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 =
$P_0 + 20\,g\,Nothopanax\,Scutellariaum\,Merr,\,P_2 = P_0 + 40\,g\,Nothopanax\,Scutellariaum\,Merr.$

*Nothopanax Scutellariaum* Merr is obtained by harvesting the leaves. Then the leaves of *Nothopanax Scutellariaum* Merr are cleaned, chopped, and dried in the sun. After drying, *Nothopanax Scutellariaum* Merr was mashed and sieved to obtain *Nothopanax Scutellariaum* Merr flour. This *Nothopanax Scutellariaum* 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 goat treated with *Nothopanax Scutellariaum* 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 Scutellariaum* Merr

| Parameters         | Treatment |
|--------------------|-----------|
|                   | P0 | P1 | P2 |
| SCC (cell/ml)      | 789.24±185.14* | 665.78±133.26b | 712.07±211.81c |
| Milk bacteria      | 2368.92±736.19 | 944.44±239.17 | 2171.51±353.13 |
| (cell/ml)          |    |    |    |
| CMT                | 1.25±0.37a | 0.68±0.67b | 0.81±0.38c |
| 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 Scutellariaum* Merr on the ration affected the somatic cell count of Etawah crossbreed 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 Scutellariaum* Merr on the ration affected the California mastitis test of Etawah crossbreed goat ($P <0.05$). Treatment of P1 is lower than P2 and P0, and P2 is lower than P0.

The administration of *Nothopanax Scutellariaum* Merr can reduce the somatic cell count. The decrease in somatic cell count and California mastitis test in P1 treatment was suspected because *Nothopanax Scutellariaum* 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 Scutellariaum* 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 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 Scutellariaum* 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 ± 0.47% and 3.59 ± 0.27%. The pH average of goat milk given *Nothopanax Scutellatum* Merr was 6.75 ± 0.04.

The treatment of *Nothopanax Scutellatum* 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 ± 0.47% and 3.59 ± 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 Scutellatum* Merr can reduce mastitis, because of its anti-inflammatory ability.

The pH average of goat milk given *Nothopanax Scutellatum* 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 clinical mastitis [20],[21].

**4. CONCLUSION**

The study concludes that giving *Nothopanax Scutellatum* 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.

**ACKNOWLEDGMENT**

Thanks are conveyed to LPPM Jambi University for funding and facilitating this research activity through the Excellent application scheme

**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/2593106
62_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/3298727
34_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. Small Rumin. Res. 19:168-175, 1996
https://doi.org/10.1016/0921-4489(95)00744-X
https://www.sciencedirect.com/science/article/abs/pii/092144899500744X

[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/3357156
99_Mastitis_Somatic_cell_count_and_milk_quality_an_overview

[9] Adriani, Penggunaan Somatic 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 Notophanax 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
Farmer Cooperative (KPSP) Karyo Ngremboko Escherichia Coli on Fresh Cow Milk at Dairy
Effendi,
A.Y.
pii/S0921448813003933
https://www.sciencedirect.com/science/article/abs/
mastitis and contagious agalactia in dairy goats.
Amores,
75
of Pharmacology murine model of contact dermatitis.
Soldato
Statistika. PT. Gramedia. Pustaka Utama. Jakarta
wajah pedagang
https://docplayer.info/38830616
Wajah Di Kecamatan Medan Baru. Jurnal Biologi
Pedagang Jamu Gendong Untuk Merawat Kulit
Fitokimia Tumbuhan Yang Digunakan Oleh
J. polyscias
K.Badahdah
WT.
ml&buku_id=164103&obyek_id=4
https://www.neliti.com/publications/152261/aktivit
11(2):1126
Methanolic Extract. Media Farmasi Indonesia.
Leaves (Polyscias scutellaria (Burn.f.)
kari
Skrining Fitokimia Daun Mangkokkan(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=pelenitian_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, and H. Sihotang, Skrining 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 oxide releasing 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] KaliNksa, Marcin GoLEbiewski, Agata Wojcik, Mastitis pathogens in dairy cattle– a review Aleksandra.World Scientific News. 89 22-31., 2017 https://www.researchgate.net/publication/3213183
32_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. Wadhwani, Study on pH and somatic cell count in milk of sub-clinical mastitic cows in association with udder and teat shape. ndian J. Anim. Prod. Mgmt. Vol. 34 (1-2): 75-79, 2018 https://www.researchgate.net/publication/3405932
94_Study_on_pH_and_somatic_cell_count_in_milk_of_sub-clinical_mastitic_cows_in_association_with_udder_and_teat_shape