PROCEEDING

International Seminar

THE ROLE OF VETERINARY SCIENCE TO SUPPORT MILLENNIUM DEVELOPMENT GOALS and
THE 12th ASIAN ASSOCIATION OF VETERINARY SCHOOLS CONGRESS

FACULTY OF VETERINARY MEDICINE
UNIVERSITAS AIRLANGGA
PROCEEDING

International Seminar
THE ROLE OF VETERINARY SCIENCE TO SUPPORT MILLENNIUM DEVELOPMENT GOALS AND THE 12th ASIAN ASSOCIATION OF VETERINARY SCHOOLS CONGRESS
JW MARRIOTT HOTEL, SURABAYA-INDONESIA
4th - 6th SEPTEMBER 2013

Editors:
Rahaju Ernawati
Fedik Abdul Rantam
Bambang Saktiari
Didik Handijatno
Mustofa Helmi Effendi
Dadik Raharjo
Epy Muhammad Luqman
Lita Rakhma Yustinasari
Widya Paramita Lokapirnasari

FACULTY OF VETERINARY MEDICINE
UNIVERSITAS AIRLANGGA
Improving Milk Quality and Udder Health of Etawah Crossbred Goat by Good Milking Procedure
Yuni Suranindyah, Sari Retno Diwanti; Ditto Aji Diantha; Nurliyani ................................. 107

Blood Chemistry Parameters of Adult Female Turi Ducks
Irkham Widiyono, Sri Hartati, Hary Purnamaningsih .......................................................... 112

The Influence of Temu Hitam (Curcuma aeruginosa roxb.) Rhizomes Ethanolic Extract Against Total Intraepithelial Lymphocyte Small Intestine on Layer Chicken Which Infect by Ascaridia galli
Handayu Untari, Eka Pramyrtha Hestianah ................................................................. 117

Potential of Beluntas (Plucea indica l.) in Animal Feed to Decrease the Ammonia, Hydrogen Sulfide and Water Levels on Broiler Excreta
Taufik Hidayatulloh; Anggun Rahimawati; Zakia Sheila Faradilla ....................................................... 121

The Xenobiotic Metabolism in Lead Intoxication Mice with Vitamin C Supplementation
Juliana Christyaningsih ........................................................................................................ 127

The Analysis of Distribution of Mycobacterium bovis Infection with Conventional Techniques, Polymerase Chain Reaction (PCR) and Geographical Information System (GIS) in Dairy Cow Cattle in Enrekang Regency
Sartika Juwita, Moch. Hatta, Lucia Muslimin, Ahmad Nadif .................................................... 135

The Effect of Cigarette Smoke Exposure due to Placental Apoptosis and Gestation Outcomes at Gestation Disorders Mechanism in White Rat (Rattus Norvegicus)
Portia Sumarsono, Shruti Listra Adrenalin, Ika Wahyuni, Bayu Digka, Christian Marco, and Widjial ........................................................................................................ 143

Some Factors that May Increase the Potency of Trypanosomiasis that was Caused by Trypanosoma Evansi to Become Zoonosis: A Review
Herlina Susianti, Fx. Satria Pinanditya, Rian Hari Suharto .................................................... 148

Antibiotic Resistance in Staphylococcus intermedius Strain Isolated from Dogs with Dermatological Disorders
Mustofa Helmi Effendi, Ngakan Made Rai Widjaja and Ristin Riwayanti ..................................... 152

Combination of Spirulina and Fermented Rumen Content Meal As Substitution in Feed Toward Feed Efficiency of Male Broiler
Mirni Lamid .............................................................................................................................. 156

Potential of Vitamin E (α-Tocopherol) Against on Spermatogenic Cells and Seminiferous Tubule Diameter Testes of Mice (Mus Muscular) Induced with 2, 3, 7, 8-Tetrachlorodibenzo-P-Dioxin (TCDD)
Rosida Achlis, Ismadiono, Hani Plumeriastutti ....................................................................... 160
THE INFLUENCE OF TEMU HITAM (CURCUMA AERUGINOSA ROXB.) RHIZOMES ETHANOLIC EXTRACT AGAINST TOTAL INTRAEPITHELIAL LYMPHOCYTE SMALL INTESTINE ON LAYER CHICKEN WHICH INFECT BY ASCARIDIA GALLI

Handayu Untari¹), Eka Pramythra Hestianah ²)
¹) Veterinary Medicine School, Brawijaya University, *corresponding author. email handayunutarivet@ub.ac.id, mobile +6281332254120 ²) Anatomy Veteriner Departement, Airlangga University

ABSTRACT

Curcuma aeruginosa Roxb, is one of the plant which has an advantages herbal medicine. This plant has been used as a traditional herbal medicine since a long time ago and the part which used as herbal medicine is the rhizomes. Rhizomes of Temu Hitam have many advantages, more specific such as anthelmintics. This research has been done to determine the effect of ethanolic extract of Curcuma aeruginosa Roxb. rhizomes to increase the total lymphocyte in the small intestine that indicate the effectiveness of this extract to kill Ascaridia galli. In this study, 25 of layer chicken were infected by Ascaridia galli. After that, the ethanolic extract rhizome of temu hitam (Curcuma aeruginosa Roxb.) were orally given to layer chicken for seven days after they positively infected at various dose of 100, 200, 300, and 400 mg/chicken/day. This research demonstrated that the ethanolic extract rhizome of temu hitam (Curcuma aeruginosa Roxb.) in 200 mg/chicken/day give a significant difference compared with case control (PO) and P1 (100 mg/chicken/day). It showed that ethanolic extract rhizome of temu hitam can decrease the number of Ascaridia galli in small intestine which is indicated by the increasing amount of total lymphocyte in small intestine.

Key words: Curcuma aeruginosa, Ascaridia galli, lymphocyte, layer chicken.

INTRODUCTION

Ascaridiasis is one of poultry diseases that usually attacked poultry farm, especially layer farm. Ascaridiasis as helminthiasis disease is caused by Ascaridia galli. This disease eventually occurred either in layer or broiler that caused the decreases of hen day and meat production (Kusumanihardja, 1993 and Subekti et al., 2005). Chicken which infected by Ascaridia galli worm may lose a lot of blood, hipoglicemia, increasing of uric acid level, thymus atrophy, growth disorder, and the increasing of mortality rate (Tabbu, 2002). According Subekti et al. (2005) ascaridiasis mortality rate in this case could reach 35%.

Infection by worms Ascaridia galli also cause an immune response in the intestinal mucosa through the activation of Th2 cells to release IL-4 and IL-5. This cytokine stimulate the proliferation of B cells to produce antibodies against antigens of the worm Ascaridia galli (Baratawidjaja, 2006; Hansen, 2003). Th2 cells is a subtype of T cells, which is one of the cells that live in intraepithelial lymphocytes are found in the intestinal epithelium of chicken (Soeparto, 1997).

The infection caused by worm Ascaridia galli is need to be treated by inhibiting the development of infecting eggs as the source of infection. The treatment can be conducted with synthetic anthelmintics or alternative medicine derived from plants and is commonly known as traditional medicine (Kuswinarti, 1993). Temu ireng rhizome (Curcuma aeruginosa Roxb.) is one of traditional medicinal plants which can be used as anthelmintics (Planthus, 2008). Temu ireng rhizome has an efficacy to cure worm disease, with a mechanism of essential oil contained in the plant that caused muscles paralysis of the worms (Setiawan, 1994). Due to the strong anthelmintic power, this study uses temu ireng rhizome extracts to figure out how much of the dose rhizome...
extracts used which show significant changes in the number of intraepithelial lymphocytes. The alteration of the lymphocyte number assumed due to the reduction number of worms in the gastrointestinal tract.

MATERIAL AND METHOD

Experimental animals used in this study were 25 ISA Brown laying hens 10 weeks aged with an average weight of 820 gram. Experimental animals that used in this research is in good health. The materials used in this study consist of Temu ireng rhizome (Curcuma aeruginosa Roxb.) processed with ethanol in order to obtain extracts of the temu ireng, Ascaridia galli worm eggs as an ingredient infections from chicken intestine, glucose saturated for examination materials of float method to count worm eggs, extraction of crude drug (ethanol 80%), materials for making histological sections such as: formaldehyde 10 %, alcohol 70%, 80%, 95%, 96%, alcohol absolute, xylo, Haematoxylin Eosin dye, paraffine, canada balsam, and fisiologic NaCl.

Treatment In Experimental Animals

After 2 weeks of adaptation period, experimental animals were infected with infectious Ascaridia galli eggs of 100 eggs/hen orally. Then the animals were kept for 100 days as the life cycle of Ascaridia galli worms (Subekti, 2005) and stool examination to ensure infected chickens. Then the animals were administered with the ethanol extract of Temu ireng rhizome (Curcuma aeruginosa Roxb.) per oral a day with various doses.

Experimental animals are divided into 4 groups, as follow : P0: Positive control, infected by worms Ascaridia galli eggs, treatment without extract (Curcuma aeruginosa Roxb.); P1: chickens are infected with worms and treatment with rhizome extract (Curcuma aeruginosa Roxb.) at 100 mg / day per oral; P2: chickens are infected with worms and treatment with rhizome extract (Curcuma aeruginosa Roxb.) at 200 mg / day per oral; P3: chickens are infected with worms and treatment with rhizome extract (Curcuma aeruginosa Roxb.) at 300 mg / day per oral; P4: chickens are infected with worms and treatment with rhizome extract (Curcuma aeruginosa Roxb.) at 400 mg / day per oral. Treatment given in 7 days consecutively. On the 8th day after treatment, the animals were dissected for ileum organs collection. Furthermore, histopathology of the ileum sections were prepared and calculated to analyze the increasing number of intraepithelial lymphocytes.

This research used Completely Randomized Design (CRD) with five treatments and five replications, were analyzed using analysis of variant (ANOVA) to determine the signification between the treatments, followed by a test at the level of trust with Duncan Method (Kusriningram, 2008).

RESULT AND DISCUSSION

Table 1. The Amount of Total lymphocyte cells

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean ± SD (lymphocyte cells)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0 (positive control)</td>
<td>67.00 ± 15.281</td>
</tr>
<tr>
<td>P1 (100 mgs/kg)</td>
<td>66.00 ± 2.449</td>
</tr>
<tr>
<td>P2 (200 mgs/kg)</td>
<td>82.00 ± 8.062</td>
</tr>
<tr>
<td>P3 (300 mgs/kg)</td>
<td>50.80 ± 7.190</td>
</tr>
<tr>
<td>P4 (ekstrak 400 mg/kgBB)</td>
<td>27.00 ± 4.359</td>
</tr>
</tbody>
</table>

Table 1 shows that the highest number of intraepithelial lymphocytes found in P2 treatment. It was the group with ethanolic extract rhizome of temu ireng (Curcuma aeruginosa Roxb.) given at 200 mg/day. In other hand, the P4 treatment, shows the lowest treatment group rhizome extracts of temu ireng with a dose of 200 mg / head / day. P4 group therapy or group Ascaridia galli infected chickens in addition also provided extracts of temu ireng at a dose of 400 mg/head/day treatment group with the lowest number of lymphocytes. Parasites that
enter into the lumen of the digestive tract will cause the activation of T lymphocytes, especially the increasing of CD4 T-cells (Baratawidjaja, 2006). Increasing of CD4 cells, will affect the number of intraepithelial lymphocytes. This is due, intraepithelial lymphocytes are major effector immune cells in the gastrointestinal tract and has an important role in the activities of protection against pathogens that enter the digestive tract (Kim et al., 2008). Intraepithelial lymphocytes in the mucosa of the small intestine largely populated by T lymphocytes (Abbas and Andrew, 2003).

Increasing the number of lymphocyte cells in the treatment of P2, in this case, rhizome extracts of temu ireng with a dose of 200 mg / head / day is a combination of activities of the small intestine in response to entry of parasites (self cure reaction) and activity from rhizome extract of temu ireng. Setiawan (1994) stated that based on the symptoms caused by Ascaris suum worms in vitro after administration rhizome essential oils of temu ireng (Curcuma aeruginosa Roxb.), the workings of rhizome essential oils of temu ireng to inhibit neuromuscular electrical, with an action to depolarization the motor end plate accompanied with excitation of the worm, then prevents repolarization causing continuous depolarization, which ultimately occurred worm muscle paralysis.

Rhizome extracts of temu ireng in addition to containing essential oils, also contain other ingredients that have potential as immunostimulatory substances, called curcumin. Curcumin has immunostimulatory activity by increasing the synthesis of IgG antibodies, and increased cytotoxicity of Natural Killer cells (Bermawi, 2006). Other than that curcumin works by increasing the activity of macrophage phagocytosis (Anthony et al., 1999). Phagocytosis is the process of absorption and elimination of microbes or other particles by a special cell called a phagocyte (Hargono, 1996). Activity Combination of curcumin and essential oils that promote the killing of worms by rhizome extracts of black meeting (Curcuma aeruginosa Roxb.) which looks at improving the immune response by increasing the number of lymphocytes intraepithelial (T cells limphocyte).

The number of lymphocytes in the treatment of P3 and P4 were infected with Ascaridia galli rhizome extracts of temu ireng (Curcuma aeruginosa Roxb.) with 300 and 400 tail-day mg dose and a significant reduction. Decrease in lymphocytes associated with the toxic effects of the rhizome of temu ireng of intestinal epithelial cells. Toxic effect of temu ireng (Curcuma aeruginosa Roxb.) associated with a high content of compounds monoterpenoid equal to 59,26% (Srivastava et al., 2006). The main monoterpenes contained in the rhizome of temu ireng (Curcuma aeruginosa Roxb.) is cineol and camphor compounds (Grayson, 2000). Cineol and camphor compounds can reduce cell division, leads to changes in organelle structure, and rupture of membranes and membrane organelles core (Purcaro, 2007). Mitochondria are cell organelles that have a membrane. Damaged of mitochondria cell membrane influence cell survival, because mitochondria are cell organelles ATP providers. The absence of ATP causes damage to the epithelial cells commonly known as necrosis. Epithelial cell damage caused by the compound camphor and cineol then will affect the number of intraepithelial lymphocytes.

CONCLUSION

The ethanol extract of temu ireng rhizome (Curcuma aeruginosa Roxb.) With a dose of 200 mg / head / day in an infected laying hens by Ascaridia galli worms to increase the number of intraepithelial lymphocytes on providing for seven days.

The ethanol extract of rhizome of black meeting with a dose of 300-400 mg / head / day to reduce the number of lymphocytes intraepithelial.
REFERENCES


Bioteknologi Institut Pertanian Bogor


Purcaro, R, 2007. Isolation of secondary metabolits from plants and their use as lead compounds for the synthesis of biologically active products. Dottorato di ricerca, Universita’ Degli Studi di Napoli Federico II.


