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The Effect of Bajakah Stem Extract on Bacterial Inhibitory Concentration and Wound Healing Process
(Journal Review)

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ABSTRACT
Bajakah is one of the plants which is potentially developed as traditional medicine. Bajakah is such a species of plant which is assumed to have the ability to cure breast cancer, heart disease, diarrhea, increase immunity, and others. The use of antibacterial is essential for the management of various infectious diseases. Bajakah Tampala which grows in Garung Village, Pulang Pisau Regency, Central Kalimantan Province, has chemical compounds through a phytochemical test, which are positive for containing Alkaloids, Flavonoids, Terpenoids, Phenolics, and Tannins. At the minimum inhibitory concentration (MIC) the ethanol extract of Bajakah stems (Spatholobus Littoralis Hassk) against Escherichia Coli bacteria through the good method concluded that the results of his research that the ethanol extract of Bajakah tampala stems had anti-bacterial activity on E. coli. The minimum inhibitory concentration is at a concentration of 6.25%. Meanwhile, the study of the effectiveness of the ethanolic extract of Bajakah tampala extract on wound healing time, showed that the ointment of ethanol extract from Bajakah tampala stem was effective for wound healing in male white mice. The duration of wound healing in the area that was smeared with 10% and 40% of the ointment with extracts of Bajakah tampala was relatively better than the area that was smeared with ointment with extracts of 20% and 40%. Further research will be carried out in the field of dentistry by testing the minimum inhibitory level (MIC) and minimum killing rate (MBC) of the tampala bajakah stem extract (Sphattolobus Littoralis Hassk) against Aggregatibacter actynomicetemcomitans with the microdilution method which is expected to have the effectiveness of Bajakah stem extract against Aggregatibacter actynomicetemcomitans.

Keywords: Bajakah tampala stem extract, Eschericia Coli, Wound healing

1. INTRODUCTION

Indonesia has been popular due to its flourishing land and lush plantation. Therefore, there has been tremendous use of traditional medicine originating from plants and herbs. Besides, people believed that the best healer is to return to nature. Instead of a species, Bajakah is known as root from a plant. It attracts people's attention as they believe that Bajakah can be a remedy for Breast Cancer. A study conducted by three Senior High School students in Central Kalimantan showed that Bajakah extract can be used for cancer management on mice. The genus of Uncaria is an essential source of natural products, particularly alkaloid, and triterpene. A pharmacological study on the genus of Uncaria clearly showed that it has cytotoxicity, anti-inflammatory, antiviral, immunostimulation,

antioxidant, SSP response, vascular, hypotension, mutagenicity, and antibacterial agents.

2. DISCUSSION

Bajakah is known as a single browny tree that propagates which appears as a big and strong rod. This root propagates with a height usually more than 5 meters to another peak. Bajakah is located on the peat groundwater flow. These roots can only live in a leafy place in the middle of the forest with slight

sun exposure. Bajakah contains antioxidant compounds which may fight cancer cells. This was proven in the study result by the Head laboratory of Biokimia dan Molekuler from Fakultas Kedokteran Lambung Mangkurat (FK ULM). The components of this root are Saponin, alkaloid, steroid, terpenoid, flavonoid, tannin dan phenolic. Hence the antioxidant level in Bajakah is significantly high.

Figure 1 Bajakah Tampala

Figure 2 The crossectional appearance of Bajakah

The mechanism of flavonoid as an antibacterial agent is on this lipophilic character which can damage microbial membranes and flavonoid compounds can interfere with peptidoglycan transpeptidase activity. This causes the failure of cell wall formation which leads to cell lysis. Saponin compounds are substances that can interact with bacteria and damage the bacterial wall. These substances will interfere with the surface tension of the cell wall. Once the leakage occurred, antibacterial substances may easily enter the cell and disrupt the metabolism of bacteria which then leads to bacterial destruction. Tannin compounds act as antibacterial agents due to their ability to detain the Transcriptase reverse enzyme and topoisomerase DNA leading to the failure of the bacterial cell wall formation. Moreover, Tannin can obstruct bacterial growth by disrupting the protein transport, inactivating cell adhesion and inner enzyme in bacteria. The processing of Bajakah is by desiccating the stems under the sun, then chopped, and ground. Bajakah powder can be infused by dissolving 1 gram powder within 500 ml water. Another way is by boiling it within 30 minutes before consumption.

There are several kinds of Bajakah stem which have been listed on the official website of Institut Pertanian Bogor (IPB).

1. Bajakah Lamei
   It endemically grows in a moist tropical forest. It has a watery stem that can be consumed straight. The gum contained in this plant is believed to heal diarrhea.
2. Bajakah Kalalawit (Uncaria Gambir Roxb)
   It contains phenol as an antibacterial agent. The extract provides a high level of catechins which can prevent cardiac disease, obesity, and promote collagen formation. Moreover, people believed that catechins compound the ability to prevent skin damage caused by sun exposure.
3. Bajakah Tampala (Spatholobus Littoralis Hassk)
   Bajakah contains the compounds of phenolic, flavonoid, tannin, and Saponin which help to escalate collagen growth and new epithelium. Besides, Bajakah helps wound healing process and other diseases.

The mechanism of flavonoid as an antibacterial agent refers to this lipophilic character which can damage microbial membranes and flavonoid compounds can interfere with peptidoglycan transpeptidase activity. This causes the failure of cell wall formation which leads to cell lysis. Saponin compounds are substances that can interact with bacteria and damage the bacterial wall. These substances will interfere with the surface tension of the cell wall. Once the leakage occurred, antibacterial substances may easily enter the cell and disrupt the metabolism of bacteria which then leads to bacterial destruction. Tannin compounds act as antibacterial agents due to their capacity to detain the Transcriptase reverse enzyme, catalyze reverse transcription of RNA to double DNA, and topoisomerase DNA as replication and DNA repair. These lead to the failure of cell wall formation. There will be two tests in this study, the first is the minimum inhibition test and the second will be the minimum killing rate (MBC) of Bajakah Tampala on *Aggregatibacter actynomicemtencomitans.* The minimum inhibition concentration (MIC) of Bajakah Tampala ((*Sphattolobus Littoralis Hassk*) on *Aggregatibacter actynomicemtencomitans* was performed by using a sumuran method. Meanwhile, the minimum killing rate (MBC) of Bajakah Tampala on *Aggregatibacter actynomicemtencomitans* was determined by using microdilution. It is a technique for the determination

of quantitative antimicrobial activity within a media volume between 0,05 - 0,1 ml. Afterward, the bacteria will be planted for growth and tested. This research is expected to be able to develop the production and use of herbal plants in dentistry which can be used as supporting materials in the treatment of periodontitis cases.

3. CONCLUSION

A previous study showed that the ethanolic extract of Bajakah stem has an antimicrobial activity on *E. coli*. The minimum inhibitory concentration (MIC) was on 6,45%, 12%, 25% and 50%. The significant difference of inhibition zone was found only between 25% and 50%, whereas the other concentrations did not show any essential difference. Furthermore, the animal model study of ethanolic extract of Bajakah stem on the wound healing process, demonstrated that the extract is effective to heal the wound in male white mice. The incision wound area, which has been smeared with an ointment of ethanolic extract of Bajakah tampala stem, has healing duration relatively better (10%) than the area which smeared with extract concentrations of 20% and 40%.

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