

Formulation and Evaluation of Suppositories Supplies Extract of Pinang Seeds (*Areca catechu* L.) as Anthelmintik

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Abstract - Areca palm is a type of palm and is commonly found in India, Malaysia, Taiwan, Indonesia and other Asian countries, both individually and in populations (Jaiswal et al, 2011). The pharmacological potential of *Areca catechu* is one of its benefits as an anthelmintic. Part taken from areca nut for anthelmintic treatment is the seeds (cement), one of the ingredients that can be potential as a worm medicine from areca nut is the secondary metabolite compound Tannin which can inhibit and kill the larval activity or adult worms *Ascariasis lumbricoides* at a concentration of 20%, 30 % and 40% betel nut extract. (Fania Putri Luhurningtyas, 2013). The purpose of this study was to formulate and evaluate suppository preparations of areca nut extract as an anthelmintic using a cacao oleum fat base combined with *cera alba*. The evaluation carried out was organoleptic test, melting time, weight uniformity and storage stability test at room temperature. The results of the study explained that areca nut extract could be made in suppository preparations with good physical properties as suppository preparations with anthelmintic activity.

Keywords: *areca nut, anthelmintic, suppository, oleum cacao*

1. INTRODUCTION

Cases that often occur in the community related to environmental sanitation are worm infections. This intestinal worms infection is a health problem that still occurs in developing countries. Nearly 1 billion people worldwide have been infected with groundworm helminthiasis. (WHO, 2011).

Roundworms (*Ascariasis lumbricoides*) are nematode parasites which causes ascariasis. The frequency of helminthiasis in the world is still high, around 1 billion people infected with *Ascariasis lumbricoides*, 795 million people infected with *Trichuris trichiura* and 749 million people infected with Hookworm worms. Indonesia is a country with high worm infections endemicity, the prevalence of

roundworm infections is around 800 million to 1 billion people in the world infected with ascariasis. (WHO, 2010).

The results of stool examination in elementary school children in East Java Province showed an average prevalence of intestinal worms in 2009-2010 of 27.28%. Survey results in Lebak and Pandeglang districts still show high worm incidence rates, which are around 62% and 43.78% (Kemenkes RI, 2012).

Worm infections cause a lot of harm that is decreasing the quality of life of human resources, due to health conditions, nutrition, cognitive abilities and work productivity of patients dramatically decreased. Adult worms can also cause decreased carbohydrate and protein absorption, especially in children which can cause growth and development disorders of children (WHO, 2011). According to the Riskesdas report (2013) the prevalence of children and infants with malnutrition nationally was 19.6%, where the highest incidence was in the regions of West Sulawesi, East Nusa Tenggara, and Papua (> 30%). Environmental conditions and poor sanitation, especially in the population who are less able to cause the incidence of intestinal worms is still high, with transmission through hands contaminated with infective worm eggs. So it needs proper handling for prevention and treatment of intestinal worms.

The life cycle of roundworms in the intestine begins when the adult stage of *Ascariasis lumbricoides* lives in the intestinal cavity. A female worm can lay as many as 100,000-200,000 eggs a day. These eggs are excreted through faeces. Clay, high humidity and temperatures ranging from 25-30°C are a support for the development of *A. lumbricoides* eggs to become infective. The fertilized egg develops into an infective form in

approximately 3 weeks. This infective egg can last up to 15 years. This infective form when swallowed by humans through dirty hands will hatch in the duodenum (stomach) of the larvae and then migrate across the liver, lungs and pharynx until finally swallowed into the esophagus, then into the small intestine. In the small intestine the larvae turn into adult worms. Since the eggs are cooked are swallowed until the adult worms lay eggs takes 2 months. Symptoms that arise in patients can be caused by adult roundworms and larvae. This clots in the intestine so that intestinal obstruction (ileus) occurs. (Anna Puspita, 2009).

Treatment for pinworm infection is one of them by consuming synthetic worm-based routines which are widely circulating in the market Albendazole, Mebendazole, Piperazine and Pyrantel pamoate. It's just that, in the long run many report side effects that often occur allergies, fever to diarrhea. So the use of medicinal ingredients derived from plants need to be considered as a worm medicine. Herbal remedies are believed to have fewer side effects than synthetic drugs and the price is affordable by the wider community.

One of the plants that can be used as an anthelmintic drug is Areca (*Areca catechu* L.). Areca palm is a type of palm and is commonly found in India, Malaysia, Taiwan, Indonesia and other Asian countries, both individually and in populations (Jaiswal et al, 2011). The pharmacological potential of *Areca catechu* is one of its benefits as an anthelmintic. Part taken from areca nut for anthelmintic treatment is the seeds (cement), one of the ingredients that can be potential as a worm medicine from areca nut is the secondary metabolite compound Tannin which can inhibit and kill the larval activity or adult worms *Ascariasis lumbricoides* at a concentration of 20%, 30 % and 40% betel nut extract. (Fania Putri Luhumingtyas, 2013).

Suppositories are a solid drug designed to be inserted into the rectum, vagina and ureter. This suppository has first pass effect (local) work activity and is not metabolized in the heart (systemic) so that the bioavailability of the drug in the heart can be reduced. The part of the drug that is absorbed in the lower 2/3 of the rectum directly reaches the inferior vena cava and does not pass through the portal vein. The advantage of this rectal Suppository addition to reducing bioavailability

in the liver can also prevent destruction by intestinal enzymes or pH in the stomach and can make it easier for people with intestinal worms that are difficult to swallow the drug. So that Suppositories become the aim of this study by combining areca nut extract a Suppository formulation with a concentration of 20%, 30%, and 40% and followed by evaluation of preparations to see the quality characteristics of suppository preparations.

II. MATERIAL AND METHOD

Sample Setup Areca nut plants were obtained from the Puspahiangan area, Tasikmalaya Regency, West Java Province. Areca seeds that have been collected, washed, cleaned and dried using an oven with a temperature of 40-42°C, then blended and sieved using a 60 mesh sieve to obtain a fine and uniform powder. The results are put in a closed container.

A. Sample Extraction Pinecone

Simplicia powder, each weighed as much as 500 grams and then put into a masher whose base has been coated with cotton, then put 96% ethanol solvent until the simplicia is completely submerged. Let stand for 3 x 24 hours, while stirring occasionally. Masher is removed and accommodated, the ethanol filtrate obtained is mixed and then concentrated extracts using a vacuum rotary evaporator followed by water bath (Swantara, 2011).

B. Extract Quality Check Parameters

Examination of the extract parameters was carried out to determine the quality of the extract from its physical properties and chemical content. The parameters examined include: Organoleptic extract, extract yield, total ash content, moisture content.

C. Phytochemical Screening

Phytochemical screening was conducted to determine the content of secondary metabolites contained in the extract. Screening includes: test alkaloids, flavonoids, tannins, polyphenols, saponins, monoterpenes, sesquiterpenes, steroids, triterpenoids and quinones.

D. Optimization of Suppository Formula as Anthelmintic

Optimization of suppositories by printing method, where the base is melted, mixing betel nut extract, pouring the fused into the mold and allowing the fusion to cool and thicken into

suppositories then release suppositories from the mold and wrap it in aluminum foil (Ansel, 2008). Suppositories are used for rectum ± 2gram dose

Table.1 Areca Seed Extract Suppositories Formulation

compound	concentration (%)		
	F1 (20%)	F2 (30%)	F3 (40%)
Areca seed extract	400 mg	600 mg	800 mg
Cera Alba	0,04gram	0,04gram	0,04gram
Propilenglycol	qs	qs	qs
Oleum Cacao	Ad 2 gram		

E. Evaluation of preparations

Evaluation of preparations that will be carried out are: Organoleptic, homogeneity, stability and melting time.

III. RESULTS AND DISCUSSION

A. Material Collection and Sample Preparation

The collection of materials starts from the selection and taking of betel nuts which are obtained from the Cikikububuk market in Tasikmalaya area by 10 kg. As much as 10 kg of betel nuts are sorted, washed with running water to remove impurities that stick to the sample, then dried under the indirect sun. Simplisia is blended with a blender until it becomes powder and sieved with a 60 mesh sieve.

B. Making of Areca Seed Extract Areca nut

simplisia powder macerated using 96% ethanol solvent. The choice of ethanol solvent is based on the level of safety and ease of evaporation and its properties which are able to attract polar secondary metabolites which are present in the sample (Umar, 2014).

The maceration method was chosen because it avoids damaging the compound due to the heating process. Maceration method is done by immersing simplicia with 96% organic solvent for 3 x 24 hours, through the immersion cell breakdown will occur due to differences in pressure between inside and outside the cell so that secondary metabolites present in the cytoplasm will be dissolved in organic solvents. From the extraction process the yield of areca nut extract was 12.6%.

for adults, whereas for children half of adult dose ± 1gram (FI, Edition IV). The draft formula can be seen in Table 1.

C. Extract Parameters

Moisture Test

The test of water content was carried out by the Azeotop method, it was found that betel nut extract had a water content of 8.6%.

Total Ash Level Test

Total ash content test is used to determine the overall amount of minerals contained in betel nut extracts obtained by ash content of 1.5%.

Phytochemical Screening Extract

Phytochemical screening is carried out to find out secondary metabolite compounds contained in areca nut extract which has the potential as an antelmintic. Table 2. Observation Results Phytochemical Screening of betel nut extract

No	Assay	Results	Results
1	Alkaloid	White precipitate	(+)
2	Flavonoid	orange	(+)
3	Saponin	Stable foam	(+)
4	Tanin	Yellow	(+)

D. Evaluation Results of Areca Seed Suppository Extracts

Organoleptic Test

All three formulas have the same color homogeneity, surface conditions, and shape: brownish homogeneous, spiky shapes such as torpedoes, and surface conditions not cracked or perforated.

Uniformity Test Results of Suppository Weight

Uniformity in weight of the preparation will affect the amount of active substances in the preparation. Weight uniformity test was carried out to determine whether the suppositories of areca nut extract produced had uniform weights. The test results show that the three formulas meet the specifications, that is, the percentage deviation of each suppository is not more than 5%. Thus the resulting suppository is expected to have the same dose and effectiveness of therapy.

Table 3. Weight of Suppository Preparations (in grams)

No	Weight F1 (gram)	Weight F2 (gram)	Weight F3(gram)
1	2.01 ± 0.1	2.02 ± 0.25	2.05 ± 0.18

Suppository Melting Time

The melting time test is carried out to determine the disintegration time or softening of the suppository preparation. The results obtained show that all formulas have a melting time of less than 30 minutes according to the specified specifications, namely a suppository melting time with a fat base of no more than 30 minutes. Thus suppository preparations can melt at body temperature and release active substances into rectal fluid to provide a therapeutic effect in an ideal time of less than 30 minutes. The mean yield of the suppository melting time of betel nut extract was 28.66 ± 0.50 minutes for F1, 28.63 ± 0.32 minutes for F2, and 29.81 ± 0.52 minutes for F3.

Suppository Stability Test

Suppository stability test is carried out to see whether there is any change during storage. This test is carried out at room temperature 25 C for 30 days. The test results stated that there were no organoleptic changes in the suppository preparation during storage.

IV. CONCLUSIONS

Based on the results of the study it can be concluded that the extract of betel nut successfully made in the form of suppository preparations with good physical chemical properties seen from the results of organoleptic evaluation, weight uniformity, melting time and storage stability test. The more concentrations added to the base the longer the melting time of the preparation.

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