

Received: May 2023 Accepted: June 2023
DOI: <https://doi.org/10.58262/ks.v11i2.428>

Increasing the Added Value of Coconut Water to Become a Balinese Coco Kefir Probiotic Drink

I Nyoman Sucipta*¹, Wayan Citra Wulan Sucipta Putri**², I Made Sugitha*, Ida Bagus Putu Gunadnya*, Dan Ketut Suriasih***³

Abstract

Balinese Coco Kefir probiotic drink (BCKPD) is a healthy drink that used microbial assistance in the production process. The microbe used were kefir starter which consist of lactic acid bacteria and yeast. The yeast was dominated by Saccharomyces cerevisiae. The purpose of this study is to increase the added value of coconut water through production BCKPD. The program targets in terms of demographics are 20-40 years old, female and male, adults, people who are on a diet. Psychographic aspects for people who are busy with work, people with a middle to upper economic segmentation, always want to try something new, have a modern lifestyle and follow trends. The behavioral aspect is intended for people who pay attention to a healthy lifestyle and enjoy trying new drinks. The expected benefit of this program is the creation of new businesses in the field of probiotic drink. Based on the results and discussion it can be concluded that by producing BCKPD, the added value of coconut water was increased by 36.15%. To meet the needs of the community for probiotic drinks it is recommended that production and quality of BCKPD should be improved

Keywords: *Added value, coconut water, probiotic kefir drinks*

Introduction

Today's Trends in food business refer to making healthy drinks. One of the healthy beverage business is coconut water / Balinese coco kefir probiotic beverage. Probiotic drinks themselves are drinks that contain good bacteria and have benefits for the body. Since the ingredients are good and beneficial for the body, many microbial-based products are popping up today. Many of these products have sprung up from small businesses to industrial scale businesses. Microbial-based food business is very profitable today. According to Learn Genetics microbes are all living things that cannot be seen in plain view. There are microbes that benefit humans, but there are also those that carry diseases that are detrimental to humans. Bali Coco Kefir probiotic drink is a healthy drink that uses microbial assistance in the production process. The main bacteria used are *lactic acid bacteria*. In addition to these microbes in the manufacture of coconut water kefir involving other microorganisms, namely *Saccharomyces cerevisiae*.

The processing of coconut water into Bali Coco Kefir should be from upstream to downstream, it must be based on the principles of sustainability, high productivity,

¹ Faculty of Agricultural Technology, Udayana University
Email: sucipta@unud.ac.id

² Faculty of Medicine, Udayana University

³ Bali Dwipa University

environmentally friendly and processed into high-value derived products. Another thing is the treatment and utilization of waste, so that overall, the production process is environmentally friendly and efficient. That is actually the biggest challenge for researchers, in the processing of agricultural products. Since the creation of science and technology in this topic, requires vision, science, and also advanced research instruments. The science and technology must be user friendly because most of the users are farmers and small / medium entrepreneurs. It also must be environmentally friendly. "

To meet these expectations, researchers continue to race to produce technologies which are able to increase added value and income of the community. Correctional research results are carried out continuously. "As we know that this added value is an old / old issue, but still relevant. Added value is the value added to a commodity due to processing, transportation or storage process in the production. In the process of production, added value can be defined as the difference between the value of the product with the value of the cost of raw materials and other inputs, not including labor. While the margin is the difference between the value of the product and the price of raw materials. This margin includes the factors of production used, namely labor, other inputs and the remuneration of processing entrepreneurs (Hayami et al, 1987).

Based on this understanding, changes in the value of raw materials that have been subjected to large treatment processes can be estimated. Thus, on the basis of the added value obtained, margins can be calculated and subsequently compensation for factors of production can be known. The added value of agricultural products, especially probiotic drinks, can certainly play a role in increasing economic growth. Large economic growth, of course, has an impact on increasing the field of business and community income which ultimately is to improve community welfare.

Some health effects that can be obtained from lactic acid bacteria in probiotic drinks coconut water / bali coco kefir, among others, can improve the digestibility of lactose, control the number of pathogenic bacteria in the intestine, increase natural resistance to infection in the intestine, reduce serum cholesterol, inhibit tumors , antimutagenic and anticarsinogenic, increase the immune system, prevent constipation, produce vitamin B and bacteriocin (antimicrobial compounds), and inactivation of various toxic compounds. The production of coconut water kefir / Bali Coco Kefir healthy drinks is to meet the community's need for probiotic drinks. By producing Bali Coco Kefir probiotic drinks, added value of coconut water could be increased and it is expected to become a new business.

The target program in demographic terms is for ages: 20-40 years, female and male sex, for adults, people who are on a diet. Geographical terms for people who live in Bali. Psychographical aspect for people who are busy with work, people who are middle and upper economic segmentation, always want to try something new and natural, have a modern lifestyle and follow trends. Behavioral aspect is for people who pay attention to healthy lifestyles and love to try new drinks

The expected benefits of this program are creating new businesses in the probiotic beverage field.

Research Methods

Production of coconut water / bali kefir coco kefir begins with the preparation of ingredients. The main ingredients of making coconut water kefir are kefir starter and coconut water. Tools and materials in making the kefir starter as shown in Figure 1



Figure 1. Tools and Materials for Making Kefir Starters.

The flowchart makes a kefir starter (Figure 2).

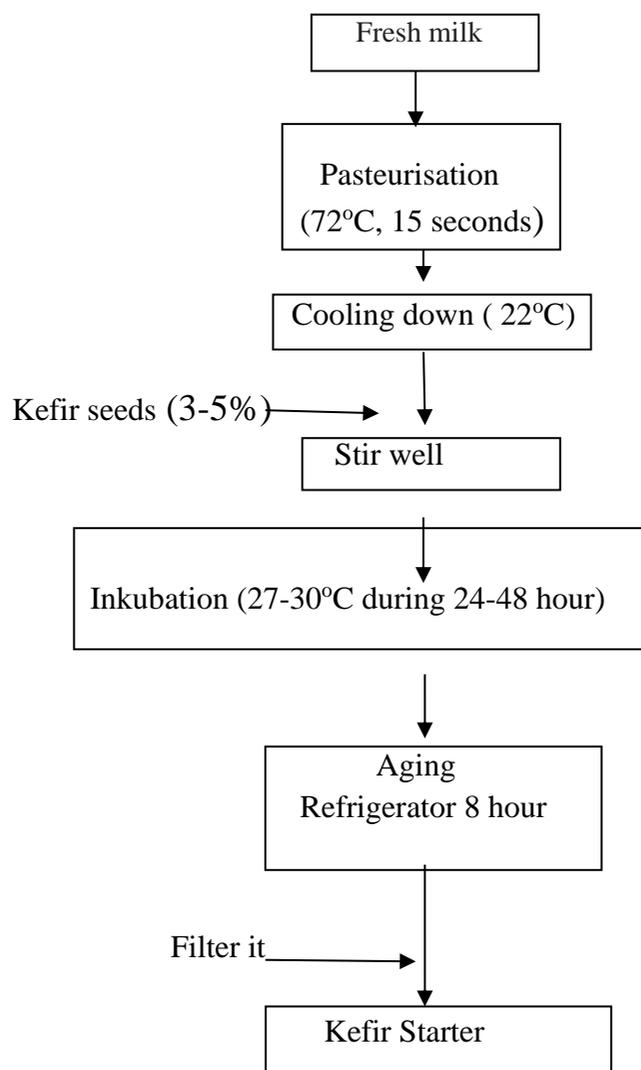


Figure 2. Flow Chart of Making Kefir Starter.

Bali Coco Kefir Production

Bali coco kefir production is started from the coconut splitting and the water is taken then the coconut water is pasteurized for 30 seconds at 60 ° C. Pasteurized coconut water is then allowed to stand until the temperature becomes 28 ° C then 10% kefir starter is added and put in a closed jar and given gauze on the lid. The treatment consists of adding sugar before incubation, and adding sugar after incubation. The incubation time is 24 hours in an incubator cupboard. After 24 hours, then the coco kefir is filtered to separate the rest of the kefir grains. Sugar added in a syrup form at a concentration of 15% (v/v). The sugar concentration of the syrup was 60% (w/v). Then it is stored in the refrigerator and stokes at 5°C, for further fermentation. Bali Coco Kefir's production process is shown in Figure 3.

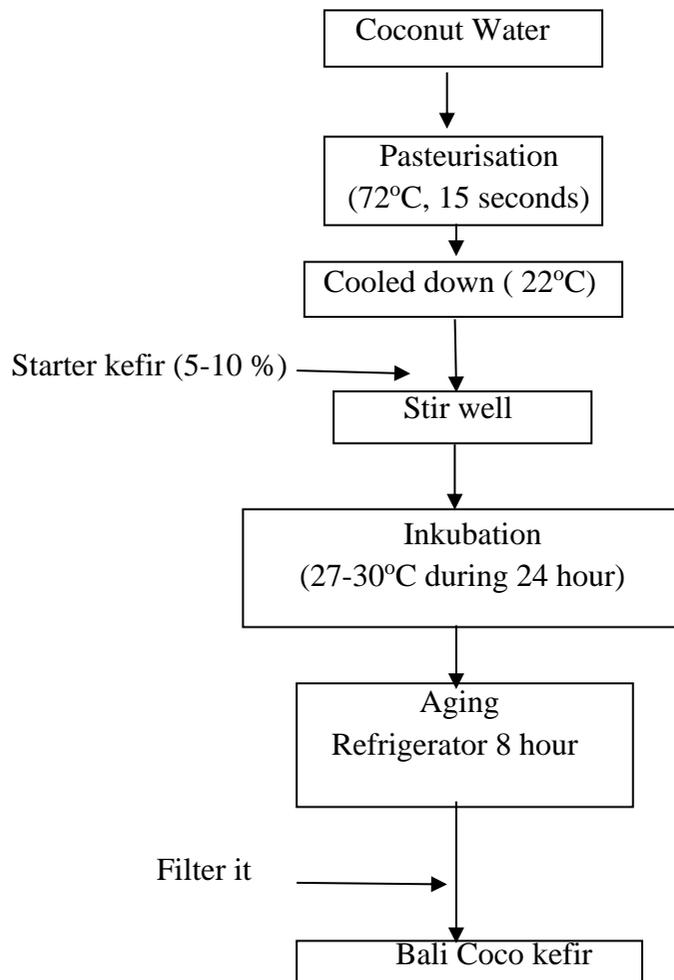


Figure 3. Flow Chart of Making Bali Coco Kefir.

Added Value of Bali Coco Kefir Production

The data that has been collected is first grouped and then processed manually, then translated with the appropriate method of analysis.

To identify the problem (1) which is to find out how the processing of coco kefir with descriptive analysis is to explain from the beginning the processing of coconut water into coco kefir.

To identify the problem (2) which is to find out how much profit the processing of coco kefir is analyzed using the calculation of profits with the formula, namely:

$$\pi = TR - TC$$

Where:

TR = Total Revenue (Rp)

TC = Total Cost (Rp)

Π = Profit (Rp)

To identify the problem (3), which is to find out how much added value from the coco kefir processing, the added value calculation formula using the Hayami method was used. The procedure for calculating the added value according to Hayami can be seen in Table 1.

Table 1. Hayami Method of Value Added Calculation Framework.

Variable	Value
I. Output, Input and Price	
1. Output (cc)	(1)
2. Input (cc)	(2)
3. Labor (HOK)	(3)
4. Conversion Factor	(4) = (1) / (2)
5. Labor Coefficient (HOK / cc)	(5) = (3) / (2)
6. Output Price (Rp)	(6)
7. Labor Wages (Rp / HOK)	(7)
II. Receipts and Benefits	
1. Price of Raw Materials (Rp / cc)	(8)
2. Other Input Donations (Rp / cc)	(9)
3. Output Value (Rp / cc)	(10) = (4) x (6)
4. a. added value (Rp / cc)	(11a) = (10) - (9) - (8)
b. value added ratio (%)	(11b) = (11a/10) x 100%
5. a. labor income (Rp / cc)	(12a) = (5) x (7)
b. share of labor (%)	(12b) = (12a/11a) x 100%
6. a. profit (Rp / cc)	(13a) = (11a) - (12a)]
b. profit rate (%)	(13b) = (13a/11a) x 100%
Reply to the Factor Production Service Owner	
1. Marjin (Rp/cc)	(14) = (10) - (8)
a. Labour income	(14a) = (12a/14) x 100%
b. Other input contributions	(14b) = (9/14) x 100%
c. Bussinisman profit	(14c) = (13a/14) x 100%

Source: Hayami, et all. Agricultural Marketing and Processing In Up Land Java. At Julian Adam Ridjal (2013).

Results and Discussion

Bali Coco Kefir production in 250 ml glass bottles and 330 ml plastic bottles as shown in Figure 4. Bali Coco Kefir production in 250 ml glass bottles and 330 ml plastic bottles as shown in Figure 4



Figure 4. Bali Coco Kefir 250 cc Glass Bottle Packaging(1) and 330 Cc Plastic Bottles (2).

The characteristics of Bali Coco Kefir are total acid 0.16%, total sugar 7.60%, pH 4.00, alcohol content 0.33%, viscosity 1.10 cP, total LAB 7.8×10^7 CFU / ml, Total Yeast $1,7 \times 10^6$ CPU / ml, total microbial 2.6×10^6 CPU / ml, and *E. Coli* negative.

In the production of Bali Coco Kefir, there are several things that need to be known, namely the procurement of raw materials (coconut water), the use of supporting or additional materials, the use of investment capital and the use of labor. And after all is calculated, the total costs, revenues and profits are obtained.

Coconut Water Requirement

The average production frequency of Bali Coco Kefir is as shown in Table 2.

Table 2. Average Production Frequency of Bali Coco Kefir

Description	Frequency of Bali Coco kefir production (time)	Coconut Water used (litre)
Weekly	6	60
Monthly	24	240

Use of Supporting Materials

The average cost of supporting materials used in one production is shown in Table 3 that shows the average supporting costs for 60 liters of coconut water or 240 bottles of 250 cc Bali Coco Kefir, were Rp. 2.380.000, -. Where the supporting costs include gas, sugar, packaging, and labels

Table 3. Average Cost of Supporting Materials Used in Once Production.

No	Supporting Materials	Bali Coco Kefir (Rp)
1	Liquid Petroleum Gass	80.000,-
2	Sucrose	200.000,-
3	Packaging material	1920.000,-
4	Lable	180.000,-
	Total	2.380.000,-

Capital Investment

The average capital investment is shown in Table 4.that shown that the average processing capital investment was Rp. 49,841,363.62

Table 4. Average Capital Investment.

No	Capital Investment	Sum (Rp)
1	Jamb	1.000.000,-
2	Door	2.000.000,-
3	Melamine	3.000.000,-
4	Glue	500.000,-
5	25 kgs of Wall Paint.	2.000.000,-
6	Freezer Sharp frv300	3.395.681,81
7	Showcase polytron scn186	3.395.681,81
8	Refrigerator	2.350.000,-
9	Glass Bottle 250 ml	15.000.000,-
10	Plasctic Bottle 330 ml	5.000.000,-
11	Ice Jell	800.000,-
12	Box	2.500.000,-
13	pH meter, refraktometer, alcoholmeter, viscometer	900.000,-
14	Test panels	1.000.000,-
15	Brochure	5.000.000,-
16	Banner	2.000.000,-
	Total	49.841.363,62

Labor

The average labor used was shown in Table 5. that shows that the average amount of labor used in processing is 32.97 HKO per day with an average wage of labor per week was Rp. 708,384.12 per HKO. The labor used was family labor

Table 5. Average Use of Labor.

Description	Frequency of Coco		Wage (Rp/HKO)
	Kefir Production (time)	Labor Used (HKO)	
Daily	-	4,71	118.064,02
Weekly	6	32,97	708.384,12
Monthly	24	1131,88	2.883.536,48

Bali Coco Kefir production, revenue and profit costs

Average coco kefir production costs, revenues and profits (Table 6), that shows that the average profit of coco kefir production in any production for 1 week was Rp. 2,281,615.88

Table 6. Average Cost of Production, Revenue, and Processing Benefits of Bali Coco Kefir.

Description	Bali Coco Kefir (Rp)
1. Reception	
Coco Kefir (240 x Rp. 20.000,-)	4.800.000,-
2. Production Cost	
Fixed Cost	60.000,-
Variable Cost	2.380.000,-
Labor Wage	708.384,12
Total Cost	2.518.384,12
3. Profit (TR – TC)	2.281.615,88

Added Value of Bali Coco Kefir Production

The added value of Bali Coco kefir production is shown in Table 7.

Table 7. Added Value of Bali Coco Kefir Production.

Variabel	Value
I. Output, Input and the Price	Bali Coco Kefir
1. Output (250 cc bottle)	6500
2. Input (liter)	10000
3. Labor (HKO)	4,71
4. Conversion Factor	0,65
5. Labor Coefficient (HKO / liter)	0,0005
6. Output Price (Rp)	20.000
7. Labor Wages (Rp / HKO)	118.064,02
II. Reception and Profit	
1. Raw material (Rp/liter)	1.000
2. Other Input Contribution (Rp/ 250 cc glass bottle and label)	7.300
3. Output Value(Rp/liter)	13.000
4. a. Added Value (Rp/liter)	4.700
b. Added Value Ratio (%)	36,15
5. a. Labor Income (Rp/liter)	59,03
b. Share of labor (%)	1,26%
6. a. Profit (Rp/liter)	4640,97
b. Rate of Profit (%)	98,74%
III. Remuneration to the Owner of Production Factors	
7. Margin (Rp/liter)	12.000
a. Direct Labor Income (%)	0,5%
b. Other Input Contribution (%)	60,83%
c. Company Owner Benefit (%)	38,67%

The added value obtained from the processing of coconut water into coco kefir was Rp.4700 for raw materials used and the result of the ratio of added value coco kefir production was 36.15% ,which is still classified as moderate. This is because production is still new, still in promotion.

Conclusions and Suggestions

Based on the results and discussion it can be concluded that by producing Bali Coco Kefir probiotic drinks could increase the added value of coconut water : as much as 36.15%. To meet the community's need for probiotic drinks, it is recommended that production and quality of Bali Coco Kefir should be improved

References

- Anonymous (2019). Microbes that make us healthy.
<https://learn.genetics.utah.edu/content/gsl/microbes/>
- Altay, F., F. K. Guler, C. D. Dikmen, and D. Heperkan. 2013. A review on traditional turkish fermented non–alcoholic beverages: microbiota, fermentation process and quality characteristics. *Int. J. of Food Microbiology*. 167 (2013): 44 – 56.
- Buckley, L. K. 2014. *Culture Your Life: Kefir and Kombucha for Every Day Nourishment*. Xlibris Corporation, USA.
- Codex Alimentarius. 2010. Codex Standard for Fermented Milks. CODEX STAN 243-2003.
- Corona, O., W. Randazzo, A. Miceli, R. Guarcello, N. Francesca, H. Erten, G. Moschetti, and L. Settani. 2015. Characterization of kefir–like beverages produced from vegetable juices. *Food Science and Technology*. 66 (2016): 572 – 581.
- Cuarto, P.M., and R. F. Magsino. 2017. Development of young coconut (*Cocos nucifera*) wine. *Asia Pasific Journal of Multidisciplinary Research*. 5 (2): 89 – 93.
- Cui, X. H., S. J. Chen, Y. Wang, and J. R. Han. 2012. Fermentation conditions of walnut milk beverage inoculated with kefir grains. *LWT – Food Science and Technology*. 50 (2013): 349 – 352.
- Farnworth, E. R. 2008. *Handbook of Fermented Functional Foods: Second Ed*. CRC Press, New York.
- Gates, D., and L. Schatz. 2011. *The Body Ecology Diet: Recovering Your Health and Rebuilding Your Immunity*. Hay House, Inc. United States of America. ISBN: 978–1–4019–3544–3.
- Hadiwiyoto. 1994. *Teori dan Prosedur Pengujian Mutu Susu dan Hasil Olahannya Edisi Kedua*. Liberty, Yogyakarta.
- Hayami, Y. 1987. *Agricultural Marketing and Processing in Upland Java, a Perspective from Sunda Village*. CGPRT Center, Bogor.
- James, C. S. 1995. *Analysis Chemistry of Food*. Blackie Academic and Professional, Britania Raya.
- Laureys, D., and L. D. Vuyst. 2014. Microbial species diversity, community dynamics, and metabolite kinetics of water kefir fermentation. *Appl. Environmental Microbiol.* 80(8): 2564 – 2572.
- Moechtar. 1990. *Farmasi Fisik*. UGM Press, Yogyakarta.
- Motaghi, M., M. Mazaheri, N. Moazami, A. Farkhondeh, M. H. Fooladi, and E.M. Goltapeh. 1997. Short communication: kefir production in iran. *World Journal of Microbiology & Biotechnology*. 13 (1997). 579 – 581.
- Musdholifah, dan E. Zubaidah. 2016. Studi aktivitas antioksidan kefir teh daun sirsak dari berbagai merk dipasaran. *J. Pangan dan Agroindustri*. 4 (1): 29 –39.
- Pakbin, B., S. H. Razavi, R. Mahmoudi, and P. Gajarbeygi. 2014. Producing probiotic peach juice. *Biotech Health Sci*. 1 (3): 1 – 5.
- Purbasari, N., A. Hantoro D. R., dan S. Wasito. 2013. Pengaruh konsentrasi biji kefir dan waktu fermentasi terhadap viskositas dan penilaian organoleptik kefir susu kambing. *J. Ilmiah Peternakan*. 1 (3): 1021 –1029.

Randazzo, W., O. Corona, R. Guarcello, N. Francesca, M. A. Germana, H. Erten, G. Moschetti, and L. Settani. 2015. Development of new non-dairy beverages from mediterranean fruit juices fermented with water kefir microorganisms. *Food Microbiology*. 54 (2016): 40 – 51.