SUSTAINABILITY OF PRODUCTION, SALES, AND PRICES OF HERBAL DRINK PRODUCTS DEVELOPED BY THE CENTER FOR AGROTECHNOLOGY INNOVATION (PIAT) UGM: A BREAK-EVEN POINT APPROACH

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ABSTRACT

The growing public interest in herbal beverages presents an opportunity for the Center for Agrotechnology Innovation of UGM (PIAT) to develop instant herbal beverage products. The PIAT-produced herbal drinks items Rosegar (rosella drink), Segar Ayu (wedang uwuh fresh drink), and Gilegrass (citronella ginger powder drink) all already have the Food and Drug Administration (BPOM) certificates. However, the three products have not yet achieved optimal sales, and it is necessary to evaluate the sustainability of production, sales, and prices of these products using a Break Even Point (BEP) analysis approach. Therefore, the goal of this study is to determine whether the BEP of the three products can be achieved. The analysis is performed for a single month of production in 2022. The study results show that the BEP for the production of Rosegar is 136 bottles, the BEP for sales is Rp. 1,364,385 at Rp. 4,586 and the BEP for the production of Segar Ayu and Rosella is 98 packs, the BEP for sales is Rp. 2,951,025 at Rp. 23,208. Overall, the price of PIAT's herbal drink products is already higher than that of BEP, but production and sales remain low or non-optimal.

Keywords: *sustainability, herbal drink, BEP*

BACKGROUND

People are aware of the importance of healthy living and strong desire to consume healthy beverages (Billich et al., 2018). This condition encourages variety in the production of beverages derived from various medicinal plants. Medicinal plants, also known as herbs, are plants or parts of plants that are suspected or proven to have efficacy as medicinal plants, with supporting data from empirical evidence or preclinical data. Herbal plants that are used to treat diseases include ginger, lemongrass, turmeric, temulawak, rosella, cinnamon, secang, cloves, and other medicinal plants (Dwisatyadini, 2017). This community behavior has the potential to create new business opportunities in the food industry, particularly in the production of healthy beverages (Istiatin & Marwati, 2021). One alternative for developing beverage products that meet the requirements of practicality in serving is instant drinks.

Winarti & Nurdjanah (2005) claim that the Indonesian herbal and pharmaceutical industries have generated numerous instant drink products made from biopharmaceuticals, which have led to a significant increase in the instant beverage industry every year. This herbal instant drink product

serves as a refresher as well as a beverage with health benefits. According to Aprilia et al. (2021), the choice to buy processed products is influenced by necessities. The demand for healthy beverages increases the potential for herbal drink products, which motivates the Center for Agrotechnology Innovation (PIAT) of Universitas Gadjah Mada (UGM) to develop novel products like Rosegar (rosella drink), Gilegrass (citronella ginger powder drink), and Segar Ayu (wedang uwuh fresh drink), which aim to cultivate and preserve herbs to be favored by adults, millennials, or teenagers. In order to assure the health of consumers, the three products have been granted distribution licenses by BPOM.

Sales of Rosegar, Segar Ayu, and Gilegrass products, which were initiated since the Covid-19 pandemic, have not yet generated optimal profits. Thus, to ensure that PIAT does not incur losses, it is vital to assess the sustainability of production, sales, and product prices. Factors that affect profits include the selling price of the product, operational costs (both fixed and variable costs), and sales volume (Alnasser, Shaban, & Zubi, 2014; Fatmawatie, 2021). Operating costs determine the selling price to affect sales volume. Sales volume affects production volume, and production volume affects costs incurred. These three factors are interrelated and play a critical part in the commercial success of herbal drink products by PIAT UGM.

Break Even Point (BEP) analysis is one of the analytical methods used to evaluate a business. It is used to estimate a specific amount of sales at which the company would not make a profit or loss (Fatmawatie, 2021). BEP is a condition when the sales of a business are only sufficient to cover the costs incurred to produce a product (Wijayanti, 2013; Alnasser, Shaban, & Zubi, 2014). The BEP analysis will provide information to PIAT UGM about the margin of safety, which is the safe limit used to determine how much sales volume must be achieved to anticipate a decline in sales to avoid losses. Given that PIAT UGM produces a wide range of processed products, BEP analysis to evaluate the sustainability of production, sales, and product prices are crucial to help management better understand the elements that influence the achievement of future profits. Additionally, the BEP analysis will make it easier for management to decide which products should be eliminated when the performance in the market is poor.

RESEARCH METHODS

This descriptive study involves extensive observation and documentation (Bhattacherjee, 2012). Because PIAT developed the downstream processing of UGM herbal products related to herbal drinks, the sample was determined using the purposive method (Neuman, 2014). The data used are sales prices, costs, and sales of Rosegar, Wedang Uwuh, and Gilegrass from one month of production in 2022. Break Even Point (BEP) analysis of production, sales, and prices were employed in this study. This analysis is then used for profit planning.

Production BEP

Production BEP is the minimum production where the income earned equals the expenditure. The formula for BEP Production is as follows (Mathur, 2015):

$$Q = \frac{F}{S - V}$$

Information:
Q   : Total sales quantity
F   : Fixed cost
S   : Unit selling price
V   : Unit variable cost

Sales BEP

BEP sales are minimal sales where the business does not make a profit and does not suffer a loss. Sales BEP formula (Mathur, 2015):

$$Q = \frac{F}{S-V} \times s$$

Price BEP

BEP price is a tool to determine the minimum price at a certain level of sales or production. The price BEP formula is (Mathur, 2015):

$$S = \frac{F + QV}{No.\,of\ units}$$

RESULT AND DISCUSSION

Fixed Costs of Herbal Drinks Production at PIAT UGM

Fixed costs are costs incurred regardless of the amount of production (Xi Chen & Bertrand M. Koebel, 2017). These costs need to be calculated and evaluated so that they can be used to increase business efficiency (Li et al., 2019). The fixed costs of producing herbal drinks at PIAT UGM can be seen in Table 1.

Table 1. Fixed Costs of Herbal Drinks Production at PIAT UGM

Description	Fixed Cost (Rp/Month)		
	Rosegar	**Wedang Uwuh**	**Gilegrass**
Operating car depreciation cost	70,000	70,000	70,000
Equipment depreciation cost	22,000	22,000	22,000
Interest in own capital	530,475	718,560	718,560
Own land rent	300,000	300,000	300,000
Labor	204,286	204,286	204,286
Total	1,126,761	1,314,846	1,314,846

The cost of operating car depreciation, equipment depreciation, own land rent, and labor are the same for all herbal drink products. Only the interest in the capital is different, where Rosegar is lower than Wedang Uwuh and Gilegrass. This cost depends on the production capital of the product, so it can be concluded that the lowest production cost is Rosegar. The cost of own capital calculation is determined by reference to the loan interest of 15%. The financing for operational cars, equipment, business premises, and labor comes from UGM. These fixed costs will be used as a means of

developing the UGM PIAT business so that it will be economically sustainable and increase profits. This is consistent with studies by Utami & Mubarok (2021), which found that calculating a company's costs—fixed costs included—can serve as a foundation for business development, and Kampf et al. (2016), who found that these costs had an impact on profitability.

Variable Costs of Herbal Drinks Production at PIAT UGM

Variable costs depend on the amount of production (Xi Chen & Bertrand M. Koebel, 2017). In this study, the one-month variable costs adjust to the fixed costs incurred. In one month, PIAT UGM can produce eight times. Table 2 describes the variable costs of herbal drink production at PIAT UGM.

Table 2. Variable Costs of Herbal Drinks Production at PIAT UGM (Rp/Month)

Description	Total	Unit	Price (Rp)	Total (Rp)
Rosegar				
Rosella	1.28	liter	80,000	102,400
Sugar	2.4	kg	12,000	28,800
Bottle	160	piece	1,700	272,000
Sticker	160	piece	830	132,800
LPG (3 kg)	10	piece	7,000	70,000
Shipping cost	8	packet	20,000	160,000
			Total	766,000
Wedang Uwuh				
Wedang Uwuh powder	32	kg	70,000	2,240,000
Aluminum foil packaging	2,880	piece	650	1,872,000
Box packaging	288	piece	1,800	518,400
Shipping cost	8	packet	20,000	160,000
			Total	4,790,400
Gilegrass				
Gilegrass powder	32	kg	70,000	2,240,000
Aluminum foil packaging	2,880	piece	650	1,872,000
Box packaging	288	piece	1,800	518,400
Shipping cost	8	packet	20,000	160,000
			Total	4,790,400

Source: Primary Data, 2022

The product with the lowest variable cost is Rosegar since its packaging costs less than Wedang Uwuh and Gilegrass. The variable cost is the same for both products. Only the primary components, such as Wedang Uwuh and Gilegrass powder, cost differently. Rosella is grown by PIAT UGM, and Wedang Uwuh and Gilegrass powder are produced in conjunction with Small and Medium

Enterprises (UKM) with assistance from PIAT UGM. As a result, this product multiplies the aided SMEs, increasing their income directly to the production level and associated costs. Variable costs, like fixed costs, are one of the cost elements that can serve as a foundation for business development, according to Utami & Mubarok (2021), and according to Kampf et al. (2016), these costs affect the profit that needs to be calculated.

Sustainability of Production, Sales, and Prices of Herbal Drink Products at PIAT UGM

The BEP is the price that PIAT UGM must establish to break even in terms of production, sales, and profit. The BEP of the production, sales, and prices of herbal drink items at PIAT UGM are listed in Table 3.

Table 3. BEP herbal drink products at PIAT UGM

Description	Rosegar	Wedang Uwuh	Gilegrass
Production BEP (unit)	136	98	98
Sales BEP (Rp)	1,364,385	2,951,025	2,951,025
Price BEP (Rp)	4,586	23,208	23,208

Source: Primary Data, 2022

Table 3 shows that the BEP of Rosegar's monthly production and sales is higher than those of Wedang Uwuh and Gilegrass. However, the BEP sales and prices for Gilegrass and Wedang Uwuh are identical. This is due to the fact that fixed costs and variable costs both make up the total cost. Figures 1 to 3 show the production, sales, and prices (both BEP and existing) at PIAT UGM. This data shows that existing pricing at PIAT has been higher than BEP, but current production and sales remain below BEP, necessitating an increase at PIAT to maintain continuity. This BEP can be the basis for setting sales goals, production targets, and minimum prices (Kucharski & Wywia, 2019; Vasiliy V, 2018). If the business environment changes, this can be used as a guideline to assess business profits (Fatmawatie, 2021). Additionally, according to Atik et al. (2022), this production must be continuous and scheduled to enhance sales.

At PIAT, marketing for herbal beverage products has been conducted offline and online. In addition to its online presence on social media platforms like Instagram and WhatsApp, PIAT operates a physical store. However, most of the products are produced through a pre-order system. A word-of-mouth method is employed in an effort to boost production and sales because it is believed that most customers will purchase things via this system (Astuti et al., 2022). Another marketing strategy is distributing flyers and posters via social media platforms like Instagram, Whatsapp, Facebook, Tiktok, and other campaigns (Nugraha et al., 2022). The digital marketing system can be applied at PIAT UGM regularly. PIAT UGM can also provide offers in each faculty, department, and study program as souvenirs for activities such as seminars and research. In addition, e-commerce sites like Tokopedia, Bukalapak, and Shopee can be used to boost marketing. This marketing strategy implies that PIAT UGM must allocate funds for marketing expenses.
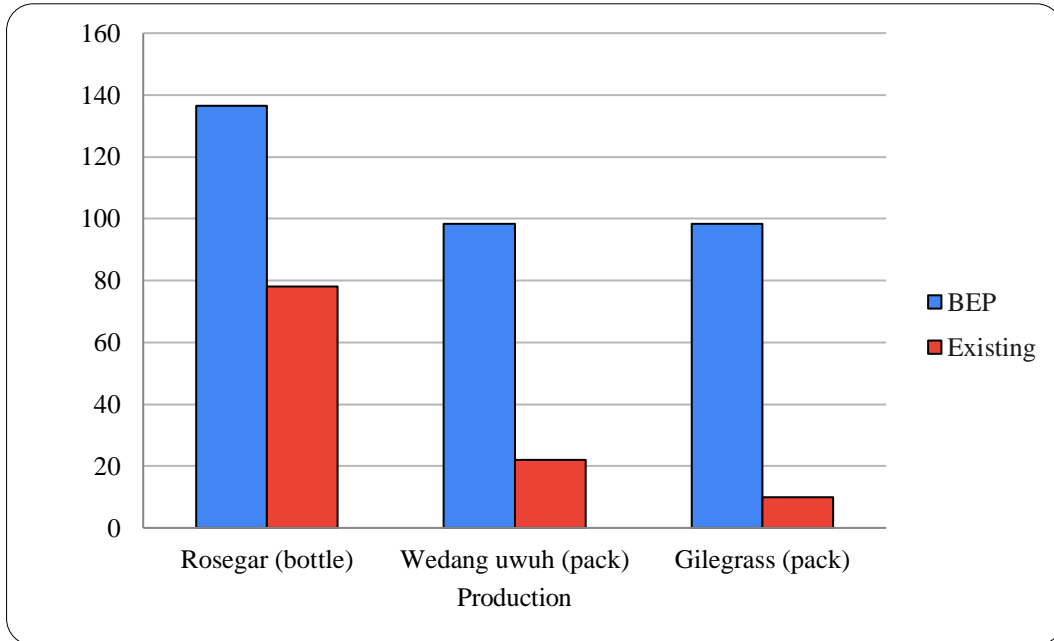
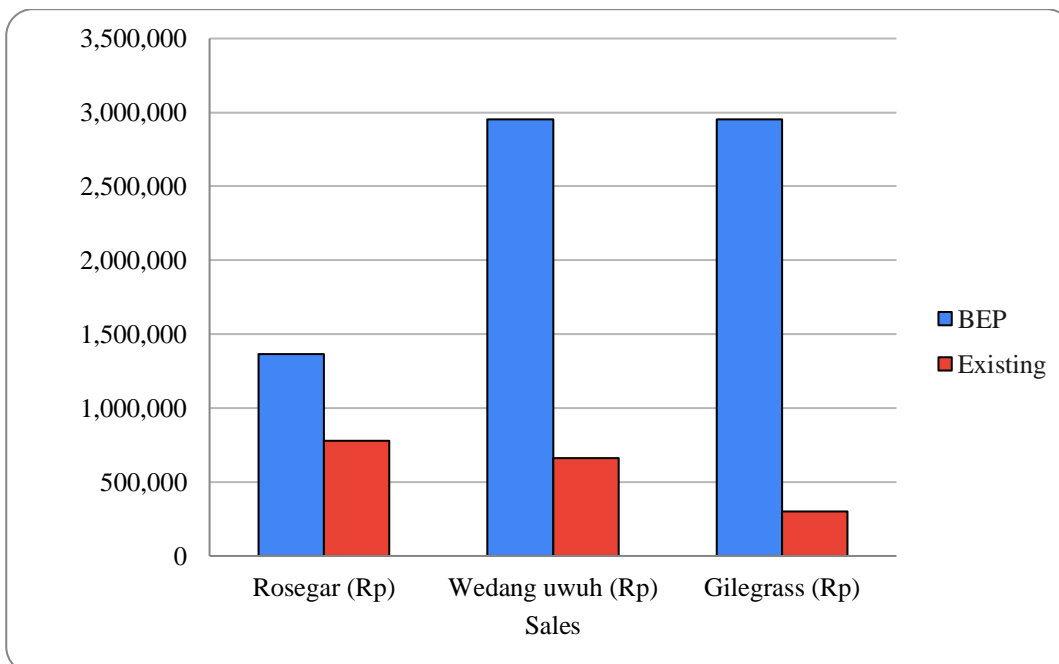**Figure 1.** BEP and Existing Production of Herbal Drinks at PIAT UGM

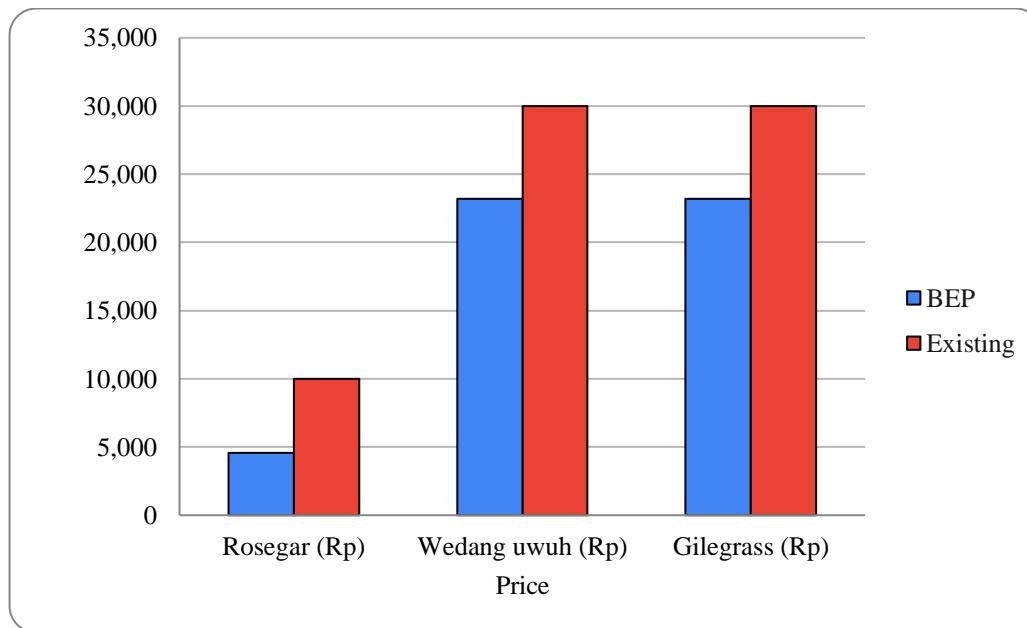**Figure 2.** BEP and Existing Sales of Herbal Drinks at PIAT UGM

Figure 3. BEP and Existing Prices of Herbal Drinks at PIAT UGM

CONCLUSION AND SUGGESTION

The Break Even Point (BEP) production, sales, and price for Rosegar are 136 bottles, Rp 1,364,385, and Rp 4,586, respectively. Meanwhile, the BEP for production, sales, and price for Wedang Uwuh and Gilegrass are identical, i.e., 98 packs, Rp 2,951,025, and Rp 23,208. Furthermore, existing prices are already higher than BEP for herbal drink products of PIAT. Therefore, we suggest that PIAT UGM must expand its marketing efforts through word-of-mouth, social media, partnerships, and e-commerce systems. With these marketing strategies, consequently, PIAT UGM must budget additional marketing costs.

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