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Telah melaksanakan penelitian dengan judul sebagai berikut :

No	Judul Karya Ilmiah	Tahun Pelaksanaan Penelitian
1	Immunomodulatory Activity of Black Jinten Oil (<i>Nigella sativa</i>) as Macrophage Activator for <i>Salmonella typhimurium</i> Infected Rat	2020
2	Screening the Reproductive Tract of Dairy Cattle for Pathogenic Micros	2019
3	Human Chorionic Gonadotropin (hCG) from Urine of Pregnant Women to Manipulate in vivo Ovulation and Pregnancy of Madura Cows	2019
4	Anti Early Embryonic Protein (EEP) for Pregnancy Test by Microtiter Strip in Dairy Cows	2019
5	The Effect of Feeding High Level of Protein on Reproductive Performance of Bali Starling.	2019
6	Antisperm Antibody in Repeat Breeder Friesian Holstein Cows at KPSP Setia Kawan Nongkojajar, Tutur District, Pasuruan, Indonesia.	2019
7	Diagnosis of Single and Twin Pregnancy, and Early Embryo Mortality Through Progesterone Level Test on Local Does.	2019
8	Improvement of Pregnancy Rate in Bali Cows with the Combination of Equine Chorionic Gonadotropine (eCG) from Local Pregnant Mare with PGF2 α .	2019
9	Progesterone Profile of Dairy Cows which Experienced the Failure of Pregnancy to Artificial Insemination (AI).	2019
10	Effect of Heat Shock Protein (HSP) in Post Thaw Baluran Bull Semen	2018
11	Potency of Mycotoxin Binders on MDA Level, Expressions of Caspase 9 and Caspase 3 in The Uterus of Mice Exposed to Zearalenone	2017



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12	Polymorphism of Growth Hormone Gene in The Artificial Insemination Result of Madura Cattle with Limousin Semen as a Reference for Genetic Selection	2018
13	Implementation of fotogrametry techniques as body mass estimation of indo-pacific bottle nose dolphin (Tursiops aduncus) in bali dolphin lodge	2020
14	Uji Sensitivitas Kebuntingan Sapi Perah Menggunakan Pregnancy Specific Protein B (PSPB) Microtiter Strip dan Progesteron sebagai Gold Standard	2007
15	Estimation of Equine Chorionic Gonadotropin (eCG) concentrate in the Blood Sera of Pregnant Mare	2014
16	Efek Pemberian L-Arginin Terhadap Gambaran Histologi Jumlah Spermatisit Primer pada Mencit (Mus musculus) Setelah Terpapar Suhu Panas	2019
17	Anti Prolactine Overcomes Heat Stress on Laying Hen.	2008
18	Unnatural Forced Moulting in The Laying Hen as Cause of Zoonosis from Salmonella Enteritidis	2009
19	Case Study: Dystocia on Beef Cattle in Kunir Regency of Lumajang District, East Java, Indonesia in 2015 and 2016	2017
20	Teratogenic Effect of Congenital Toxoplasmosis in Chicken Embryo	2017

Adapun penelitian tersebut layak dilakukan, meskipun belum ada **Ethical Clearence** karena menggunakan hewan coba yang minimal dan menghasilkan output yang sangat baik.

Demikian surat keterangan ini kami buat untuk dapat dipergunakan sebagai persyaratan pengusulan Jabatan Fungsional **Guru Besar**

Surabaya, 3 April 2023

Wakil Dekan III,

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THE INDIAN VETERINARY JOURNAL

SINCE - 1924

**Journal of the
INDIAN VETERINARY ASSOCIATION**
ESTD - 1922 Regd. No. Sl. No. 96/1967 (CHENNAI)

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(Official organ of the Indian Veterinary Association)

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EDITORIAL

Indian Veterinary Journal

Vol. 97, No. 01, January 2020

HAPPY NEW YEAR 2020

OUR NINETY SEVENTH (97th) VOLUME

We are proud and happy on our successful Journey of entry into the 97th year of uninterrupted publication of the 97th volume of The Indian Veterinary Journal in this new year 2020. We wholeheartedly acknowledge the support and patronage of all the contributors, subscribers, authors and advertisers with all our grace and gratitude. We are thankful to the Director of Animal Husbandry, Tamilnadu for continuing the sanction of IVJ subscription to all the working veterinarian in all the levels of the department in full. We are glad and greatly indebted to Dr Chirantan Kadian, The President of the newly organised The Indian Veterinary Association and his team of office bearers for their support and guidance to continue the working of The Indian Veterinary Journal.

When we are stepping into another new year, we are always trying to find out what should be the element of priority to IVJ to reach to next higher level.

We are proud to announce our IVJ Archives Digitization Process taking a huge leap forward. As we had updated before, in Phase I of digitization, the journals were digitized as images in various useful formats. Moving forward, we have further achieved larger milestones in the IVJ Archives Digitization on : ♦ **Map the portion of the digitized image file which has metadata information (like Journal Title, Authors, Place of work etc);** ♦ **OCR the mapped portions to get the text and validate its correctness;** ♦ **Place the text in the appropriate fields;** ♦ **Create table of contents and map with the page number as printed in the journals and** ♦ **Map other portion of the image file which has text (content) and OCR them to link the text with each article to get text-based search capabilities.** The OCR mapping part is completed upto 1989 from 1924.

On the subscribers and authors side, we have put our last touches on : ♦ **Payment integration from our IVJ website;** ♦ **IVJ Staff interface for uploading digital version of the IVJ every month.**

We haven't become complacent with the achieved milestones, but strenuously setting goals to move IVJ for the betterment of subscribers and authors to **1). Complete and launch the IVJ digital archive;** **2). Bring in the workflow for subscriber article upload and revision process under the umbrella of new IVJ website workflows and** **3). Upgrade staff interface for managing article workflow.**

The IVJ takes this opportunity to wish all the readers, subscribers, contributors and advertisers, A HAPPY PROSPEROUS AND PURPOSEFUL NEW YEAR, 2020.

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Immunomodulatory Activity of Black Jinten Oil (*Nigella sativa*) as Macrophage Activator for *Salmonella typhimurium* Infected Rat

Dewa K. Meles, Erma Safitri¹, Wurlina, Imam Mustofa, Suherni Susilowati and Desak K.S.C. Putri

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(Received : July, 2019 249/19 Accepted : September, 2019)

Abstract

This study was aimed to prove immunomodulatory activity of *Nigella sativa* as macrophage activator for *S.typhimurium* infected rats. 125 rats were divided into five groups and observed for five days (2nd, 4th, 6th, 8th, 10th). The rats were infected with *S.typhimurium* 10⁵CFU by intraperitoneal route, and given black jinten oil doses 12.60 mg, 18.90 mg, 25.20mg/200 gram bw/day, for 10 days. The observation: total number of leukocytes, neutrophils, eosinophils, basophils, lymphocytes, monocytes, activated macrophages. The results showed that black jinten oil was able to maintain an immune response towards normal total number of leukocytes and activated macrophages, in rats which were infected with *S.typhimurium*.

Key words : Black jinten oil, Immunomodulators, Salmonellosis

Nigella sativa is natural immunomodulator and often used to strengthen the immune system from attacks by viruses, germs, bacteria and extreme changes in conditions. Jinten seed oil contains several chemicals that have activities as hypo-allergenic, antihistamines anti-inflammatory and immunodeficiency (Akpolat and Kanter, 2009). So that it can be used as a medicine to prevent and treat for immune deficiency, such as in Salmonellosis case.

Materials and Methods

125 rats were divided into 5 groups and observed for 5 days on (2nd, 4th, 6th, 8th, 10th). The treatment group was infected with *Salmonella typhimurium* at 10⁵ CFU intraperitoneally (Chart, 2003,

Mustofa *et al.*, 2017). The treatment groups were given black jinten oil at doses of 12.60 mg (T1), 18.90 mg (T2) and 25.20 mg (T3) per 200 gram bw/day for 10 days and compared with control negative (C-) = healthy rats and control positive (C+) = rats with salmonellosis and without black jinten oil. The parameters observed were total number leukocytes, neutrophils, eosinophils, basophils, lymphocytes, monocytes and activated macrophages. The data was analyzed by one-way analysis and, if there were differences, further analysis was carried out with the smallest real difference test

Results and Discussion

The results of the examination of total leukocytes (neutrophils, eosinophils, basophils, lymphocytes, monocytes) and activated macrophages in rats infected with *Salmonella typhimurium*, then treated with black jinten oil extract at various doses, are presented in Table I and II.

The results of the study showed that administration of black jinten oil extract for 2 days, 4 days, 6 days, 8 days and 10 days in rats infected with *Salmonella typhimurium* between the control negative group (C-) and control positive group (C+) and T1, significant differences ($p < 0.05$), while T2 and T3 there is no difference ($p > 0.05$) with C-. The results revealed that in rats infected with *Salmonella typhimurium* had an increase in total leukocytes neutrophils, eosinophils, basophils, lymphocytes, monocytes and activated macrophages from infection day 2, to 4, to 6, to 8 and day 10 in C+ and T1 compared to the group of normal rats (C-).

Circumstances that can stimulate an increase in leukocyte levels (leukocytosis)

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Table I. Average of total leukocytes in rats administered with black jinten oil extract after infected with *Salmonella typhimurium* (Mean \pm S.E.)

Treatment	Average of Total Leukocyte Count in Days				
	2nd	4th	6th	8th	10th
C-	7880 ^a \pm 228.03	7900 ^a \pm 158.11	7960 ^a \pm 207.36	7860 ^a \pm 230.21	7920 ^a \pm 389.87
C+	13940 ^b \pm 194.93	13820 ^b \pm 192.35	13900 ^b \pm 187.08	13960 ^b \pm 89.44	13920 ^b \pm 130.384
T1	10780 ^c \pm 861.39	10540 ^c \pm 746.99	10680 ^c \pm 589.06	10220 ^c \pm 438.17	10140 ^c \pm 804.98
T2	7980 ^a \pm 526.30	8040 ^a \pm 89.44	8020 ^a \pm 715.54	7880 ^a \pm 356.37	7940 ^a \pm 642.65
T3	7960 ^a \pm 114.01	7940 ^a \pm 650.38	7940 ^a \pm 384.70	7800 ^a \pm 187.08	7780 ^a \pm 228.03

Different letter superscripts in one column indicate differences ($p < 0.05$)

indicate a change in the normal body reaction to the entry of foreign material into the body including stress and infection by germs and viruses (Davis *et al.*, 2008).

Administration of black jinten oil extract at a dose of 18.90 mg / head / day in rats infected with *Salmonella* were able to stabilize the normal body condition by maintaining the total leukocytes. The nonspecific immune response in the body can be maintained on the administration of black jinten oil fraction after infection with *Salmonella typhimurium*, indicates that black jinten oil extract can modulate the total leukocytes in the body towards normal and reduce the burdon of leukocytes, during infections.

Leukocyte programmed death was mediated by the release of signaling molecules called ligands. Furthermore, the ligand will bind with the receptor found in leukocyte transmembrane. Death receptors located on the cell surface are related to the Tumour Necrosis Factor (TNFR) receptors that initiate leukocyte death by apoptosis.

Administration of black jinten oil extract starting at a dose of 18.90 mg / head / day in rats infected with *Salmonella typhimurium* was able to stabilize the body condition by maintaining the amount of Eosinophils, Basophils, Neutrophils, Lymphosit, Monosit and activated Macrophages within the normal range. Black jinten extract is able to modulate the amount of Eosinophils in the body towards normal and replace the role and function of Eosinophils at the time of infection.

The number of lymphocytes shows the body immune response related to T cells and B cells in maintaining the body resistance if an infection occurs. T cells will differentiate into cytotoxic T cells, helper T cells, suppress T cells, and memory T cells that play a role in the secretion of Interferon IF (IFN γ) in activating macrophages to phagocyte infectious microorganisms that enter the body. While B cell will differentiate into memory cells and plasma cells which produces antibodies (Cummings, 2005; Mustofa *et al.*, *loc cit*). The immunomodulatory response due to black jinten oil extract is related to the increase in differentiation and proliferation activity of T cells and B cells.

Decreased macrophages towards normal numbers shows the immunological response of rats to *Salmonella typhimurium* and treated with black jinten oil extract by the body resistance through increased neutrophils, basophils and eosinophils (Criss *et al.*, 2001) while decreasing the number of macrophages.

The administration of black jinten oil extract after *Salmonella typhimurium* infection did not cause a significant increase in the number of macrophages compared to normal rats. Activated macrophages play a role in phagocytic process. The role of macrophages and activation of macrophages depends on gamma interferon produced by T cells, B cells, NK cells and activated macrophage cells (Kusmardi *et al.*, 2007, Mustofa *et al.*, *loc cit*). The black jinten oil extract has been able to stabilize and support the role of macrophages in maintaining immune responses.

Table II. Average of Macrophage count on rats administrated with black jinten oil extract after being infected with *Salmonella typhimurium* (Mean \pm S.E.)

Treatment	Average of Rats Macrophage Count in Days				
	Ke 2	Ke 4	Ke 6	Ke 8	Ke 10
C-	13.20 ^a \pm 2.16	13.40 ^a \pm 2.07	12.80 ^a \pm 1.30	13.40 ^a \pm 1.94	12.80 ^a \pm 1.30
C+	38.80 ^b \pm 9.57	38.20 ^b \pm 1.78	37.40 ^b \pm 2.30	37.40 ^b \pm 3.36	37.80 ^b \pm 3.11
T1	26.80 ^c \pm 5.40	27.40 ^c \pm 2.34	27.20 ^c \pm 1.92	27.60 ^c \pm 4.39	26.80 ^c \pm 4.32
T2	14.20 ^a \pm 1.30	14.80 ^a \pm 1.09	14.40 ^a \pm 2.30	14.20 ^a \pm 1.30	13.80 ^a \pm 1.78
T3	12.80 ^a \pm 2.38	12.60 ^a \pm 0.54	12.60 ^a \pm 2.79	12.40 ^a \pm 2.30	12.20 ^a \pm 2.28

Different letter superscripts in one column indicate differences ($p < 0.05$)

Administration of black jinten oil extract with dose of 18.90 mg / head / day in rats infected with *Salmonella typhimurium* from day 2 to day 10 has been able to stabilize the body immune response by maintaining the number of macrophages towards normal.

Summary

The Black jinten oil extract can stabilize total leukocytes, neutrophils, eosinophils, basophils, lymphocytes, monocytes and activated macrophages in rats to normal levels which were infected with *Salmonella typhimurium*

References

Akpolat, M. and Kanter, M. (2009) Protective effect of the volatile oil of *Nigella sativa* seed on beta cell damage in streptozotocin-induced diabetic rats : a light and electron microscopic study. *J.Mol Hist.* **40**: 379-385

Chart, H. (2003) The pathogenicity of strains of *Salmonella paratyphi* B and *Salmonella java*. *J. Appl. Microbiol.* **94**: 340-341.

Criss, A.K., Silva, M., Casanova, J.E. and McCormick, B.A. (2001) Regulation of *Salmonella*-Induced Neutrophil Transmigration by Epithelial ADP-Ribosylation Factor 6. *J. Biol. Chem.* **276**: 48431-48439

Cummings. (2005) FliC-Specific CD4+ T cell Responses are Restricted by Bacterial Regulation of Antigen Expression. *J. Immunol.* **174**: 7929-7938.

Davis, A.K., Maney, D.I., and Maerz, J.C. (2008) The use of leukocyte profiles to measure stress in vertebrates. A Review for ecologist functional. *Ecology.* **22**: 760-772

Kusmardi, S., Kumala, E.E., and Triana. (2007) Efek imunomodulator ekstrakdaun ketepeng cina (*cassia alata* l.) terhadap aktivitas dan kapasitas fagositosis makrofag. *Makara Kesehatan.* **11(2)**: 50-53.

Mustofa, I., Wurlina, Meles, D.K., Zakaria, S., Suwasanti. N. (2017) Potensi imunomodulator alkaloid sambiloto (*Andrographis paniculata* l) terhadap respon IFN dan CD4⁺ setelah diinfeksi *Salmonella typhimurium*. *Vet Med.* **10(2)**: 239-244.

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