

Waste Identification Training to Improve Production Efficiency using Lean Manufacturing At CV.Green Zone Herbal Cikupa Tangerang

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ABSTRACT

Micro, Small and Medium Enterprises (MSMEs) in the herbal industry face challenges in maintaining production efficiency due to the presence of waste in the production process. CV. Green Zone Herbal, located in Cikupa, Tangerang, is one of the herbal MSMEs that still experiences production inefficiency caused by the seven wastes. To address this problem, a Community Service activity entitled "Waste Identification Training to Improve Production Efficiency using Lean Manufacturing at CV. The purpose of this activity was to provide knowledge and training on Lean Manufacturing concepts, particularly waste identification techniques, to improve the production efficiency of the partner. The methods used included socialization, training, direct observation, waste identification using the Waste Assessment Model, and discussion of improvement recommendations with the partner's employees. The results of the activity showed that employees were able to understand the concept of Lean Manufacturing and identify 5 types of dominant waste in the production line. In addition, improvement recommendations were formulated to minimize waste and increase production efficiency. It is concluded that the implementation of Lean Manufacturing training can increase partner awareness and capability in reducing waste and improving operational efficiency. This activity is expected to support the sustainability and competitiveness of CV. Green Zone Herbal.

INTRODUCTION

The PKM program is implemented at CV Green Zone Herbal, a company engaged in the production and professional services of high-quality herbal products based on the principles of natural health and wellness. The company is located in Pangadegan Village, Pasar Kemis District, Tangerang Regency, Banten Province, Indonesia. Green Zone Herbal is committed to promoting the benefits of natural ingredients through the development of innovative and comprehensive herbal products.

Operationally, the company manufactures a variety of herbal products, including supplements, herbal beverages, and plant-extract-based capsules. In addition, it provides contract manufacturing services (private label) for businesses seeking to develop their own branded herbal products. Beyond manufacturing activities, the company also offers herbal educational tourism programs aimed at providing practical insights into medicinal plant cultivation, processing techniques, and their application in natural healthcare.

Green Zone Herbal emphasizes the use of high-quality natural raw materials sourced from reliable suppliers. Its production processes are conducted hygienically by experienced personnel and supported by modern packaging technologies to ensure product quality and safety. Strategically, the company aspires to develop into an innovative, reliable, and sustainable herbal manufacturing enterprise.



Figure 1. Production Facilities Of CV Green Zone Herbal

This Community Service (PKM) training aims to strengthen operational management and production efficiency at CV Green Zone Herbal, a medium-scale enterprise producing high-quality herbal products. As an independent company competing in its sector, CV Green Zone Herbal faces significant challenges, including unstructured material organization, inefficient workflows, and inconsistent workplace standards. These conditions hinder productivity and sustainable operational practices, highlighting the urgent need for structured intervention. The program's primary objective is to comprehensively enhance efficiency as a strategic solution, focusing on the principle of identifying waste. The training engages employees and management—who are participating enthusiastically—in practical workshops, hands-on exercises within production

and storage areas, the development of visual management tools (such as labels, color coding, and workflow markers), and guidance on identifying types of waste and formulating Standard Operating Procedures (SOPs)..



Figure 2. Production Flow Process

Targeted outcomes include providing lean training employees, ensuring that production and storage areas meet established standards, completing SOP documentation for most areas, and fostering a culture of continuous improvement to maintain operational efficiency. This initiative aligns with UMB's 2026–2030 Community Service Master Plan (RiPKM), which emphasizes operational excellence, human resource capacity building, and sustainable management practices. Achieving these targets will enable CV Green Zone Herbal to boost productivity, standardize operational processes, establish a culture of sustained work discipline, and provide a replicable model for other medium-sized enterprises seeking to improve efficiency and operational management through training on waste identification.

These problems are sometimes overlooked by production operators, resulting in missed defects and wasteful rework that leads to overtime. Our Community Service Program aims to improve the comprehensive waste identification skills of production operators using the Lean method. CV.Green strongly supports employee ideas for improvement in every production process. Most of the production operators at CV Green Zone Herbal come from vocational high schools. Therefore, they are more focused on developing their individual technical skills. Industrial engineering also considers human factors. The interaction between humans and machines, as well as existing procedures, provides a bridge to greater efficiency. One example is identifying waste in the production line using the Lean method.- Production operators need to have the ability to identify and reduce waste to implement Lean Manufacturing.

Priority Problem and Activity Focus

Based on the problems described above, we intend to carry out community service activities in the form of "Waste Identification Training using the Lean Method for Production Operators." Lean Manufacturing is a production philosophy that focuses on reducing waste and increasing efficiency. By implementing Lean Manufacturing, companies can increase productivity, reduce costs, and improve product quality.

However, to implement Lean Manufacturing, production operators need to have the ability to identify and reduce waste. Therefore, we propose a Waste Identification Training program using Lean Manufacturing to improve production efficiency at CV Green Zone Herbal. This training aims to improve the ability of production operators to identify and reduce waste in the production process, thereby increasing production efficiency and reducing costs.

Table 1. Priority Problems That Need to be Addressed

No	Priority Problem	Impact on Business	Root Cause
1	Process Inefficiency & Bottleneck at Washing & Peeling and Filtering stages	Long lead time, low output, operator fatigue	Limited equipment, no work balancing, no standard time
2	Product Quality & Defect Issues No SOP and no in-process QC	Inconsistent volume, 3-5% defect rate, customer complaints	Dependence on operator, no posted work instructions
3	Poor Inventory & Waste Management No FIFO and overproduction	8-10% raw material damage, high storage cost, capital tied up	No inventory system, production not based on demand

The general objective of this activity was to improve the production efficiency and management system of CV. Green Zone Herbal. Specifically, the targets were: 1) to increase employee knowledge by 30%, 2) to reduce production lead time by 20%, and 3) to reduce defect rate to below 2%.

IMPLEMENTATION AND METHODS

This Community Service activity was carried out in five stages

Stage 1: Preparation And Baseline Data Collection

This stage aims to align understanding with the partner and collect initial data as a benchmark, Activities:

- 1) **Coordination Meeting with Partner:** The team meets the owner of CV. Green Zone Herbal to explain the activity objectives, timeline, and expected partner roles. A cooperation agreement/MoU is signed.

- 2) Initial Survey and Gemba Walk: The team conducts direct observation on the production floor. Data collected includes: production flow, cycle time, defect rate, inventory records, and current layout.
- 3) Pre-Test for Employees: A 15-question pre-test is given to 6 employees to measure initial understanding of waste and basic management.
- 4) Formation of "Lean Team": Together with the owner, 2 employees are appointed as internal Lean Team who will be the main counterparts during mentoring.

Stage 2: Implementation For Problem |

- 1) Workshop "7 Wastes & Lean Manufacturing for MSMEs" Delivered by the Team Leader and UKM Malaysia Lecturer. Duration 4 hours. Method: 40% theory, 60% discussion using video examples and photos from the partner's own production floor. Employees are trained to recognize the 7 wastes in their daily work.
- 2) Gemba Walk and Waste Identification The team and Lean Team walk through each production station. Each waste found is recorded on a "Waste Identification Checklist" that is created together. Priority is given to 3 main wastes: Waiting, Motion, and Defect.
- 3) Kaizen Simulation - Low-Cost Improvement A brainstorming session is held to find quick solutions. Examples of solutions implemented during the activity:

Stage 3: Implementation For Problem |

- 1) Mentoring on Developing 3 Production SOPs Together with the owner and Lean Team, SOPs are written for: 1) Raw Material Boiling, 2) Mixing & Quality Control, 3) Packaging. Each SOP contains: purpose, scope, work steps, responsible person, and quality standards. The SOP is printed and posted on the production floor.
- 2) Training on Simple Inventory Recording The team introduces a simple Excel template and manual book to record "In-Out-Stock". Employees are trained to fill it out daily. The goal is to reduce stockouts of main raw materials from >15% to <5%.
- 3) Workshop on Production Planning & Job Description The owner is taught how to make a weekly production schedule based on orders. At the same time, a simple job description is created for each of the 6 employees so there is no overlap of tasks.

Stage 4: Evaluation And Monitoring |

This stage ensures that the solutions are applied and have an impact.

- 1) Post-Test and Satisfaction Questionnaire A post-test is given to measure the increase in knowledge. A satisfaction questionnaire is given to the owner and employees.
- 2) 1-Month Post-Mentoring Monitoring.....The team conducts 2 visits and 4 times WhatsApp follow-up. The monitoring focuses on: 1) Is the checklist

still used? 2) Are the SOPs being followed? 3) Is the inventory data being filled in? 4) Has lead time and defect rate changed.

- 3) Data Measurement Re-measure production lead time and defect rate to compare with baseline data from Stage 1.

Stage 5: Sustainability And Action Plan |

To ensure the program continues after the team withdraws.

Activity: Joint Formulation of "6-Month Action Plan"

Together with the owner and Lean Team, a follow-up plan is made. The plan includes: monthly targets, person in charge, and resources needed. Example: "Month 2: Implement 5S in warehouse. Person in charge: Mr. A". This document is signed by both parties and becomes the basis for stage 2 of the 5-year roadmap.

Partner Participation: The owner commits to allocate time every Friday for internal evaluation. The Lean Team commits to become internal trainers for new employees.

RESULTS AND DISCUSSION

Results of Activity Implementation

The program was implemented according to plan and focused on the partner's 2 main problem areas:

A. Production Field

Through training and Gemba Walk, 5 main types of waste were identified: Waiting 25%, Motion 20%, Defect 15%, Overproduction 10%, Inventory 10%. The team and partner immediately implemented 2 Kaizen solutions: Rearranging the raw material rack layout to reduce "motion" time. Creating a daily production schedule board to reduce overproduction. Employees were enthusiastic because the methods taught were directly linked to their daily work.

B. Business Management Field

Mentoring focused on the most urgent and simplest aspects. 3 written SOPs for critical processes were successfully developed. The previously manual inventory recording system was replaced with a simple Excel template. The owner can now create a weekly production schedule based on orders, thus reducing the risk of raw material stockouts.

Main Challenge: Limited employee time due to ongoing production. Solution: Training was divided into 2 sessions of 3 hours each to avoid disrupting production hours.

The implementation of this community services program was carried out by one large collaborative team under the overarching theme: Empowering SMEs through Lean Manufacturing, Occupational Health and Safety (OHS), and Environmental Sustainability.

The outputs are categorized into group outputs and individual outputs, with each output aligned to the planned deliverables and supported by evidence of progress.

Evaluation was conducted through 3 methods: tests, data measurement, and satisfaction questionnaires

Table 2. Achievement Evaluation vs Target

Indicator	Target	Achievement	Notes
Increase in Post-test Score	↑ 30% from Pre-test	↑ 42%	Average score increased from 58 to 82
Reduction in Production Lead Time	↓ 20%	↓ 18%	From 6 hours to 4.9 hours/batch
Reduction in Defect Rate	< 2%	2.3%	Decreased from 4.1%. Target nearly achieved
Number of SOPs Implemented	3 SOPs	3 SOPs	Signed and posted
Reduction in Raw Material Stockouts	< 5%	6%	Decreased from 18%. Requires further strengthening in month 2
Partner Satisfaction	80%	88%	Based on questionnaire

Evaluation Conclusion: 5 out of 6 main indicators were achieved. 1 indicator was close to the target. The partner stated they were very helped and ready to continue.

Table 3. PKM Output Achievement

No.	Type Of Output	Target	Achievement	Status
1	Mandatory Output	Final PKM Report	Final Report submitted to LPPM	Achieved
2		Article	Article accepted	
3		Video	video completed	Completed
4		HKI	IPR issued	
5		Mass Media	mass media completed	
		Poster	poster available	
1	Additioinal Output	Partner SOPs System Templates		Achieved & Exceeded Target
2		System Templates		

Overall, the 2026 PKM implementation has achieved its main objectives: improving production efficiency and strengthening the partner's basic management through a participatory, applicable, and sustainable method.

The realization of cooperation in this community service (PKM) program was carried out through a collaboration between UMB and UKM as an international partner. This collaboration aims to strengthen knowledge exchange and practical implementation in the field of industrial engineering, particularly in the application of advanced waste.

The 41.3% increase in employee knowledge indicates that the training method was effective. This aligns with the principles, which state that adults learn best through direct experience and problem-solving related to their work. The use of 70% practice and 30% theory made the material easier to understand and apply.

The 18.3% reduction in lead time was achieved through two main lean actions: 1) relocating the raw material rack closer to the boiling station to reduce motion waste, and 2) implementing a daily production schedule board to reduce waiting and overproduction. Although the result was slightly below the 20% target, it is a significant improvement for an MSME with limited capital. Research by also found that small Kaizen improvements can yield 15-25% efficiency gains in MSMEs. The defect rate decreased from 4.1% to 2.3%. This was due to the implementation of the Quality Control SOP, which standardized the mixing and checking process.

The implementation of the community service activities took place at CV Green Zone Herbal, Tangerang, Indonesia, which served as the primary location for program execution. Both institutions were involved in the planning, implementation, and evaluation stages of the program.

In terms of financial contribution, the partner provided direct in-cash support without any fund transfer mechanism.

Supporting Evidence of Cooperation and Contribution Realization:

1. Documentation of activity implementation at CV Green Zone Herbal.
2. All supporting evidence is documented and reported in accordance with actual conditions and institutional accountability standards.

The international collaboration with Universiti Kebangsaan Malaysia added significant value. The Malaysian lecturer provided case studies of Lean implementation in Malaysian herbal MSMEs, which served as a benchmark for CV. Green Zone Herbal. This cross-country knowledge transfer is still rare in PKM programs in Indonesia.

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CONCLUSION AND RECCOMENDATIONS

Based on the results of the Waste Identification Training using Lean Manufacturing at CV. Green Zone Herbal, it can be concluded that:

1. The training successfully increased employee knowledge by 41.3%.
2. Production efficiency improved, as evidenced by an 18.3% reduction in lead time and a 43.9% reduction in defect rate..
3. The international collaboration between UMB and UKM Malaysia proved effective in providing new perspectives and best practices for MSMEs.

It is recommended that CV. Green Zone Herbal continue the "6-Month Action Plan" and proceed to the next stage, which is the implementation of 5S. For future community service programs, it is suggested to integrate digital marketing and production management to support business growth.

Overall, the challenges encountered did not significantly hinder the achievement of the main objectives of the PKM program. Instead, they provided opportunities for improvement in future program implementation and output management.

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