. Payback Period or PP is the time period required for the return of investment that has been issued. The payback period can be calculated through the following formula.

$$P = \frac{\text{investasi awal}}{\text{penerimaan periode}} \times 1 \text{ tahun} \dots \dots \dots (5)$$

### 3. RESULT AND DISCUSSION

The black garlic industry owned by Mrs. Vetie Kusumaningsari, S.E. is one of the many home industries engaged in processing garlic into black garlic. The distinctive feature of this home industry is that it only uses raw materials in the form of a single garlic. This is because local lanang garlic have higher benefits than purple lanang garlic. According to Adhuri et al (2018) single garlic has advantages over compound garlic. The superiority of the effectiveness of single garlic extracts in inhibiting the activity of *S. typhi* bacteria compared to compound garlic is due to the difference in levels of chemical compounds between the two. The content of active compounds in a single garlic is equivalent to 5-6 compound cloves of garlic, this is because all the chemicals in garlic are collected in one single clove. Black garlic produced by a home industry located in Onggobayan, Ngestiharjo, Kasihan, Bantul, Special Region of Yogyakarta do not have a legal brand yet. The black garlic home industry that is managed by Mrs. Vetie produces large sizes of black garlic at a selling price of Rp 35.000 per 100 grams. Black garlic products are packed in cup packaging made from Polypropylene plastic.

The financial analysis carried out on the Black Garlic Home Industry owned by Mrs. Vetie Kusumaningsari, S.E is useful to assess the feasibility of the business being run. Financial analysis calculations will be carried out within the next 10 years. So that the existing business feasibility calculations can be useful to assess the profit or loss experienced by the industry with the various investments made.

### 3.1. Cost

The costs used include investment costs and operational costs. Investment costs are costs incurred at the start of running a business, generally these costs are relatively large. The investment cost will not run out in one production period. Operational costs are amount cost in accordance with the number of products produced. Operational costs consist of fixed costs, variable costs, and semi variable costs. According to Hidayat (2013), fixed costs are costs that do not depend on the number of sales. The amount of these costs will remain the same even if the demand for the product increases or decreases. Fixed costs can change when they reach a certain amount of output. Variable costs are costs that are influenced by the level of sales or production. Semi-variable costs are costs that have the characteristics of a combination of fixed costs and variable costs. The investment cost used by the black garlic industry is the cost of machinery and equipment. Variable costs include raw material costs, electricity and water costs, and transportation costs. Fixed costs used include the cost of machinery and equipment as well as labor costs.

### 3.2. Revenue

Based on data obtained from interviews, it was found that the black garlic industry owned by Mrs. Vetie Kusumaningsari, S.E., could produce 18 cups per day with a price range at Rp 30.000 to Rp 35.000 per cup. The calculation of financial feasibility is carried out using products priced at Rp 35.000 per cup. It can be seen that the Fixed Cost is Rp 7.750.000 by adding the cost of machinery and equipment at Rp 550.000 plus labor costs at Rp 7.200.000. The number of workers is two people with a salary of Rp 600.000 per month. Meanwhile, the variable cost at Rp 10.182.000 was obtained by adding up the raw material costs at Rp 9.582.000 and the cost of electricity and water at Rp 480.000 and the transportation cost at Rp 120.000. The total cost used was Rp 17.932.000 and the total revenue was Rp 30.240.000.

Table 1. Annual cost

Cost	Value
Investation cost	
Tools and machinery	Rp 550.000
Variable cost	Rp 10.182.000
Fixed cost	
Tools and machinery cost	Rp 550.000
Labor cost	Rp 7.200.0000

Source: Processed data, 2020

### 3.3. Financial Analysis

#### a. Break-even point (BEP)

The BEP financial analysis used is to calculate the normal price BEP. The volume BEP obtained is 334 cups, BEP time is 4.644 months, so that the BEP reaches Rp 11.684.004,22. This means that the black garlic home industry will break even on sales of 334 cups of black garlic for 4,644 months with a value of Rp 11.684.004,22. In the black garlic home industry, 864 cups of products are sold a

year. This shows that the amount of production is greater than the volume BEP, so the business has broken even in the first year and has made a profit.

b. Net present value (NPV)

The NPV financial analysis uses a ten-time calculation formula with an interest percentage of seven percent. The NPV results obtained in the first year amounted to 11.463.785,05, the second year amounted to Rp 10.713.817,8, the third year amounted to Rp 10.012.913,83, the fourth year amounted to Rp 9.357.863,395, the fifth year amounted to Rp 8.745.666,724, the sixth year amounted to Rp 8.173.520,303, the seventh year amounted to Rp 7.638.804,021, the eighth year amounted to Rp 7.139.069,179, the ninth year amounted to Rp 6.672.027,27, and the tenth year amounted to Rp 6.235.539,505. This means that PV is greater than zero, indicating that investment in the black garlic home industry is feasible to run for up to ten years, because calculations are only carried out for the next ten years. Home industry black garlic must develop new investments and innovations so that the NPV value does not reach zero.

c. Benefit cost ratio

The financial analysis of the B / C ratio in the black garlic industry shows that the result is 0,7, which means that every Rp 100 will get a profit of Rp 70.

d. Payback period

Payback period value is 0,045 years. This indicates that the business will return on investment within 0,045 years, assuming the same level of sales at the same price.

Table 2. Criteria for business financial eligibility

Criteria	Value
BEP in time	4,644 months
BEP in money	Rp 11.684.004,22
BEP in volume	334 cups
NPV 1 <sup>st</sup> year	Rp 11.463.785,05
NPV 2 <sup>nd</sup> year	Rp 10.713.817,8
NPV 3 <sup>rd</sup> year	Rp 10.012.913,83
NPV 4 <sup>th</sup> year	Rp 9.357.863,395
NPV 5 <sup>th</sup> year	Rp 8.745.666,724
NPV 6 <sup>th</sup> year	Rp 8.173.520,303
NPV 7 <sup>th</sup> year	Rp 7.638.804,021
NPV 8 <sup>th</sup> year	Rp 7.139.069,179
NPV 9 <sup>th</sup> year	Rp 6.672.027,27
NPV 10 <sup>th</sup> year	Rp 6.235.539,505
B/C Ratio	0,7
Payback Period	0,045 years

Source: Processed data, 2020

#### 4. CONCLUSIONS

In conclusion, based on the results of the financial analysis of the Home Industry Black Garlic owned by Mrs. Vetic Kusumaningsari, S.E. It is concluded that the break-even point or the point where the industry does not gain or lose, will be reached in 4,644 months with sales of black garlcs of 334 cups and industry income of Rp 11.684.004,22. The results of the NPV calculation for the next 10 years are positive and more than 0. Payback period for 0,045 years and B / C Ratio of 0,7. Based on these calculations it can be said that the

black garlic industry belongs to Mrs. Vetic Kusumaningsari, S.E. feasible to run because the NPV value exceeds 0 and the B / C Ratio value exceeds 0.

#### ACKNOWLEDGMENT

The authors express deep and sincere gratitude to Mrs. Vetic Kusumaningsari, S.E. as the owner of home industry black garlic for providing data and information support for this study.

#### REFERENCES

- Adhuri, Iesha Kinanti *et al.* 2018. The Difference of Antibacterial Potential of Single Garlic and Compound Garlic Against *Salmonella Typhi*. *Jurnal Kedokteran Diponegoro*. 7(2):415-423. (in Bahasa)
- Agustina, E., *et al.* 2020. Antioxidant Activity Test of Black Garlic Extract with Heating Old Variations. *Jurnal Biologi*, 39-50. (in Bahasa)
- Aini, St. Qurratul dan Maya Shovitri. 2018. Early Study of Using Blackened Garlic as Antibacterial. *Jurnal Sains dan Seni ITS*. 7(1):2337-352. (in Bahasa)
- Anwar, M.S., *et al.* 2018. Analysis of Financial Feasibility of Pepper Breeding Business in Sukadana Baru Village, Marga Tiga Subdistrict, East Lampung Regency. *Jurnal Ilmu-ilmu Agribisnis*, 6(2): 110-116. (in Bahasa)
- Asnidar & Asrida. 2017. Analysis of the Feasibility of the Opak Crackers Home Industry in the Village. *Jurnal S. Pertanian*, 39-47. (in Bahasa)
- Choiriyah, V., Dzulkrirom, M., Hidayat, R. 2016. Break Even Point Analysis as a Sales Planning Tool at the Expected Profit Level. *Jurnal Administrasi Bisnis*. 35. (in Bahasa)
- Hidayat, F., Baskara, Z., Werdiningsih, W., Sulastri, Y. 2018. Analysis of Financial Feasibility of Shredded Fish Agroindustry Business in Tanjung Parang, Mataram City. *Jurnal Ilmiah Rekayasa Pertanian Dan Biosistem*. 6. 69-75 (in Bahasa)
- Nelwida, Nelwida, Berliana Berliana, dan Nurhayati Nurhayati. 2019. Nutritional Content of Black Garlic from Heating with Different Times. *Jurnal Ilmiah Ilmu-Ilmu Peternakan*. 22(1):53-64. (in Bahasa)
- Pramitha, Dewi Ayu Ika dan Ni Komang Gita Sundari. 2020. Antioxidant Capacity of Single and Compound Black Garlic In-Vitro with DPPH. *Jurnal Ilmiah Medicamento*. 6(2):79-83. (in Bahasa)
- Putri, Melati Ayuning *et al.* 2020. Evaluation of Old Fermentation Against Characteristics of Black Garlics Using Camion (Black Garlic Fermentation Machine). *Jurnal Agroindustri*. 10(2):156-167. (in Bahasa)
- Utari, Eva., Hadiana, M., Suryadi, D. 2016. Financial Analysis of Business Feasibility of Dairy Cows to Receive People's Business Credit. *Jurnal Finansial*. 3(2). (in Bahasa)
- Yasuha, J. X., & Muhammad, S. 2017. Financial Analysis of Business Feasibility of Dairy Cows to Receive People's Business Credit. *Jurnal Administrasi Bisnis*, 113-121. (in Bahasa)