

# Educational Case Study of the Total Plate Count of Jamu Gendong in Cirebon City

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## Abstract

Indonesian herbal heritage that still survives and continues to be preserved. Jamu that is very well known by the people of Indonesia is jamu gendong. Based on the Regulation of the Head of the Food and Drug Administration of the Republic of Indonesia number 12 of 2014 concerning traditional medicines that are prohibited from circulating, namely traditional medicines that do not meet the quality safety and usefulness requirements, one of which meets the TPC test requirements. The Total Plate Count (TPC) test is used to calculate the number of bacteria that grow and develop in a sample, as well as a reference for determining the quality and safety of simplisia. One of the regulations of the Food and Drug Supervisory Agency (BPOM) no 32 of 2019 concerning the safety and quality requirements of traditional medicines that in the process of making liquid preparations of internal medicine must meet the requirements of a total plate number value of  $r < 10^5$  colonies / mL. The purpose of this study was to determine the TPC value before and after How to Make Good Fresh Herbal Medicine (CPJB) education and to determine the effect of CPJB education on jamu gendong rice kencur sellers in Kejaksaan District and Kesambi District. Samples in this study were taken from 5 herbal medicine sellers. The results of this study showed the TPC value before CPJB education, sample 1  $12 \times 10^5$ , sample 2  $1.4 \times 10^4$ , sample 3  $2.6 \times 10^4$ , sample 4  $3.6 \times 10^4$ , sample 5  $2.2 \times 10^4$ . This study used leaflet media to conduct CPJB education. TPC value after CPJB education, in sample 1 amounted to  $2.7 \times 10^4$ . The conclusion of this study is that there is an effect of CPJB education on kencur rice herbal sellers, as evidenced by changes in TPC values before education and after education.

**Keywords:** Bacteria, education, fresh herbal medicine, jamu gendong, leaflet, microorganism, total plate count, CPJB.

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## INTRODUCTION

Since thousands of years ago, Indonesian people already know traditional medicine, where people use plants which has medicinal properties as traditional medicine. Herbal medicine is wrong one of Indonesia's cultural heritage until now it still survives and continue to be preserved. One of a kind herbal medicine that is very well known by Indonesian people are herbal medicine cradle. It is called herbal medicine because it is generally sold with how to be carried. However, currently it is herbal medicine not just peddled with carried by someone who uses it cart, bicycle or motorbike. Jamu Gendong is herbal medicine made from leaves and roots which is boiled with water, filtered, and can be drunk for several certain time. Carrying herbs generally produced from fresh ingredients (especially fresh leaves, roots, fruit and stem) (Dwisari, 2022).

In Indonesia based on the Regulation of the Head of the Food and Drug Supervisory Agency Republic of Indonesia number 12 of 2014 concerning prohibited traditional medicines circulating, namely traditional medicines that do not meet quality and safety requirements expediency. Herbal medicine that is permitted to circulate is herbal medicine that meets the requirements conditions, have passed safety parameter tests such as pathogenic microorganism tests, tests Total Plate Count (TPC), metal contamination test, quality test through purity test and the content of active chemical compounds (Zubaidah, 2022).

Microorganisms can cause a lot of harm and damage. That matter can be seen from its ability to infect humans, animals and plants, causes illnesses ranging from mild infections to death. Microorganisms can also contaminate food, and by causing the chemical changes in it, make the food inedible or even poisonous (Nations, 2020). TPC can be used as a guide for drug

manufacturing levels traditional conforming (CPOTB) Way Making Traditional Medicine Good.

TPC is used to calculate the number of bacteria growing and developed on samples, also as a reference to determine quality and safety simplicia. One of the regulations of the Agency Food and Drug Monitoring (BPOM) no 32 2019 regarding security requirements and the quality of traditional medicine that is in the process manufacture of liquid dosage forms of internal medicine must meet the requirements for the total plate number value of r.

## METHODS

This research is non-research quantitative descriptive experimental, namely describe TPC in herbal medicine preparations carrying kencur rice which is sold in the district Prosecutor's Office and Kesambi City District Cirebon. This quantitative method is used for determine the number of microbes present a sample, generally known as a TPC. The samples taken were only rice herbal medicine kencur, samples taken from 5 herbal medicine sellers carrying kencur rice in Kejaksaan District and Kesambi sub-district. Sampling was carried out taken at 08.00-10.00 WIB.

### Sample Dilution

Sample dilution is carried out by prepare the NaCl solution into the tube reaction of 4 tubes (9 mL) coded  $10^{-1}$  and  $10^{-4}$ . Next take 1 mL sample. Put it in a  $10^{-1}$  test tube. Next take 1 mL of  $10^{-1}$  solution then put it

in a  $10^{-2}$  test tube carry out this treatment until dilution  $10^{-4}$ .

### Making Plate Count Agar Media (PCA)

Weigh 1 g PCA powder dissolved in 100 mL sterile distilled water, then heated and Stir until the solution is saturated. Process sterilization using an autoclave for 15 minutes at  $121^{\circ}\text{C}$ . Total Plate Number Test into each petri dishes poured  $\pm 8$  mL of PCA medium then immediately a petri dishes. Shake while rotating for media spread evenly then made duplicate. Each cup was given labels  $10^{-1}$  to  $10^{-4}$ . Furthermore pour the sample that has been made. Dilution according to label contained in a petri dish. Entire petri dishes are incubated at temperature  $35^{\circ}\text{C}$  for 24 hours with position inversely, the number of growing colonies observed and calculated with using a colony counter.

**Data Analysis:** In this research data analysis was carried out using the calculation formula TPC.

## RESEARCH RESULTS AND DISCUSSION

This research has received ethical approval number 190/KEPK/EC/VI/2024 issued by the Health Research Ethics Commission, Faculty of Pharmacy, YPIB Majalengka University

### TPC Test Results

This test was carried out in the Microbiology Laboratory, YPIB Majalengka University, Faculty of Pharmacy for 1 days.

**Table 1: Total Plate Count Test Results**

No.	Sample Code	Dilution	Number of Microbes		TPC Value (CFU / mL)	Information
			Petri Dishes I	Petri Dishes II		
1	S1	$10^{-3}$	11	10	$12 \times 10^{-5}$	TM
		$10^{-4}$	11	44		
2	S2	$10^{-3}$	13	15	$1,4 \times 10^{-4}$	MS
		$10^{-4}$	9	16		
3	S3	$10^{-3}$	25	28	$2,6 \times 10^{-4}$	MS
		$10^{-4}$	17	10		
4	S4	$10^{-3}$	25	47	$3,6 \times 10^{-4}$	MS
		$10^{-4}$	21	7		
5	S5	$10^{-3}$	27	28	$2,2 \times 10^{-4}$	MS
		$10^{-4}$	14	20		

Note:

TBUD: Cannot be calculated

TMS : Not Compliant

MS : Fulfills the requirements

The sample is said to meet the requirements (MS) if the TPC value  $< 10^5$  CFU/mL. Based on research (Tivani, 2018) the TPC value obtained is  $1.2 \times 10^7$  CFU/mL,  $1.8 \times 10^6$  CFU/mL, and  $5.2 \times 10^6$  CFU/mL. These results show that the value TPC does not meet the requirements Drug Control Agency and Food (BPOM) no. 32 of 2019 regarding security requirements and the quality of traditional medicine that in process of making

liquid medicinal preparations must meet the requirements total plate number value  $< 10^5$  CFU/mL (Anggraini *et al.*, 2022).

In Table 1 TPC value exceeds the limit in sample 1 can caused by several factors, such as contamination in the process preparation, processing and serving (place sale). Herbal ingredients are also used

could be a factor in contamination, starting from selecting and storing materials the herbal medicine (Dewi *et al.*, 2023).

### CPJB Education

Samples that exceed the requirements determined and then provided with education herbal medicine seller by providing information through leaflet media. Providing leaflets carried out on May 1, 2024 aims respondents can apply that information given by researchers in processing rice herbs aromatic ginger. When providing research education explain to respondents how to do it making good and correct herbal medicine on the material listed in the leaflet, researchers also see the tools in making herbal medicine whether it is in accordance with CPJB or not. After the leaflets were given and collected re-sample within 30 days of sampling is then carried out repeat ALT testing on sample 1.

### Sampling After Education #

After conducting education on the date May 1, 2024 researchers carried out the collection samples for

retesting May 30, 2024. Sample carried out testing only sample 1. At the time sampling researchers found the influence of CPJB education on sellers herbal medicine includes the use of cloth wipes change frequently, use washed glass with clean water and use a mask when selling.

### TPC Test Results after Education

Repetition of TPC testing after conducting education on the sample 1, the result is  $2.7 \times 10^{-4}$  CFU/mL where these results do not exceed TPC requirements (qualified) in accordance with the regulations of BPOM No. 32 of 2019 concerning drug safety and quality requirements traditional that in the process manufacture of liquid dosage forms of internal medicine must meet the grade requirements total plate number of  $r < 105$  CFU/mL (Astriyani *et al.*, 2022).

In this test you can, It is said that education influence on herbal medicine sellers support the TPC value of herbal medicine carrying kencur rice. The results obtained in the test after education is in Table 2.

**Table 2: TPC Test Results After Education**

No.	Sample Code	Dilution	Number of Microbes		TPC Value (CFU / mL)	Information
			Petri Dishes I	Petri Dishes II		
1	S1	$10^{-3}$	28	16	$12 \times 10^{-5}$	TM
		$10^{-4}$	26	13		

### Interview Study Results

Eligible samples conducted an interview study for find out more about the process processing of kencur rice herbal medicine. Studies the interview was

conducted on June 3 2024<sup>th</sup>. An interview study was conducted on the sample 2,3, and 4, and the results of interviews with sellers the kencur rice herbal medicine is in Table 3.

**Table 3: Interview Study Results**

Sample	Results Interview
S2	Herbal medicine sellers use water flowing for boiling sterile herbs and tools.
S3	Herbal medicine sellers process herbal medicine kencur rice with ingredients fresh ingredients, using stainless steel pan and glass bottle.
S4	Herbal medicine sellers use glass bottles and materials fresh, making herbal medicine done in the morning before the herbal medicine is sold.
S5	In the process of making herbal medicine the tools used are sterile and fresh ingredients.

Based on the results of the interview researchers found that cleanliness of tools, clean water, use of glass bottles and materials very fresh ingredients influence the TPC value herbal medicine for kencur rice.

## CONCLUSIONS AND SUGGESTIONS

### CONCLUSION

TPC value of kencur rice herbal medicine before education is carried out including  $12 \times 10^{-5}$  CFU/mL,  $1.4 \times 10^{-4}$  CFU/mL,  $2.6 \times 10^{-4}$  CFU/mL,  $3.6 \times 10^{-4}$  CFU/mL,  $2.2 \times 10^{-4}$  CFU/mL. TPC value of kencur rice herbal medicine after education including  $2.7 \times 10^{-4}$  CFU/mL. There is an educational influence CPJB to herbal medicine sellers carrying kencur rice, proven with changes in ALT values before education and after

education is carried out. Herbal medicine for kencur rice District Prosecutor's Office and District Kesambi meets the grade requirements TPC.

### SUGGESTIONS

This research can be continued with replace the herbal medicine sample with other variants. Research can be continued with went to the herbal medicine seller's house and see the process of making herbal medicine carry the kencur rice directly to ensure the manufacture of herbal medicine carrying kencur rice is appropriate CPJB guidelines (how to make herbal medicine what is good and right). This research can be continued with pay attention to the collection stages

sample, where the sample is taken at the same hours and quantities the same buyer.

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