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FORMULATION, PHYSICAL EVALUATION, AND STABILITY TEST OF CAPSULES FROM A MIX OF EXTRACTS OF *Cucurbita moschata* Duch AND *Sauropus androgynus (L.)* Merr.

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ABSTRACT

Pregnant women and postpartum mothers need iron intake and need intake to prepare their breast milk production. *Cucurbita moschata* Duch. seeds contain essential iron for pregnant women, and *Sauropus androgynus* (L.) Merr. leaves have active compounds that are effective in increasing breast milk production needed by postpartum mothers. Capsule preparation is used as an alternative preparation development because it is considered easier to consume and practical. This study aims to make capsule preparations that can be used as iron intake by pregnant women and breast milk boosters and evaluate the preparation and the stability of the preparation. This study used an experimental method by making a capsule preparation formula with different talc compositions (F1 (1%), F2 (5%), and F3 (10%)) and conducting physical evaluation including flow properties tests, angles of repose, capsule weight uniformity, capsule disintegration time, and physical stability tests using the cycling test method for 6 cycles and cross-combination at 40°C and 4°C, as well as its microbiological stability. The results showed that the capsule preparations in F1, F2, and F3 had good physical quality. The more talc concentration added, the better the flow speed and angle of repose, and the capsule produced has a uniform weight. The results of the physical stability of *Cucurbita moschata* Duch. seeds extract capsules and *Sauropus androgynus* (L.) Merr. leaves meet the requirements of good capsule results from the 1st cycle to the 6th cycle. The storage cycle affects the stability test of capsule water content but does not affect the organoleptic stability test, flow speed, angle of repose, weight uniformity, water content, or microbiology.

Keywords: capsules, *Sauropus androgynus* (L.) Merr, *Cucurbita moschata* Duch., physical quality, stability

INTRODUCTION

There were 27.7% cases of anemic pregnant women from the results of the Indonesian Health Survey in 2023. These results are grouped based on age differences and it is known that pregnant women experience the highest anemia in the age group 35-44 years old at 39.6%, followed by the age group 25-34 years old at 31.4% (Kemenkes, 2023). Anemia in pregnant women can have an impact on postpartum hemorrhage, maternal weight gain, infectious diseases, difficult labor, and low birth weight babies (LBW). Third-trimester pregnant women with anemia need higher nutrient intake and blood supplementation (Sukarya, 2020). Anemia is a condition where the hemoglobin (Hb) level in the blood is less than 11 g/dL, which occurs in pregnant women. One of the causes of anemia in pregnant women is iron deficiency compared to other nutrient deficiencies. Factors that cause anemia during pregnancy are age, parity, pregnancy distance, economic status, and compliance with taking Fe tablets. Anemia has a bad influence on pregnant women and is fatal if not immediately resolved, such as miscarriage, premature partus, uterine inertia, prolonged partus, uterine atony, and bleeding and shock (Sulaiman et al., 2022).

Mothers during pregnancy should consume foods with high iron content, such as whole grains, red meat, beans, green vegetables, and liver (Kemenkes RI, 2022). *Cucurbita moschata* Duch. seeds have a high iron (Fe) content that can be used as iron intake in pregnant women and mothers after childbirth. *Sauropus androgynus* (L.) Merr. leaves are potential alternative medicines because they contain many vitamins and nutrients. Effective active compounds in the content of *Sauropus androgynus* (L.) Merr. leaves are several compounds, namely steroids, lactogogum, and polyphenols, which are efficacious to increase breast milk (breast milk) (Putri & Fitri, 2021).

Postpartum mothers need to increase breast milk production. The impact of the mother not breastfeeding the baby can make the baby vulnerable to disease, both in the baby and in the mother. Nutritional fulfillment through breastfeeding is the leverage needed to obtain quality human resources; breastfeeding is not only physical intelligence quotient (IQ) but also mental health (Triananinsi et al., 2020).

In breastfeeding mothers who consumed *Sauropus androgynus* (L.) Merr. leaves extract, as many as 70% of breastfeeding mothers had an increase in breast milk production to exceed their baby's needs. Whereas in mothers who did not consume *Sauropus androgynus* (L.) Merr. leaves extract, only 6.7% experienced an increase in milk production to exceed their baby's needs (Asokawati et al., 2021).

In general, many people still make herbal concoctions in the form of decoction preparations. However, decoction preparations take time to prepare, are less practical for traveling, cannot be stored for a long time, and the bitter taste and unpleasant odor of the decoction cannot be covered. This sometimes makes patient compliance in consuming herbal medicine reduced because the dosage form is one of the factors that affect therapy compliance (Majida et al., 2013). Therefore, it is necessary to develop a dosage form that is more practical and more acceptable to the community.

Based on the results of this study, it is necessary to make products that are easy to consume and are considered practical in storage and use in the form of capsule preparations.

METHODS

This study is an experimental study. Experimental research is research conducted by making a capsule preparation formula with different talc concentrations and conducting physical evaluation of the preparation, including flow properties, angle of repose, capsule weight uniformity, and capsule disintegration time. The three formulas made will be selected as one of the best based on the results of the physical evaluation to carry out stability tests. Physical stability test using the cycling test method for 6 cycles and cross-combination at 40°C and 4°C, as well as microbiological stability of the capsules made.

Determination of *Cucurbita moschata* Duch. seeds and *Sauropus androgynus* (L.) Merr leaves

Cucurbita moschata Duch. seeds and *Sauropus androgynus* (L.) Merr. leaves used in this study were obtained in the Kaliurang-Yogyakarta area and determined at *UPF Pelayanan Kesehatan Tradisional Tawangmangu RSUP Dr. Sardjito.*

Preparation of Simplicia and Extract of *Cucurbita moschata* Duch. Seeds and *Sauropus androgynus* (L.) Merr. Leaves

Cucurbita moschata Duch. seeds and *Sauropus androgynus* (L.) Merr. leaves of 1 kg each were cleaned and dried at 50 ºC for 24 hours until dry. Simplicia was pulverized and sieved using mesh no. 40. The obtained *Cucurbita moschata* Duch. seeds and *Sauropus androgynus* (L.) Merr leaves, simplicia powder was tested for drying shrinkage using a moisture analyzer. Simplicia powder of *Cucurbita moschata* Duch. Seeds, as much as 675 g and 700 g of *Sauropus androgynus* (L.) Merr leaves were extracted by maceration using 96% ethanol solvent in a ratio of 1: 6. The maceration time was carried out, namely for 3 days. Every 24 hours, each extract, namely *Cucurbita moschata* Duch. seeds and *Sauropus androgynus* (L.) Merr leaves, was stirred for 15 minutes (Kartikasari *et al.,* 2019). Each macerated simplicia was then filtered using filter paper. The filtrate formed is evaporated in a water bath until a thick extract is obtained.

Capsule Formulation of *Cucurbita moschata* Duch. Seeds and *Sauropus androgynus* (L.) Merr Leaves Extracts

The composition of the *Cucurbita moschata* Duch. seeds and *Sauropus androgynus* (L.) Merr leaves capsule formula uses the ingredients below.

Table 1. Capsule Formula of *Cucurbita moschata* Duch. Seeds and *Sauropus androgynus* (L.) Merr. Leaves Extracts

Ingredients	F1 (%)	F 2 (%)	F 3 (%)	Uses
Sauropus androgynus (L.) Merr leaves	22,5	22,5	22,5	Active substance
Cucurbita moschata Duch. seeds	10	10	10	Active substance
Avicel	32,5	32,5	32,5	Thickened extract dryer
Talc	1	5	10	Slippery
Magnesium stearat	2	2	2	Slippery
Amylum maydis	6	6	6	Binders and crushers
Lactose	ad 100	ad 100	ad 100	Binders and fillers

Capsule formulation was carried out by weighing *Cucurbita moschata* Duch. seeds and *Sauropus androgynus* (L.) Merr. leaves in the form of extracts and putting them into a mortar and grinding until homogeneous. Add vivapur®, amylum maydis, and lactose with the amount according to the formula into the mortar and stir until homogeneous. The mixture was dried using a dry oven at 50 ºC for 16 hours and then sieved using mesh no. 16. The dry granule powder was added with talc and Mg stearate as a lubricant and then inserted into the capsule shell using capsule filling (Farida *et al.,* 2019; Wulandari *et al*., 2020).

Physical Quality Test of Preparations

Capsule preparations were evaluated for physical quality as follows:

1. Flow Speed Test

Weighed 20 g of powder, put the granule into the funnel, opened the cover at the bottom of the funnel slowly. Calculated the granule flow rate using a stopwatch and recorded the time of the granule flow rate test (Cheiya *et al*., 2023).

2. Quiescent Angle Test

A total of 20 g of sample was put into the funnel and allowed to pass through the funnel. The diameter and height of the sample stack were recorded. (Wulandari *et al*., 2021).

3. Weight Uniformity Test

Weighed 20 capsules, labeled one by one, and then removed the contents of each capsule. Weigh each capsule shell and calculate the difference between the weight of the capsule shell and each capsule weight. (Depkes RI, 2020).

4. Crush Time Test

A total of 6 capsules were inserted into the tube in the disintegration tool, and then the temperature of the tool was set to 37 °C. The tube was dipped into a 1000-mL beaker containing water, and then the device was run for 15 minutes. The disintegration time was recorded as the time at which the capsule disintegrated into powder particles (Depkes RI, 2020).

5. Moisture Content Test

A test is performed by continuous weighing while the sample is heated and dried using a halogen lamp or infrared radiator. As the sample loses weight, the difference between the two weights is measured, which is used to calculate the moisture content (Nurhidayati & Warmiati, 2021).

Stability Test

The stability test process was carried out using a freezing temperature of 4 ^{o}C and a hot temperature of 40 ^{o}C for 24 hours, which counted as 1 cycle. This test was carried out as many as 6 cycles, or equal to 12 days (Dewi *et al*., 2022). Stability tests were carried out in the form of physical stability and microbiology in the form of total plate count numbers (TPC).

1. Capsule Physical Stability Test

Capsule physical stability tests include powder flow rate tests, powder stationary angle tests, organoleptic tests, weight uniformity tests, disintegration time tests, capsule water content tests.

2. Total Plate Count (TPC) Test

The test began with stabilization of tools and materials used by the heating method at 121 ^{o}C for 45 minutes. The TPC test used 5 test tubes, each filled with 9 mL of diluent. From the results of homogenization in the preparation of *Cucurbita moschata* Duch. seeds capsules and *Sauropus androgynus* (L.) Merr leaves powder, 1 mL was pipetted into the tube containing the first diluent until a dilution of 10-1 was obtained and shaken until homogeneous. Further dilutions were made up to 10-5 or as required. Each dilution was pipetted 1 mL into a petri dish, and into each petri dish was poured 15-20 mL of nutrient agar (NA) media. The Petri dish was homogenized so that the suspension was evenly distributed. After the media solidified, the Petri dish was incubated at 37 ^{o}C for 24 hours in an inverted position, and the number of colonies that grew was observed and counted (Lindawati & Hartono, 2013).

RESULT AND DISCUSSION

Plant Determination Results

Determination of *Cucurbita moschata* Duch. seeds and *Sauropus androgynus* (L.) Merr. leaves is carried out to determine the truth of the plant and avoid errors in the use of samples conducted at the Functional Implementation Unit of Traditional Health Services of Tawangmangu, Karanganyar, Central Java. The determination results show that the *Cucurbita moschata* plants used are of the *Cucurbita moschata* Duch. type of the Cucurbitaceae family, and the *Sauropus androgynus* (L.) Merr. plants used are of the *Sauropus androgynus* (L.) Merr. type of the Phyllanthaceae family.

Results of Simplicity and Extract Preparation

The dried simplicia that has been pollinated is then pollinated and sieved using mesh number 40 (Khumaida et al., 2017) to produce a powder form with smaller particles. This is done to facilitate the extraction process because the larger the surface area of the plant sample, the greater the contact of the powder with the solvent and the higher the content of the simplicia substance that can be diatric solvent (Esiyati, 2020). The data results of making simplicia and extracts are presented in Table 2.

Table 2. Data on the Results of Making Simplicia and Extracts

Parameters	**Result**	
	***Sauropus androgynus* (L.) Merr Leaves**	***Cucurbita moschata* Duch seeds**
Drying Shrinkage of Simplicia	3,79% ± 0,05	2,82% ± 0,06
Rendemen of extracts	17,14%	8,42%
Organoleptic of Extract	Dark Green Color and Typical Odor of Extract	Light Green Color and Typical Odor of Extract

Table 2 shows that the percentage of drying shrinkage of *Cucurbita moschata* Duch. seeds and *Sauropus androgynus* (L.) Merr leaves simplicia powder is 3.79% and 2.82%, respectively. These results are in accordance with the requirements of drying shrinkage of simplicia, which is < 10% (Ministry of Health, 2017). The smaller the drying shrinkage value, the smaller the amount of water in the simplicia. Water content can affect the quality of simplicia against physical and microbial contaminants in simplicia (Wijaya & Noviana, 2022).

The results of making *Sauropus androgynus* (L.) Merr leaves extract showed that the yield obtained has met the standard, which is less than 10%. The yield of *Cucurbita moschata* seeds extract obtained has a greater yield than the research conducted by Fiddiniyah et al. (2020), where the resulting yield was 6.44% with the maceration method using 96% ethanol solvent, which was carried out for 2 days while stirring 3 times a day.

Capsule making is carried out using a dry granulation mixing process because the ingredients added are dry components. Other additional ingredients added were fillers, crushers, and dryers. The purpose of adding these ingredients is to obtain a quality preparation that meets the formulation requirements. Lactose, which serves as a filler for the capsule period used, is also used to determine the weight of the preparation to be produced. The addition of amylum as a crusher to facilitate the dispersion of capsule lumps in the gastrointestinal tract.

The addition of avicel as an extract dryer so that a dry extract is obtained so that it is not easily overgrown by mold and the quality of the preparation is maintained (Indriawan *et al.*, 2023). Research conducted by Wulandari et al. (2021) found that avicel acts as an adsorbent because it has good compressibility with a ratio of thick extract (1:½) that can maintain the stability of the preparation, and the results of the water content contained in the preparation are less than 10%.

Capsule Physical Evaluation Results

Physical evaluations aim to ensure the quality of the preparations made. Physical evaluations carried out include organoleptic tests, flow speed tests, stationary angle tests, weight uniformity tests, destruction time tests, and water content tests. The physical evaluation table is presented in Table 3.

Table 3. Results of Physical Evaluation of Capsule Preparation

Parameters		Formula			Standard (Kemenkes, 2020)
		FI (1%)	**FII (5%)**	**FIII (10%)**	
Organoleptic	Shape	Powder	Powder	Powder	–
	Color	Green	Green	Light Green	
	Odor	Typical	Typical	Typical	
	Taste	Bitter	Bitter	Bitter	
Flow Rate (g/s)		10,36	11,74	13,90	≥10 g/s
Angle of Repose (°)		33,22	32,23	27,42	25° – 40°
Weight Uniformity		Qualified	Qualified	Qualified	Meet the requirements of weight uniformity.
Disintegration Time (Minutes)		6,36	7,16	8,03	≤ 30 minutes
Water Content (%)		4,51	4,50	4,56	≤ 10%

Sauropus androgynus (L.) Merr. leaves have a green color with a pungent odor and bitter taste. The green color of *Sauropus androgynus* (L.) Merr leaves and *Cucurbita moschata* Duch. seeds is because the plants have chlorophyll. This is in accordance with the research of Magdalena et al. (2015), which states that the substance that gives rise to green color in plants is chlorophyll. Research conducted by Sitepu & Heryanto (2018) shows that in *Sauropus androgynus* (L.) Merr leaves and *Cucurbita moschata* Duch. seeds, there is a substance that gives green color in the form of chlorophyll. The aroma contained in *Sauropus androgynus* (L.) Merr leaves and *Cucurbita moschata* Duch. seeds is pungent, which can occur due to the activity of lipoxygenase and chlorophyllase enzymes (Hanutami & Dandan, 2019).

The bitter taste caused is due to the presence of saponin compounds in *Sauropus androgynus* (L.) Merr. leaves and *Cucurbita moschata* Duch. seeds. *Sauropus androgynus* (L.) Merr. leaves and *Cucurbita moschata* Duch. seeds contain compounds in the form of alkaloids and saponins, which are alkaline in nature, causing a bitter taste (Syam *et al.*, 2019).

Flow rate testing aims to see the difference in the time it takes for granules to flow. Based on table 3, the results of the three formulas fulfill the requirements of the flow velocity, which is 10 g/s. The greater the concentration of talc added, the better the flow speed of the powder. Flow speed is influenced by shape, size, surface condition, granule moisture, and the addition of lubricants. The added lubricant will envelop the entire surface of the granule so as to make the granule easier to flow by reducing friction between granule particles (Cheiya et al., 2023).

Quiescent angle testing aims to determine the flow properties of granules. The results obtained by the three formulas have a stationary angle between 25 and 40◦. Then the three formulas meet the requirements of the silent shrinkage test. The size of the angle formed is strongly influenced by the tensile and frictional forces between particles. A large concentration of lubricant will cause attractive forces and friction forces between small particles, so that the powder flows easily and thus the value of the angle of repose is getting smaller (Novidiyanto et al., 2008).

The results obtained from testing the weight uniformity of the three formulas meet the requirements where no more than 2 capsules whose respective contents weights deviate from the average content weight greater than 10% and not a single capsule whose contents weight deviates from the average content weight greater than 25% (BPOM, 2019). Talc as a lubricant can promote granule flow by reducing friction between particles. Good flow properties cause the volume of material entering the capsule shell to be uniform so that the variation in the weight of the capsules produced is not too large.

The results of the destruction time test obtained by the three formulas met the requirements of the capsule destruction time, which is no more than 15 minutes. Formula 3 has the longest crushing time. This is because the more talc concentration is added, the longer the destruction time will be because talc is hydrophobic. Hydrophobic coatings envelop each granule, reducing the penetration of solvents into the capsule and into the granules and resulting in a decrease in dissolution speed (Wijayanti et al., 2016).

The results obtained by the two formulas meet the requirements of moisture content, where it is better for natural ingredient capsule preparations to have a moisture content of less than 5%; the drier the preparation, the better (Roselyndiar, 2012), because in the storage process there will be a process of absorption of moisture by the extract contained, which is hygroscopic, so that the moisture content of the preparation can increase during the storage process. Excessive moisture content in traditional medicines will cause increased microbial growth and facilitate hydrolysis of the chemical content of traditional medicines, thereby reducing the quality of these traditional medicines.

Based on the results of physical quality testing of the three formulas, it shows that formula 3 has better flow speed and angle of repose results than formula 1 and formula 2, so the physical and microbiological stability tests were carried out on the best, namely formula 3 with a larger talc composition (10%).

Physical and Microbiological Stability Test

We conducted the stability test at freezing temperatures of 4^{o}C and hot temperatures of 40^{o}C. The storage was carried out for 24 hours each, which counted as 1 cycle. This test was conducted for 6 cycles, or equal to 12 days. The capsule physical stability test includes a powder flow velocity test, a powder dwell angle test, an organoleptical test, a weight uniformity test, a crush time test, a capsule water content test, and a microbiological test in the form of TPC (Dewi *et al.,* 2022) (Kemenkes, 2020). The results of the capsule physical and microbiological stability tests can be seen in tables 4 and 5.

Table 4. Results of Organoleptical Physical Stability of *Cucurbita moschata* Seeds and *Sauropus androgynus* Leaves Extract Capsule Powder

Aspect	**Siklus ke-**						
	0	**1**	**2**	**3**	**4**	**5**	**6**
Color	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green
Shape	Powder	Powder	Powder	Powder	Powder	Powder	Powder
Odor	Typical of cotton leaves	Typical of cotton leaves	Typical of cotton leaves	Typical of cotton leaves	Typical of cotton leaves	Typical of cotton leaves	Typical of cotton leaves
Taste	Bitter	Bitter	Bitter	Bitter	Bitter	Bitter	Bitter

Table 5. Results of Physical and Microbiological Stability of *Cucurbita moschata* Seeds and *Sauropus androgynus* Leaves Extract Capsules

Cycle	Average Results Physical and Microbiological Stability					
	Flow Rate (g/second) ± SD	Angle of Repose (°) ± SD	Weight Uniformity	Disintegration Time (Minutes) ± SD	Water Content (%)± SD	Total Plate Number (Cfu/mL)
0	13,24[a] ± 0,51	27,89[a] ± 0,07	Qualified	5,48 [a] ± 0,10	4,06[a] ± 0,08	$6,5 \times 10^{3}$ [a]
1	13,32[a] ± 0,58	27,92[a] ± 0,12	Qualified	5,49 [a] ± 0,05	3,39[b] ± 0,13	$2,0 \times 10^{4}$ [a]
2	13,11[a] ± 0,36	27,96[a] ± 0,02	Qualified	5,51 [a] ± 0,06	3,14[c] ± 0,10	$2,0 \times 10^{4}$ [a]
3	14,05[a] ± 0,25	27,89[a] ± 0,01	Qualified	5,49 [a] ± 0,04	2,97[c,d] ± 0,06	$8,4 \times 10^{3}$ [a]
4	13,49[a] ± 0,50	27,86[a] ± 0,03	Qualified	5,51 [a] ± 0,08	2,87[d] ± 0,06	$7,6 \times 10^{3}$ [a]
5	13,23[a] ± 0,53	27,91[a] ± 0,02	Qualified	5,48 [a] ± 0,07	2,81[d,e] ± 0,07	$7,5 \times 10^{3}$ [a]
6	13,44[a] ± 0,64	27,92[a] ± 0,03	Qualified	5,49 [a] ± 0,09	2,61[e] ± 0,08	$1,4 \times 10^{4}$ [a]

Informations :
SD : Standar Deviation
The same script [a] shows no significant difference (p > 0,05)

The results of the capsule organoleptical physical stability test in the form of color, shape, odor, and taste in Table 4 can be said to be stable because it does not change from cycle 0 to 6. During the storage cycle, the capsules are stored in a tightly closed container and protected from light, thus indicating that there are no chemical changes in the preparation (Murtini & Elisa, 2018).

In table 5, it is known that the capsule powder flow velocity stability test in the table has stable results because it meets the requirements of the flow velocity test, namely > 10 g per second from cycle 0 to cycle 6 (Kemenkes, 2020). The data were analyzed with one-way Anova and obtained p > 0.05, which means that there is no influence between the storage cycle and the physical stability of the capsule powder flow velocity.

The stability test of the stationary angle of the capsule in Table 5. shows that it has stable results because it meets the requirements of the stationary angle test during storage cycles 0 to 6. The angle of repose is said to be good if it is in the range of 25°-40° (Kemenkes, 2020)**.** The results of the one-way Anova analysis of the stationary angle test obtained p > 0.05, which means that there is no influence between the storage cycle and the physical stability of the stationary angle of the capsule powder.

Table 5 also shows the results of capsule weight uniformity during cycles 0 to 6, were stable and met the requirements, i.e., none of the capsules deviated in weight at 10% and 25% deviations, so it can be said that the stability of capsule weight uniformity is stable. The storage cycle had no effect on the physical stability of weight uniformity, which was characterized by a p > 0.05 value in the one-way Anova analysis. This is in line with the research on sea cucumber capsules that there was no change in weight after the capsules were stored for 3 weeks. This means that there is no influence between the length of storage and capsule weight uniformity (Ringo *et al.,* 2017).

The results of the stability test of the disintegration time of *Cucurbita moschata* Duch. seeds capsules and *Sauropus androgynus* (L.) Merr leaves in table 5 show stable results and meet the test requirements, and there are no significant changes during cycles 0 to 6, which are characterized by p > 0.05 values in the one-way Anova analysis. A good destruction time in traditional capsule preparations is < 15 minutes (BPOM, 2019). In line with the research on Japanese papaya leaves capsules, the results of the destruction time are not more than 30 minutes after storage, and there is no significant difference. A good disintegration time on the capsule can mean that the expected pharmacological effects on the capsule can be obtained in a short time because the capsule can dissolve and disintegrate shortly after swallowing (Santoso *et al.,* 2022).

The water content test results of *Cucurbita moschata* Duch. seeds capsules and *Sauropus androgynus* (L.) Merr. leaves met the requirements during the storage cycle. There is a significant difference in the water content test, which is indicated by a p-value of 0.05 in the one-way Anova analysis. In table 5, it can be seen that in cycle 0, the capsules had an average water content of 4.06%, which experienced a constant decrease until cycle 6, with an average water content of 2.61%. This is in line with research on chickpea powder extract, which explains that the water content value of the prepared sample is greater than after the storage process. The storage time for the powder preparation produced is known to have an influence on the water content of the sample (Nugraheni *et al.,* 2015).The water content of a material or preparation is influenced by the temperature and humidity of the storage room. The higher the room temperature, the lower the room humidity, resulting in a decrease in water content (Fitriyah, 2018).

The results of the microbiological stability test (TPC) of *Cucurbita moschata* Duch. seeds capsules and *Sauropus androgynus* (L.) Merr leaves were stable and in accordance with the existing requirements from cycle 0 to cycle 6. There were no significant differences between each storage cycle, which was indicated by a p value > 0.05. This is in line with research on the identification of tuna histamine bacteria (*Thunnus* sp.) at standard storage temperature conditions, which explains that there is no effect of storage time on microorganism contamination of the preparation. Microbial contamination of a preparation comes from the raw materials used and the environment, such as air or water, as a mediator for bacterial development (Wahyuni, 2011).

CONCLUSION

Based on the research that has been carried out, it can be concluded that *Cucurbita moschata* seed and *Sauropus androgynus* (L.) Merr. leaves extract capsules have good physical quality results and meet existing standard requirements. Added explanation of the best formula and reasons.

Stability of *Cucurbita moschata* Duch. seeds and *Sauropus androgynus* (L.) Merr leaves extract capsules for 6 cycles, both physical and microbiological stability, has stable results because it meets all requirements. The storage cycle of the cycling test method does not affect the results of organoleptic physical stability, flow rate, angle of repose, weight uniformity, disintegration time, or capsule microbiology, but it does affect the physical stability of capsule water content.

The results of this study can be used as a reference for information sources related to physical stability test research on capsule preparations and become a reference for further research related to research methods and their benefits. In addition, the results of this study have the potential to become capsule preparation products to overcome anemia in pregnant women who get intellectual property rights so that they can provide profitable profits.

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