



THE ACTIVITY OF FALOAK PLANTS IN VARIOUS DISEASES : REVIEW OF RESEARCH

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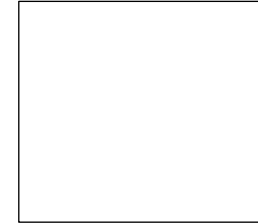
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Abstract

Sterculia quadrifida or Faloak is one of the rare plant species that grows in the mainland of Timor, Nusa Tenggara Timur. Study studies of Family Sterculiaceae show Faloak contains alkaloid compounds, phenyl propanoids, flavonoids, terpenoids and other types of compounds including hydrocarbons, sugars, quinones, phenolic acids, lactones, lignans, amines and amides. Research on Faloak shows Faloak as the main chemical content of Flavonoids, Alkaloids, Terpenoids and Phenolic Acids that can be used as medicinal plants. One treatment by Faloak as Anticendawan, Antifungal, anticancer, antioxydant. This study aims to see the activity of faloak plant resistance to the Anticendawan, Antifungal, anticancer, antioxydant. The results obtained by Faloak seeds have an activity of resistance to the growth of the fungal, bacteria and microbial.

Keywords: Faloak, *Sterculia quadrifida*, Anti-fungal, Anti-bacteria, Anti-Cancer, Anti-Oxydant.

I. INTRODUCTION

The name faloak is a local name given by the people of NTT, especially the people of Timor for the *S. quadrifida* tree. Faloak is one of the plants that have the ability to grow and develop well in natural conditions such as NTT is classified as dry areas because it only has 4 wet months with 1,470 mm rainfall, and average temperature above 27°C. Faloak generally grows on soils with shallow and rocky columns (BPS NTT, 2009). In addition to NTT, faloak plants are found in Sulawesi and Maluku (Zipcodezoo, 2013). Faloak plants are known by various names in Indonesia, namely:

Table 2.1.3 Other names of Faloak plants (*Sterculia quadrifida* R.Br)

Daerah	Nama daerah Faloak
Manado	Bangilan
Gorontalo	Mangiladu
Tobelo	Kalimana olimana
Maluku	Kaita
Pulau mangas	Lahea
Pulau buru	Kayu pani
Pulau seram	Susulangit
NTT	Faloak

(Sumber: Ranta, 2012:15)

Faloak (*Sterculia quadrifida*) is one of the rare species that has not received attention, although traditionally has potential as a drug ingredient. Utilization of faloak by people in East Nusa Tenggara Province (NTT) has been used to cure various internal diseases, among others, faloak tree skin can cure jaundice, typhoid, ulcers, and hepatitis. Faloak is also used as a menstrual, the remnants of impurities after giving birth and recovery after giving birth. Based on community experience, regular consumption of faloak can increase stamina (reducing fatigue). The World Health Organization (WHO) reports that the increase in the use of medicines from natural substances (traditional medicine) in various countries today has reached 65% of the population of developed countries (Menkes RI, 2007). On the other hand, the world pharmaceutical industry utilizing compounds and medicines as raw materials for the pharmaceutical industry is currently only 6% (Frederique, 2009). This situation provides an opportunity to assess the types of medicinal plants in various areas that have been traditionally used by the community as a medicine.



II. ETNOBOTANI FALOK

Public knowledge about the utilization of faloak as a medicine traditional knowledge is based on experience down from their ancestors. The part used is the skin tree inside, with the following stages:

- The bark of the faloak tree is obtained by peeling from live tree trunks. Then the outer skin or dead skin or commonly called ritidoma separated from the inner skin to be utilized.
- The inner tree bark is washed with water, then boiled until the boiling water shows a deep red color.
- Water stew is used by way of drink to cure various internal medicine, among others, can cure typhoid, ulcer, liver (impaired liver function), increase stamina (relieve fatigue or tired after heavy work), peluruh menstruation, peluruh the remnants of dirt after childbirth, recovery after childbirth.

The bark of this tree is derived from the faloak tree that grows wildly in forest areas, gardens, and surrounding settlements, including spreading in the city of Kupang. The process of re-forming faloak skin after retrieval may occur after 1-3 months. Thus, the impact of damage which occurs due to the utilization of the skin of the faloak tree is not cause death to the faloak tree. However, it remains to be taken into account that excessive bark removal still has a negative impact on growth of faloak due to nutrient transport from the soil through tree trunks faloak becomes obstructed. The availability of faloak trees is still quite a lot to cause silvicultural measures have not touched this species. Besides that other part of this tree that can be utilized is still very low. This causes attention to the cultivation of this faloak is reduced even never before do. Part of faloak tree is high enough exploited so far is part of the skin that is used as a medicine, while the wood itself has never been used as building materials, furniture, or carvings. The low utilization of this faloak wood remembers strong class and durable class relatively low, and high free branches are low. In connection with the utilization of faloak wood, Tantra (1976) states that the wood is faloak including an interior class that can not be in direct contact with the ground and exterior environments. Other parts are quite useful so far that can be eaten is the dried beans of the faloak fruit. These seeds can be eaten directly or roasted before eating. Tantra (1976) states that seed *sterculiaceae* is generally edible. No information has been found on chemotax (Chemotaxonomy) faloak. However, some other species of the family *Sterculiaceae* reported Tantra (1976) who already know the components major chemicals, such as *sterculia acid*, among others *Sterculia guttate*, and *Sterculia alata*. Other types, such as *Sterculia urens*, contain major chemical components polyphenols obtained from tree bark, and major chemical components of polyphenols of *Sterculia parviflora* produced from ripe fruit.

III. BIOACTIVITY AND METHODE RESEARCH OF *STERCULIA QUADRIFIDA*

Utilization of faloak as a traditional medicine is mostly found in the area of East Timor. East Timorese use faloak stem bark to cure lumbago, kidney, rheumatic, liver and other internal diseases (Kupang Forestry Research Institute, 2010). According to Al-Muqarabun, 2012 Family *sterculiaceae* contains chemical compounds of alkaloids, phenyl propanoids, flavonoids, terpenoids and other types of compounds including hydrocarbons, sugars, quinones, phenolic acids, lactones, lignans, amines and amides. Test results by the Institute of Integrated Research and Testing (LPPT) UGM showed secondary metabolite compounds in faloak containing phenolic acids, flavonoids, alkaloids, and terpenoids.

A recent review of several species from the family *Sterculiaceae* is known to contain alkaloids from seeds, such as *Sterculia javanica* R.Br., (now *Sterculia cordata* Bl.), and *Sterculia blumei* G. Don. (now *Sterculia coccinea* Jack var. *coccinea*.) Another study that has been reported by Katade et al. (2006) that extractive substance of *Sterculia guttata* seeds is larvicidal against *Aedes aegypti* and *Culex quinquefasciatus* because contains alkaloids. Shamsundar and Paramjyothi (2010) reported that based on phytochemical test of extractive substance of seeds containing *Sterculia foetida* alkaloids, flavonoids, saponins as a useful major chemical component in the pharmaceutical field. Vital et al. (2010) found extractives of *Sterculia* leaves foetides are antimicrobial because they contain the major compounds of alkaloids and tannin.

Assessment of extractive substances contained in faloak trees such as wood, seeds, leaves, skin, and its use as medicinal plants has not been reported scientifically, either at regional, national or international levels. Assessment of extractive substance component of faloak tree is directed to determine the inhibitory power of antifungal from the leaves, seeds, and bark of the faloak tree.

A study by Saefudin (2012), antioxidant tests on six plant species of *sterculiaceae*, the results of phytochemical



screening showed a high association of antioxidant activity with the number of polyphenol compounds above 80%. *Pterospermum hebecum* has 3 antioxidant compounds (polyphenols, flavonoids, saponins), *Sterculia SP* has 2 antioxidant compounds, polyphenols and saponins, *Klenovia hospital* has 2 antioxidant compounds, polyphenols and flavonoids.

Research by Cici B. Mulyati with research title "Test Activity of Microbiological Obstacles of Ethanol Extract of Faloak Plant (*Sterculiaquadrifida*) Against Growth of Some Bacteria and Mushroom". The results showed the average of inhibitory test of ethanol extract of faloak plant with concentration of 1%, 3%, 6% and 10% on *Candida albicans* fungi and *Escherichia coli*, *Shigella*, *Salmonella*, *Vibrio cholerae*.

The study by Fabianus Ranta under the title "Antimicrobial Properties of Extractive Substances of Faloak Trees". Bark, leaves and seeds are made of 40-60 mesh powder and extracted with acetone. Acetone extracts were subsequently fractionated gradually, respectively with n-hexane, diethyl ether, and ethyl acetate. Test of antimicrobial activity against *Escherichia coli* bacteria, *Salmonella typhii*, *Staphylococcus aureus*, *Bacillus cereus*, *Streptococcus agalactiae*, and the fungus *Candida albicans* using the agar well diffusion method. The most active fractions were isolated with the best eluent resulting from Thin Layer Chromatography (TLC) using GF254 silica gel plates, with different types of solvents having different polarity levels. Column chromatography using silica gel 60 F254, with Benzen and Chloroform eluents (4: 1). The eluates were analyzed by TLC and similar eluats were incorporated as subfractions, vaporized with rotary evaporator. The subfraction obtained is then used to test the MIC and MFC values by using the two-fold serial dilution method. Identification of compounds for selected fractions The results of chromatography were performed using infrared spectra (FTIR), Liquid Chromatography Mass Spectroscopy (LCMS) and Nuclear Magnetic Resonance (NMR) magnetic resonance to determine functional groups, molecular weights, and compound structures. It can be concluded from this study The faloak tree contains extractives of extractive substances in every part of the tree is very diverse. Extracts of faloak seeds have antifungal properties against *C.albicans*. The 3-hydroxyoctadecanoic acid compound is the main compound in the extractive substance of faloak seeds which plays a role in inhibiting the growth of *C.albicans* fungi. This suggests that the faloac seed is potentially used as a source of medicine to prevent and treat the disease caused by *C. albicans*.

Study by Rollando (2016; 9-10) Faloak bark contains fenol, flavonoid, and terpenoid. This study aims to analyze the ability of antibacterial and antioxidant of fraction of faloak bark ethanol extract. Fraction 3 showed the highest antibacterial activity (IC50) to the bacteria *B. subtilis* (90.51 µg/mL), *E. coli* (80.12 µg/mL), *S.aureus* (77,87 µg/mL), and *S.thypi* (61.23 µg/mL). Antioxidant activity test showed that fraction 2 has highest phenol content (34,16 ± 0,76 mg GAE) and antioxidant activity.

Study by Rollando (2017;10-11), This study was performed to test anticancer activity fraction of n-hexane, ethyl acetate, ethanol, and methanol of ethanolic extract from faloak stem bark for the type of breast cancer cell line T47D, and normal cell types Vero using cytotoxic 3-(4,5-dimetilazol-2-yl)-2,5-difeniltetrazolium bromide (MTT) test method. Ethanolic extract was subjected to column chromatography using different solvents polarity level as n-hexane, ethyl acetate, ethanol, and methanol. Testing the cytotoxic effects using the MTT assay in T47D breast cancer cells and normal Vero cells with EC50 parameter. Ethyl acetate fraction in inducing apoptosis and cell cycle modulation was observed with flowcytometry method. The test results cytotoxic fraction indicating the fraction of ethyl acetate has the lowest activity with EC50 of 24.88 µg/mL and selectivity index of 15.58. Ethyl acetate fraction effects an accumulation of cells in S phase (27.43%) in breast cancer cells T47D which is able to induce apoptosis. These results demonstrate that the ethyl acetate fraction can be developed as a chemotherapeutic agent in improving the effectiveness of breast cancer treatment.

Study by Rollando (2017;14-15), This study aims to determine the active compounds contained in the bark of faloak as anticancer. The extraction was conducted with maceration method followed by a multilevel isolation method. The elucidation was carried out using information of IR spectra, 1D-NMR, 2D-NMR and LC-MS. The anticancer activity test on T47D breast cancer cells was also conducted using MTT method. Based on the results obtained, the active compound is naphthoquinone derivative compound which is 2,3-dihydro-6-hydroxy-2-methylenaphtho [1,2-b] furan-4,5- dione that has anticancer activity on breast cancer cell (T47D) with IC50 value of 9.88 µg/mL and index selectivity value of 30.23.

IV. CONCLUSION



Faloak contains a group of compounds alkaloids, flavonoids, phenolic compounds and terpenoid. From the results of several studies showed active faloak as anti-bacteria, anti-fungus, anti-cancer, anti oxidant.

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