

Effect of *Nothopanax acutellaium merr* on Mastitis and Milk Quality of Etawah Cross-Breed Goat

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ABSTRACT

Twelve Etawah Cross-breed goats were used to determine the effect of *Nothopanax Scutellaium Merr* on Mastitis and Milk Quality of Etawah Cross-breed Goat. A randomized block design was used in this study with 3 treatments and 4 groups. The treatments of the research were P0 = control diet, P1 = P0 +20 g *Nothopanax Scutellaium Merr*, P2 = P0 + 40 g *Nothopanax Scutellaium Merr*. Goats were reared for one month and milk samples for mastitis were taken once a week for analysis. The results showed that giving *Nothopanax Scutellaium Merr* in the ration could reduce the SCC and CMT of milk ($P < 0.05$), but did not affect the number of bacteria, pH, fat, and milk protein. This study concludes that giving *Nothopanax Scutellaium Merr* in the ration can reduce mastitis in goats, namely reducing SCC and CMT, and does not affect milk protein and fat.

Keywords: Etawah crossbreed, Goat, Mastitis, *Nothopanax*.

1. INTRODUCTION

Mastitis or udder inflammation is still a problem in dairy farming because it is one of the most expensive sources of disease costs in dairy farming [1],[2]. Mastitis can result in a decrease in milk production, and even stop production [3]. Subclinical mastitis cases in Indonesia at the end of 2006 were 75% –83% [4]. Subclinical mastitis does not show clinical symptoms and changes in milk quality but can reduce milk production and quality[5]. And an increase in the somatic cell count (SCC), the number of bacteria, and the California mastitis test (CMT) [2].

Mastitis in the udder will be responded to by attempts of udder glands to neutralize unknown objects and interfere with milk synthesis so that a repair path is prepared so that udder cells can function again in producing milk [6]. The common reaction that occurs in infected udder cells is the process of infiltration of inflammatory cells from the blood to the site of inflammation accompanied by disturbances in the synthesis of milk components. The result is a decrease in lactose, casein, and milk fat [7],[8].

The higher the goat's milk production, the higher the mastitis, resulting in a faster decrease in milk production [9]. Of course, this is a problem that needs a solution. One of them is by giving *Nothopanax Scutellaium Merr*.

Nothopanax Scutellaium Merr is a plant that is widely found in home yards in Indonesia. *Nothopanax Scutellaium Merr* is anti-inflammatory, effective in treating wounds and inflammation, overcoming anemia due to lack of blood, treating breast inflammation, swelling, and promoting breast milk [10], treating hair loss, treating bad body odor, treating wounds, increasing milk production [11]. *Nothopanax Scutellaium Merr* contains flavonoids, saponins, phenols, terpenes, coumarin, and alkaloids [12],[13]. The ability of *Nothopanax Scutellaium Merr* as an anti-implantation and treatment of breast inflammation is expected to reduce mastitis in goats, resulting in increased milk production and quality.

Based on the above conditions, we want to know how the effect of *Nothopanax Scutellaium Merr* on mastitis and the milk quality of Etawah Cross-breed goat.

2. MATERIAL AND METHOD

The research began by preparing 12 lactating Etawah cross-breed goats. All goats were milked for 1 week to determine the condition of mastitis with a CMT (California mastitis test), then mastitis was grouped, and randomized according to treatment.

Randomized block design was used in this study with 3 treatments and 4 groups. Treatment P0 = control, P1 =

P0 + 20 g *Nothopanax Scutellaium* Merr, P2 = P0 + 40 g *Nothopanax Scutellaium* Merr.

Nothopanax Scutellaium Merr is obtained by harvesting the leaves. then the leaves of *Nothopanax Scutellaium* Merr are cleaned, chopped, and dried in the sun. After drying, *Nothopanax Scutellaium* Merr was mashed and sieved to obtain *Nothopanax Scutellaium* Merr flour. This *Nothopanax Scutellaium* Merr flour was used for treatment.

The ration adaptation was carried out for 1 week. Milk samples were taken once a week to observe mastitis and milk quality. Before the goats are placed in individual cages according to the treatment given, the cage is cleaned first.

During the study, forage feed was given 2 times a day in the morning and evening, and concentrate feed once a day. The amount of concentrate and forage is adjusted to

the ability of the goat to consume when adjusting the feed, while drinking water is ad libitum.

The variables observed in the study were CMT, SCC, number of bacteria, fat, protein, pH of the milk. CMT is carried out directly at the time of milking, while SCC and the number of milk bacteria use the breed method, milk fat using the Gerber method, milk protein using formol titration.

The data obtained were analyzed according to the design used, if significantly different then continued with the Duncan distance test [14].

3. RESULT AND DISCUSSION

The mean SCC, CMT, the number of bacteria, and the milk quality of the Etawah crossbreed goats treated with *Nothopanax Scutellaium* Merr can be seen in Table 1.

Table 1. Mean SCC, CMT, number of bacteria, and milk quality of Etawah cross-breed goat treated with *Nothopanax Scutellaium* Merr

Parameters	Treatment		
	P0	P1	P2
SCC (cell/ml)	789,24±185,14 ^a	665,78±133,25 ^b	712,07±211,81 ^c
Milk bacteria (cell/ ml)	2368,92±736,19	944,44±239,17	2171,51±353,13
CMT	1,25±0,37 ^a	0,68±0,67 ^b	0,81±0,38 ^c
Milk Fat (%)	4,56±0,60	4,67±0,45	4,64±0,36
Milk Protein (%)	3,56±0,35	3,62±0,33	3,58±0,14
pH	6,75±0,03	6,74±0,04	6,75±0,04

Note: Superscript lowercase letters on the same line indicate significantly different ($P < 0.05$)

Administration of *Nothopanax Scutellaium* Merr on the ration affected the somatic cell count of Etawah cross-breed goat ($P < 0.05$). SCC of goat milk in P1 treatment was significantly lower than P3 and P0 ($P < 0.05$), while P3 was significantly lower than P0 ($P < 0.05$).

The administration of *Nothopanax Scutellaium* Merr on the ration affected the California mastitis test of Etawah cross-breed goat ($P < 0.05$). Treatment of P1 is lower than P2 and P0, and P2 is lower than P0.

The administration of *Nothopanax Scutellaium* Merr can reduce the somatic cell count. The decrease in somatic cell count and California mastitis test in P1 treatment was suspected because *Nothopanax Scutellaium* Merr was anti-inflammatory [15], was effective in treating wounds and inflammation, overcoming anemia due to lack of blood, efficacious in treating breast inflammation, swelling, and expediting of milk [10], treating wounds, and expediting milk production [11] and has the antioxidant activity of

23.03% [12]. So that *Nothopanax Scutellaium* Merr can reduce mastitis or inflammation of the udder.

Most mastitis is caused by the presence of the bacteria *Streptococcus agalactiae*, *Streptococcus dysgalactiae*, *Streptococcus uberis*, *Escherichia freundii*, *Escherichia freundii*, *Escherichia coli*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, and *Aerobacter aerogenes* [16],[17],[18]. Research by Suwito obtained 55.55% *Staphylococcus aureus*, 27.77% *Pseudomonas Sp*, 8.33% *Streptococcus sp*, and 8.33% *Bacillus Sp* in milk from mastitis goats [3].

The Somatic cell count average of the research results was in the range recommended by SNI, namely below 500,000 cells/ml and milk bacteria below 1 million/ml of milk. So that the quality of goat's milk is good.

Nothopanax Scutellaium Merr did not affect the fat, protein, and pH content of Etawah Cross-breed goat milk ($P > 0.05$). The average fat and protein content of milk

were $4.62 \pm 0.47\%$ and $3.59 \pm 0.27\%$. The pH average of goat milk given *Nothopanax Scutellaium* Merr was 6.75 ± 0.04 .

The treatment of *Nothopanax Scutellaium* Merr did not affect the fat, protein, and pH content of Etawah Cross-breed goat. The mean content of fat and milk protein was $4.62 \pm 0.47\%$ and $3.59 \pm 0.27\%$. The research results of Riyanto stated that the protein and fat content of healthy cows' milk was higher than that of mastitis cows [19]. This condition is thought to be because *Nothopanax Scutellaium* Merr can reduce mastitis, because of its anti-inflammatory ability.

The pH average of goat milk given *Nothopanax Scutellaium* Merr was 6.75 ± 0.04 . The pH of milk is one of the benchmarks for udder health conditions, an increase in the pH of milk above 6.75 is thought to have mastitis, usually followed by a decrease in milk protein content. However, the pH of milk has a low sensitivity (28.9%) for sub clinic mastitis [20],[21].

4. CONCLUSION

The study concludes that giving *Nothopanax Scutellaium* Merr in the Etawah Cross-breed goat ration can reduce mastitis in goats, namely reducing SCC and CMT, and does not affect milk protein and fat.

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REFERENCES

- [1] K.J. Hand, A. Godkin, D.F. Kelton.. Milk production and somatic cell count A cow-level analysis J. Dairy Sci., 95: 1358-1362, 2012
<https://pubmed.ncbi.nlm.nih.gov/22365217/>
DOI: 10.3168/jds.2011-4927
- [2] U. Geary, N. Lopez-Villalobos, N. Begley, F. McCoy, B. O'Brien, L. O'Grady, L. Shalloo,. Estimating the effect of mastitis on the profitability of Irish dairy farms.J. Dairy Sci., 95, pp. 3662-3673, 2012
<https://doi.org/10.3168/jds.2011-4863>
<https://www.sciencedirect.com/science/article/pii/S0022030212003475>
- [3] W. Suwito, A.E.T.H. Wahyuni, W.S. Nugroho, B. Sumiarto, Isolation and Identification of Clinical Mastitis Bacteria on Ettawah Crossbred Goat. Jurnal Sain Veteriner 31 (1):49-54, 2013
<https://doi.org/10.22146/jsv.2643>
<https://journal.ugm.ac.id/jsv/article/view/2643>
- [4] Sudarwanto M, Latif H, Noordin M., The relationship of the somatic cell counting to sub-clinical mastitis and to improve milk quality. In: Proceedings of the 1st International AAVS Scientific Conference. Jakarta, 11-13 July 2006. Bogor (Indonesia): Faculty of Veterinary Medicine, Bogor Agricultural University, 2006, <https://repository.ipb.ac.id/handle/123456789/54091>
- [5] M.F.Najeeb, A.A. Anjum, M.U.D. Ahmad, H.M. Khan, M.A. Ali, M.M.K. Sattar, Bacterial Etiology of Subclinical Mastitis in Dairy Goats and Multiple Drug Resistance of The Isolates. J. Anim. Plant Sci., 23(6), 1541-1544, 2013
https://www.researchgate.net/publication/259310662_Bacterial_etiology_of_subclinical_mastitis_in_dairy_goats_and_multiple_drug_resistance_of_the_isolates
- [6] M. Singh, K. Kavitha, D. Bharti, S.K. Dixit, R. Mukherjee, S. Soni, H. Jagatap, and J.S. Gandhar. Clinical management of mastitis in goat: A case report. Journal of Entomology and Zoology Studies. 6(6): 1163-1165, 2018
https://www.researchgate.net/publication/329872734_Clinical_management_of_mastitis_in_goat_A_case_report
- [7] S.S. Zeng, and E.N. Escobar,. Effect of breed and milking method on somatic cell count, standard plate count and composition of goat milk. Smal Rimun. Res. 19:168-175, 1996
[https://doi.org/10.1016/0921-4488\(95\)00744-X](https://doi.org/10.1016/0921-4488(95)00744-X)
<https://www.sciencedirect.com/science/article/abs/pii/092144889500744X>
- [8] M.C. Deshapriya, R. Rahularaj and R.M.S.B.K. Ransinghe, Mastitis, Somatic Cell Count And Milk Quality: An Overview. S.L. Vet.J. 66 (1): 1-12, 2019
<http://doi.org/10.4038/slvj.v66i1.32>
https://www.researchgate.net/publication/335715699_Mastitis_Somatic_cell_count_and_milk_quality_an_overview
- [9] Adriani, Penggunaan Somatick cell count (SCC), Jumlah Bakteri dan California Mastitis Test (CMT) untuk Deteksi Mastitis pada Kambing. J. Ilmu-Ilmu Peternakan Februari XIII (5) 229-234, 2010 DOI: <https://doi.org/10.22437/jiip.v0i0.42>
<https://online-journal.unja.ac.id/index.php/jiip/article/view/42>
- [10] R. Marina, dan P. Astuti, Potency of Pandanus amaryllifolius and Notopanax scutellarium as Aedes albopictus Mosquito Repellent. Aspirator 4(2): 85-91, 2012, DOI: 10.22435/aspirator.v4i2.Des.3011.
<https://www.neliti.com/ru/publications/54067/pote>

- nsi-daun-pandan-pandan-amaryllifolius-dan-mangkokan-notophanax-scutellariu
- [11] S. Hartati, Skringing Fitokimia Daun Mangkokan(*Nothopanax scutellarium* Merr.) serta Isolasi dan Karakterisasi Alkaloidnya. Skripsi. Fakultas Farmasi, Universitas Gadjah Mada. Yogyakarta, 1995
http://opac.lib.ugm.ac.id/index.php?mod=penelitian_detail&sub=PenelitianDetail&act=view&typ=html&buku_id=164103&obyek_id=4
- [12] WT. Eden, Buanasari, Shihabuddin, and N. K.Badahdah, Antioxidant Activity Of Mangkokan Leaves (*Polyscias Scutellaria* (Burn.f.) Fosberg) Methanolic Extract. *Media Farmasi Indonesia*. 11(2):1126-1135, 2016
<https://www.neliti.com/publications/152261/aktivitas-antioksidan-ekstrak-metanol-daun-mangkokan-polyscias-scutellaria-burnf>
- [13] J. Tarigan, J. F. Zuhroh, dan H. Sihotang, Skringing Fitokimia Tumbuhan Yang Digunakan Oleh Pedagang Jamu Gendong Untuk Merawat Kulit Wajah Di Kecamatan Medan Baru. *Jurnal Biologi Sumatera*. 3(1):1-6, 2008
<https://docplayer.info/38830616-Skrining-fitokimia-tumbuhan-yang-digunakan-oleh-pedagang-jamu-gendong-untuk-merawat-kulit-wajah-di-kecamatan-medan-baru.html>
- [14] R.G.D. Steel, dan J.H. Torrie, Prinsip dan Prosedur Statistika. PT. Gramedia. Pustaka Utama. Jakarta, 1991
- [15] E. Hyun, M. Bolla, M. Steinhoff, L.W. John, P. del Soldato, N. Vergnolle, Anti-inflammatory effects of nitric oxidereleasing hydrocortisone NCX 1022 in a murine model of contact dermatitis. *British Journal of Pharmacology*.143:618-625, 2004.
doi: 10.1038/sj.bjp.0705854.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1575422/>
- [16] A. Paterna, A. Contreras, A. Gomez-Martin, J. Amores, J. Tatay-Dualde, The diagnosis of mastitis and contagious agalactia in dairy goats. *Small Ruminant Res*. 121:36-41, 2014
<https://doi.org/10.1016/j.smallrumres.2013.12.002>
<https://www.sciencedirect.com/science/article/abs/pii/S0921448813003933>
- [17] A.Y. Pradika, S. Chusniati, M.T.E. Purnama, M.H. Effendi, A. Yudhana, P.A. Wibawati, Total test of *Escherichia Coli* on Fresh Cow Milk at Dairy Farmer Cooperative (KPSP) Karyo Ngremboko Purwoharjo Banyuwangi. *J. Med. Vet.*, 2(1), 1-6, 2019,
https://www.academia.edu/38932583/Uji_Total_Escherichia_coli_pada_Susu_Sapi_Segar_di_Koperasi_Peternak_Sapi_Perah_KPSP_Karyo_Ngremboko_Kecamatan_Purwoharjo_Kabupaten_Banyuwangi
- [18] Kalińska, Marcin Gołebiewski, Agata Wojcik, Mastitis pathogens in dairy cattle– a review Aleksandra. *World Scientific News*. 89 22-31., 2017
https://www.researchgate.net/publication/321318332_Mastitis_pathogens_in_dairy_cattle_-_a_review
- [19] J. Riyanto, B.S. Sunarto, M. Hertanto, Cahyadi, r. Hidayah, dan W. Sejati, Milk Quality and Production of Dairy Cow Mastitis Patients who Get Treatment of Antibiotics. *Sains Peternakan*. 14 (2): 30-41, 2016
<https://jurnal.uns.ac.id/Sains-Peternakan/article/view/4352>
- [20] M. Sudarwanto, and E. Sudarnika, The Relationship between pH Value of Milk and the Somatic Cell Count as a Parameter of Sub-Clinical Mastitis Detection. *Media Peternakan*. 31(2):107-113, 2008
<https://journal.ipb.ac.id/index.php/mediapeternakan/article/view/1089>
- [21] R. H. Modh, M. M .Islam, D. S. Nauriyal, R. J. Modi and K. N. Wadhvani, Study on pH and somatic cell count in milk of sub-clinical mastitic cows in association with udder and teat shape. *Indian J. Anim. Prod. Mgmt*. Vol. 34 (1-2): 75-79, 2018
https://www.researchgate.net/publication/340593294_Study_on_pH_and_somatic_cell_count_in_milk_of_sub-clinical_mastitic_cows_in_association_with_udder_and_teat_shape