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„Empowering of Society through the Animal Health and Production Activities with the appreciation to the Indigenous Knowledge"

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The Effect of Bay Leaves Infusum (Syzygium polyanthum (Wight)) on anti inflammation in White Rat Sprague-Dawley

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Introduction

Medicinal plant has long been used in Indonesia to maintain health since a long time, based on empirical evidence. People only notice the effect of eating medicinal plant instead of explanation on how the medicinal plant works. Individual medicines in developing countries vary considerably in quality. Herbs used for medicinal purposes are "crude drugs". These unprocessed herb plant or plant parts are dried and used in whole or cut forms. Herbs are prepared as teas, sometimes as capsules for internal use and as poultices for external use. Usually medicines are developed from plants. Much modern day medicine is directly or indirectly derived from plant sources. Therefore it would not be correct to conclude that plants offer no further potential for the treatment or cure of the major diseases. World wide, the botanical pharmacopoeias contain tens of thousands of plants used for medicinal purposes (Darma in Ietje et al., 2000). In Indonesia there have been many vegetables and herbs that have been widely used as traditional medicinal plants since ancient times. There are 40.000 species of medicinal plants in the world, and 30.000 species among them grow in Indonesia, including 90% species which have been identified to have medicinal effect, 74% species cultivars are found wild in the forests, thick forests, fields and garden plantations, 26% species the remaining or equivalent with 940 species which have known, but only 17% which have been exploited as basic material of traditional medicines commercially (BAPPENAS, 1996; Hamid et al., 1991).

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Exploiting traditional medicines from all the times tends to increase because of the desire of society itself to re-use natural materials to improve the health degree (BAPPENAS, 1996). Before being used and marketed widely, traditional medicines have to be tested about the quality and the safety of the medicine. Some researches that have to be done are as follows: filter tests to know the compound of the plant; toxicity test to know the safety when it is consumed for medication, experimental test and clinic test to ascertain the pharmacology effect, security and clinic benefit (Goth 1984, 2003).

Objectives

The aim of this research is to know anti-inflammation effective in white rat of Spraguay-Dawley male type from bay leaves infusum (*Syzygium polyanthum* (Wight) Walp at various concentration.

Materials and Methods

This research was conducted using facilities at the Laboratory of Toxicology, Department of Physiology and Pharmacology - FKH IPB. In January - February 2005.

Experimental animals

Thirty growing male Spraguay-Dawley of similar body weight is about 180-200 gram divided into 6 groups. The animals were obtained from the Research of Veterinary (BALITVET) Bogor. The animals were housed in the cages in a room to adapt to laboratory conditions.

Bay leaves infusum

Bay leaves obtained from the wild growing tree in front of house. The process of bay leaves was done according to infusum method which is fresh bay leaves being collected, withered and dried-up process in the oven at temperature of 50°C for 3 days. Dry bay leaves then being milled and become powder. Bay leaves infusum obtained by dissolving 100 g bay leaves powder with 900 ml aquadest. This solution was heated and stirred at temperature 90°C, 15 minutes, then filtered.

Procedure

During the experiment, the animals were offered their respective diets ad libitum.

Anti-Inflammation Test

Thirty growing male Spraguay-Dawley rats of similar body weight were used divided into 6 groups, five animals each. The back right foot dipped into phenol 50% during 3 seconds to get inflammation then attempt materials given orally. As shown in the table 1 below:

Table 1. Treament of the rats

Treatment group	Given attempt materials peroral
1. Normal Control	Is not continued with any treatment
2. Aquadest Control	Given 2 ml aquadest
3.Na-diklofenak Control	Given 2 ml Na-diklofenak
4. Bay leaves 100%	Given 2 ml Bay leaves the concentration of 100%
5. Bay leaves 200%	Given 2 ml Bay leaves the concentration of 200%
6. Bay leaves 400%	Given 2 ml Bay leaves the concentration of 400%

To see the effect of giving treatment, perception and measurement of swelling done at 0 minute, 15, 30, and at the first hour, 2, 4, 24 after the back right foot dipping into phenol 50%. The data was analyses using ANOVA at reliable level of 95% and level of α 0,05. If the result showed in the real difference it will be continued to Duncan test.

Result and Discussion

Through the Duncan test, obtained the results which showed control group tends to have the first alphabet letter. This matter indicates that the control group's inflammation effect tends to be high. While group of given Bay leaves tends to have the end alphabet letter, which indicates that giving of Bay leaves can reduce inflammation effect.

In 30 minutes inflammation effect of normal control group real differ (P<0,05) had the highest inflammation effect compared to the other treatment group. At the first hour, inflammation effect of Bay leaves group 200% real differ (P<0,05), with the lowest inflammation effect compared to the group control and the Bay leaves group 100%, but it is not real differ (P<0,05) than the Bay leaves group 400%. At the second hour inflammation effect of Bay leaves group 200% real differ (P<0,05), with the lowest inflammation effect compared to the other treatment group. At 24 hours inflammation effect of aquadest control group and Bay leaves group 100% showing the real differ result (P<0,05), with higher inflammation effect than the other treatment group.

At the first hour, normal control group have the highest inflammation effect, whereas Bay leaves group 200% have the lowest inflammation effect. At the second hours to 24 hours, aquadest control group have the highest inflammation effect, whereas Bay leaves group 200% have the lowest inflammation effect. At second hours inflammation effect of phenol control group is equal to aquadest control group. At fourth, all treatment groups have shown degradation of inflammation effect.

Complexity of biological system and the impact generated by correct medicine dose to organism caused the interaction with specific receptor or network as according to expected impact to be influenced by physics-chemistry medicine and tieing medicine-receptor bound. Physics-chemistry characteristic of medicine are dissolving, partition coefficient, ionization degree, and surface activity (Korolkovas, 1970).

Dissolving has important role at biological action some medicines. Dissolving had a close of relationship with absorption. Because tendency of biological action in medicine will depend on the absorption degree. Dissolving of medicine at water is called hydrophilia or lyphofobia, whereas dissolving at grease is called lypophilia or hydrophobia (Korolkovas, 1970).

Biological activity from some medicines can be connected by the partition coefficient at polar and nonpolar dissolver. Partition coefficient is comparison of concentration at grease phase with liquid phase when a molecule goes to concentration balance (Goldstein *et. al.*, 1969).

Improvement of ionization will result the dissolving medicine in water and declining the dissolving medicine in grease. This matter affect to absorption and past of medicine pass the resistance and grease membrane, and concentration of medicine at rich network of grease (Korolkovas, 1970).

Some molecules of medicine can decline of surface tension by concentration the molecule at surface of liquid, so that the biological activity happened (Korolkovas, 1970).

Normal Control

In zero minute to first hour, fast improvement of highest inflammation happened but compared than the other treatment group, phenol is soluble water and make skin irritation (Jenkins, *et al.*, 1957). The toxic effect a substance adsorbted through skin usually have the character grease dissolve, can destroy permeability of skin so that cause the skin and layer dermis of skin consisting of connective and capillary

tissue become very permeable to all molecules, both for dissolve in grease and dissolve in water (Goldstein *et. al.*, 1969). Without the existence of treatment delay the phenol activity, this toxic substance easy to have diffusion to skin network, and cause inflammation at the flatten skin.

At the first hour to 24 hours, the fast degradation of inflammation happened. The happening of fast degradation and inflammation effect has designate detoxification and degradation of phenol toxicity. The molecule tendsing to have non polar character and dissolve in grease including phenol can easily be adsorbted by tubular cell of kidney and metabolism become the dissolve molecule in water so that easy to be excreted. Metabolism process enlarging the molecule more polar, dissolve in water, cause detoxification and declining of toxicity (Ariens *et. al.*, 1964).

Aquadest Control

At zero minute to first hour, the fast improvement of inflammation happened although the effect is lower compared with the inflammation at normal control, but higher rather than the inflammation of the other treatment group. Molecule of water tends to easily ionize (Kimber *et. al.*, 1956). Water had diffusion through membrane pores with a few amount at cell membrane. Most of cell membranes tend to permeable to non ion molecule which able to dissolve in grease and less permeable to ion molecule form (Goth, 1984). When the distribution of water was reach for the network of inhibition phenol, the smaller part phenol dissolve in the water. This matter may cause the resistance of inflammation because the dissolve ness phenol in water does not distribution quickly, because the phenol cannot dissolve in grease but ion with water so that have to pass the pores at cell membrane in a few number.

At second hours to 24 hours, the fast degradation of inflammation happened. Fast degradation of inflammation at aquadest control group is the slowest compared with the other treatment group. The molecule which dissolve in water and form ion from the most medicines cannot enter the cell quickly (Goldstein *et. al.*, 1969). The phenol which dissolve in water decelerate in the distribution in body, so that detoxification process and degradation of phenol toxicity through metabolism process rather pursued. This matter showed that the inflammation effect at aquadest control group remain higher than the other treatment groups.

Sodium Diclofenak Control

At zero minute to second hours, the fast improvement of inflammation happened. Anti-inflammation medicine non steroid work by pursuing synthesis and release prostaglandin.. Pharmacology effect cover reduction of inflammation symptom, downhill of body temperature, lessen to feel the pain without eliminating awareness, and lessen full scale platelet (Goth, 1984).

At second minutes to 24 hours, the fast degradation of inflammation happened. Degradation rate and inflammation effect show that the medicine had pharmacology effect. Effect of medicine is influenced by medicine-receptor bound and characteristic of physics-chemistry between medicine and receptor which is important functionally for mortal (Goldstein *et. al.*, 1969).

Bay leaves 100%, 200%, and 400%

At Bay leaves groups 100%, 200%, 400%, fast improvement of inflammation happened in 0 minute to second hours, and fast degradation of inflammation happened in second hours to 24 hours.

At Bay leaves groups 100%, the fast improvement of inflammation happened in 0 minute to second hours. At this concentration, volume content irrigate as dissolver tends more compared with the Bay leaves group concentration 200% and Bay leaves group 400%, so that the inflammation effect still up of the other Bay leaves group. (Kimber *et. al.*, 1956; Goth, 1984). This matter affect at slower of distribution, also difficult of active component to bundle with specific receptor, because have to penetrate the water coat becomes dissolver (Goldstein *et al.*, 1969).

All perception time of inflammation effect of Bay leaves group 200% showed that lower effect than the other treatment group inflammation effect. Bay leaves 200% have highest effective as anti-inflammation, so that this concentration is the best and correct dose used in medication. Interaction between medicines with receptor happened when correct concentration water phase is achieved, so that medicine must be able to penetrate on receptor to reach the effective concentration. Correct dose needed to the stimulus a total of potential molecules, is so that yielded the maximal effect (Ariens, 1964).

At Bay leaves group 400% have the best effectiveness of anti-inflammation compared with Bay leaves 100%, but it is not better than the Bay leaves 200%. To produce the effect, medicine-receptor must be able to produce enough stimulants. The decreasing contents of water will cause the decreasing composition of molecule medicine to receptor,

therefore the maximal effect may occurred, when all receptor filled by molecule medicine (Ariens, 1964).

Complex total medicine-receptor which formed at Bay leaves group 100%, 200%, and 400% influenced by the injected dose (dose administration), relation between doses medicine and effective concentration of water phase (transfer of medicine), and the ability of medicine to bind with receptor (affinity) (Ariens, 1964). Transferred medicine and affinity determined the medicine potency, which is the medicine dose that will generate the effect (Devoted *et. al.*, 1995). Potency medicines pursuant to the most effective of anti-inflammation are Bay leaves group 200%, Bay leaves group 400%, and Bay leaves group 100%.

Fast degradation and inflammation effect at the Bay leaves group 100%, 200%, and 400% distinguishing the medicine have been given the effect pharmacology. Medicines effect, influenced by binding the medicine-receptor and the nature of physics-chemistry between medicines and receptor, is important functionally for mortal (Goldstein *et al.*, 1969). Jenkins *et. al.*, (1957) say that sour ester of acetate, compound phytochemistry which consist in Bay leaves, used by plant to detoxication alcohol and fenol. Bisset *et. al.*, (1991) say that flavonoid, compound phytochemistry, which also consist in Bay leaves, have the activity anti-inflammation by pursuing the release histamin. This matter caused the Bay leaves group 100%, 200%, and 400% tending to have lower inflammation effect compared to the control group.

Conclusions and Suggestions

Conclusions

- Bay leaves is medicine plant with effect LD_{50} practical not toxic
- Infusum of Bay leaves can be function as anti-inflammation
- Bay leaves 200% is most effective concentration as anti-inflammation

Suggestions

To examine chronic toxicity and prepared the histophatologic to know the usage effect of infusum Bay leaves on along term.

References

Areins EJ. 1964. Nolucular Pharmacology. The Mode of Biologically Active Compounds. Volume I. New York and London: Acaemic press.

BAPPENAS. 1996. Strategi Perkembangan Agribisnis dan Agroindustri Tanaman Obat secara Terpadu dalam Prosiding: Forum Konsultasi Strategi dan Koordinasi Pengembangan Agroindustri Tanaman Obat, Bogor: Badan Penelitian dan Pengembangan Pertanian Balai Penelitian Tanaman Obat dan Remapah

Bisset NG, Houghton PJ, Hylands PJ., 1991. Some Trends in Medicinal Plant Research in the Medicinal Plant Industry. Edited by ROB Wijesekara. 1991. Florida: CRC Press.

GoldsteinA, Aronow L, Kalman S., 1969. Principles of Drug Action. The Basis of Pharmacology. New York: Harper International Edition.

Goth A, 1984. Medical pharmacology. Principles and Concepts.11 edition. St. Louis Toronto: The C.V. Mosby Company.

Hamid A, Hadad EA dan Rostianan O., 1991. Upaya Pelestarian Tumbuhan Obat di BALITRO daiam Prosiding Pelestarian Pemanfaatan Tumbuhan Obat dari Hutan Tropis Indonesia, Bogor: Institut Pertanian Bogor.

Ietje W, Chakareda S, Meulen UT,. 2002. Effect of Curcuma (*Curcuma xanthorrhiza*) on Lipid Metabolism in Rabbits, Journal of the Science of food and Agriculture

Jenkins GL, Hartung WH, Hamlin KE, Data JB,. 1957. The chemistry of Organic Medicinal Products. New York: John Wilwy and Sons Inc. London: Chapman and Hall Ltd.

Kimber DC and Gray CE., 1956 Textbook of Anatomy and Physiology. New York: The Macmillan Company.

Korolkovas A. 1970. essential of Molecular Pharmacology. Background for Drug Design. New York: Wiley-Interscience.