

## DAFTAR PUSTAKA

- Abdella, A. M., Elabed, B. H., Bakhiet, A. O., Gadir, W. S. A., & Adam, S. E. I. (2011). In vivo study on lead, cadmium and Zinc supplementations on spermatogenesis in albino rats. *Journal of Pharmacology and Toxicology*, 6(2), 141–148. <https://doi.org/10.3923/jpt.2011.141.148>
- Ahirwar, M. K., Kataktaaware, M., Prasad, K., Pal, R. P., Barman, D., Thul, M., & Rawat, N. (2018). Effect of non-genetic factors on semen quality in bulls: A review. *Journal of Entomology and Zoology Studies*, 6(4), 38–45. <http://www.buffalopedia.cirb.res.in>
- Aisah, S., Isnaini, N., & Wahyuningsih, S. (2017). Kualitas semen segar dan recovery rate sapi bali pada musim yang berbeda. *Jurnal Ilmu-Ilmu Peternakan*, 27(1), 63–79. <https://doi.org/10.21776/ub.jiip.2017.027.01.06>
- Ana, O. H., & Tarmidi, R. (2016). *Kajian Fungsi Mineral Seng ( Zn ) Bagi Ternak*. 1–15.
- Azzahra, F. Y., Setiatin, E. T., & Samsudewa, D. (2016). Evaluation of Sperm Motility and Viability of Fresh Semen of Kebumen PO Bulls. *Jurnal Sain Peternakan Indonesia*, 11(2), 99–107.
- Badade, Z. G., More, K., & Narshetty, J. (2011). Oxidative stress adversely affects spermatogenesis in male infertility. *Biomedical Research*, 22(3), 323–328.
- Baiomy, A. A., Mohamed, A. E. A., & Mottelib, A. A. (2009). Effect of dietary selenium and vitamin E supplementation on productive and reproductive performance in rams. *Journal of Veterinary Medical Research*, 19(1), 39–43. <https://doi.org/10.21608/jvmr.2009.77807>
- Barchielli, G., Capperucci, A., & Tanini, D. (2022). The Role of Selenium in Pathologies: An Updated Review. *Antioxidants*, 11(2). <https://doi.org/10.3390/antiox11020251>
- Bindari, Y., Shrestha, S., Shrestha, N., & Gaire, T. (2013). Effects of Nutrition on Haematology of Rabbits : a Review. *Adv. Appl. Sci. Res.*, 4(1), 421–429.
- Bintara, S. (2011). Rasio Spermatozoa X:Y dan Kualitas Sperma pada Kambing Kacang dan Peranakan Etawa. *Sains Peternakan*, 9(2), 65. <https://doi.org/10.20961/sainspet.v9i2.4792>
- Biswajit, R. (2006). Influence of Zinc Supplementation on Semen Quality and Sexual Behavior of Crossbred and Murrah Buffalo bulls. *ICAR-NDRI, Karnal*, 173p.
- Blegur, J., Nalley, W. M., & Hine, T. M. (2020). Pengaruh penambahan

virgin coconut oil dalam pengencer tris kuning telur terhadap kualitas spermatozoa sapi Bali selama preservasi. *Jurnal Nukleus Peternakan*, 7(2), 130–138.

- Centola, G. M. (2018). Semen Analysis. In *Encyclopedia of Reproduction*. Elsevier Science Publishing Co Inc: USA.
- Chantiratikul, A., Chinrasri, O., & Chantiratikul, P. (2018). Effect of selenium from selenium-enriched kale sprout versus other selenium sources on productivity and selenium concentrations in egg and tissue of laying hens. *Biological Trace Element Research*, 182(1), 105–110. <https://doi.org/10.1007/s12011-017-1069-0>
- Chauhan, N. S., Sharma, V., Dixit, V. K., & Thakur, M. (2014). A review on plants used for improvement of sexual performance and virility. *BioMed Research International*, 2014. <https://doi.org/10.1155/2014/868062>
- Cheah, Y., & Yang, W. (2011). Functions of essential nutrition for high quality spermatogenesis. *Advances in Bioscience and Biotechnology*, 02(04), 182–197. <https://doi.org/10.4236/abb.2011.24029>
- Courtman, C., Van Ryssen, J. B. J., & Oelofse, A. (2012). Selenium concentration of maize grain in South Africa and possible factors influencing the concentration. *South African Journal of Animal Science*, 42(5SUPPL.1), 454–458. <https://doi.org/10.4314/sajas.v42i5.2>
- Dey, S., Brothag, C., & Vijayaraghavan, S. (2019). Signaling Enzymes Required for Sperm Maturation and Fertilization in Mammals. *Frontiers in Cell and Developmental Biology*, 7(December), 1–15. <https://doi.org/10.3389/fcell.2019.00341>
- Eni, N. (2019). Pengaruh Pengencer Tris Kuning Telur Itik dan Konsentrasi Spermatozoa Berbeda Terhadap Kualitas Sapi Bali. In *Tesis*. Universitas Hasanuddin.
- Feradis, D. I. (2010). *Bioteknologi Reproduksi Pada Ternak* (Cetakan 1). Alfabeta.
- Ferro, C., Florindo, H. F., & Santos, H. A. (2021). Selenium Nanoparticles for Biomedical Applications: From Development and Characterization to Therapeutics. *Advanced Healthcare Materials*, 10(16), 1–50. <https://doi.org/10.1002/adhm.202100598>
- Geary, T. W., Kelly, W. L., Spickard, D. S., Larson, C. K., Grings, E. E., & Ansotegui, R. P. (2016). Effect of supplemental trace mineral level and form on peripubertal bulls. *Animal Reproduction Science*, 168, 1–9. <https://doi.org/10.1016/j.anireprosci.2016.02.018>
- Gong, J. (2018). Effect of Organic Selenium Supplementation on Selenium Status, Oxidative Stress, and Antioxidant Status in Selenium-

Adequate Dairy Cows During the Periparturient Period. *Biological Trace Element Research*, 186, 430–440. <https://doi.org/10.1007/s12011-018-1323-0>

- Hapsari, R. D., Khalifah, Y., Widyas, N., Pramono, A., & Prastowo, S. (2018). Age effect on post freezing sperm viability of Bali cattle (*Bos javanicus*). *IOP Conference Series: Earth and Environmental Science*, 142(1). <https://doi.org/10.1088/1755-1315/142/1/012007>
- Haryani R, Toleng AL, Sonjaya H, dan Yusuf M. (2016). Characteristic of Bali Bulls Sperms Assessed using Computerized Assisted Semen Analysis (CASA). *International Journal of Sciences: Basic and Applied Research*. 28(2):161-168.
- Haryani. (2017). Rasio Gradien Putih Telur Optimal pada Sexing Spermatozoa dalam Upaya Meningkatkan Proporsi Spermatozoa Y Semen Sapi Bali. In *Disertasi*. Universitas Hasanuddin.
- Herry, S. (2009). *Pengaruh Nutrisi Terhadap Performans Reproduksi Ternak Sapi*. Saintis-Akademis.
- Indriani, Susilawati, T., & Wahyuningsih, S. (2013). Daya Hidup Spermatozoa Sapi Limousin yang Dipreservasi dengan Metode Water Jacket dan Free Water Jacket (Spermatozoa Viability Of Limousin Cattle Preserved With Water Jacket And Free Water Jacket Method). *Jurnal Veteriner September*, 14(3), 379–386.
- Inonie, R. I., Baa, L. O., & Saili, T. (2018). Kualitas Spermatozoa Kambing Boerawa Dan Kambing Kacang Pada Penggunaan Tris-Kuning Telur Yang Berbeda. *Jurnal Ilmu Dan Teknologi Peternakan Tropis*, 3(1), 52. <https://doi.org/10.33772/jitro.v3i1.1070>
- Ismaya. (2014). *Bioteknologi Inseminasi Buatan Pada Sapi dan Kerbau*. Gadjah Mada University Press.
- Isnaini, N., & Fazrien, W. A. (2020). *Fisiologi Reproduksi dan Inseminasi Buatan Pada Kerbau*. Universitas Brawijaya Press.
- Kanchan, & Matharoo, J. S. (2015). Effect of semen colour on seminal characteristics in cattle bulls. *Indian Journal of Animal Research*, 49(1), 146–147. <https://doi.org/10.5958/0976-0555.2015.00031.X>
- Kastelic, J. P. (2013). Male involvement in fertility and factors affecting semen quality in bulls. *Animal Frontiers*, 3(4), 20–25. <https://doi.org/10.2527/af.2013-0029>
- Khairi, F., Muktiani, A., & Ondho, Y. S. (2014). Pengaruh Suplementasi Vitamin E, Mineral Selenium dan Zink Terhadap Konsumsi Nutrien, Produksi dan Kualitas Semen Sapi Simental. *Jurnal Agripet*, 14(1), 6–16. <https://doi.org/10.17969/agripet.v14i1.1199>
- Kruzhel, B., Vovk, S., Małgorzata, B., Nowakowska, E., & Sergei, P. (2014). Selenium in the diet of ruminants. *Acta Sci. Pol.*,

*Zootechnica*, 13(4), 5–16.

- Lemma, A., & Shemsu, T. (2015). Effect of Age and Breed on Semen Quality and Breeding Soundness Evaluation of Pre-Service Young Bulls. *Journal of Reproduction and Infertility*, 6(2), 35–40. <https://doi.org/10.5829/idosi.jri.2015.6.2.94131>
- Martin, G. B., Blache, D., Miller, D. W., & Vercoe, P. E. (2010). Interactions between nutrition and reproduction in the management of the mature male ruminant. *Animal*, 4(7), 1214–1226. <https://doi.org/10.1017/S1751731109991674>
- Menegassi, S. R., Barcellos, J. O., Peripolli, V., & Camargo, C. (2011). Behavioral assessment during breeding soundness evaluation of beef bulls in Rio Grande do Sul. *Animal Reproduction*, 8(3–4), 77–80.
- Mila, Kaka, & Ina. (2022). *Jurnal Sains dan Teknologi Peternakan Karakteristik dan Kualitas Semen Sapi Sumba Ongole dalam Pengencer Tris yang Disuplementasi dengan Susu Skim yang Disimpan pada Suhu 3-5 °C Skim Milk Stored at a Temperature of 3– 5 °C*. 3(1).
- Mojadadi, A., Au, A., Salah, W., Witting, P., & Ahmad, G. (2021). Role for Selenium in Metabolic Homeostatis and Human Reproduction. *Nutrients*, 13(9), 3256. <https://doi.org/https://doi.org/10.3390/nu13093256>
- Mokadem, M., Taha, T., Samak, M., & Yassen, A. (2012). Alleviation of reproductive toxicity of gossypol using selenium supplementation in rams. *Journal of Animal Science*, 90(9), 3274–3285. <https://doi.org/https://doi.org/10.2527/jas.2011-4545>
- Monem, U. M. A., & El-Shahat, K. H. (2011). Effect of different dietary levels of inorganic zinc oxide on ovarian activities, reproductive performance of egyptian baladi ewes and growth of their lambs. *Bulgarian Journal of Veterinary Medicine*, 14(2), 116–123.
- Moradpour, F. (2019). A Review on Animals Semen Characteristics: Fertility, Reproduction and Development. *Asian Journal of Advances in Agricultural Research*, 10(2), 1–9. <https://doi.org/10.9734/ajaar/2019/v10i230024>
- Nubatonis, A., Purwantiningsih, T. I., Oki, Y., & Doarce, B. (2022). Evaluasi Spermatozoa Domba Jantan Berekor Tipis yang Digembalakan di Lahan Kering. *Jurnal Peternakan Indonesia (Indonesian Journal of Animal Science)*, 24(1), 55. <https://doi.org/10.25077/jpi.24.1.55-65.2022>
- Opelia, M. M. (2019). Effect of Dietry Selenium Supplementation and Oestrous Synchronisation on Reproductive Performance of South African Indigenous Goats. *Animal and Wildlife Sciences*.

- Parillo, F., Sylla, L., Palombi, C., Monaci, M., & Stradaioli, G. (2014). Immunocytochemical localisation of phospholipid hydroperoxide glutathione peroxidase in bull's spermatogenic cells. *Italian Journal of Animal Science*, 13(3), 677–683. <https://doi.org/10.4081/ijas.2014.3483>
- Payaran, K. O., Wantouw, B., & Tendean, L. (2014). Pengaruh Pemberian Zink Terhadap Kualitas Spermatozoa Pada Mencit Jantan (*Mus musculus*). *Jurnal E-Biomedik*, 2(2), 496–500. <https://doi.org/10.35790/ebm.2.2.2014.5044>
- Perumal, P., Srivastava, S. K., Ghosh, S. K., & Baruah, K. K. (2014). Computer-Assisted Sperm Analysis of Freezable and Nonfreezable Mithun (*Bos frontalis*) Semen. *Journal of Animals*, 2014, 1–6. <https://doi.org/10.1155/2014/675031>
- Rachmawati, L., (Ismaya), I., & Astuti, P. (2014). Korelasi Antara Hormon Testosteron, Libido, Dan Kualitas Sperma Pada Kambing Bligon, Kejobong, Dan Peranakan Etawah. *Buletin Peternakan*, 38(1), 8. <https://doi.org/10.21059/buletinpeternak.v38i1.4598>
- Rajak, S. K., Kumaresan, A., Gaurav, M. K., Layek, S. S., Mohanty, T. K., Aslam, M. K. M., Tripathi, U. K., Prasad, S., & De, S. (2014). Testicular cell indices and peripheral blood testosterone concentrations in relation to age and semen quality in crossbred (Holstein FriesianxTharparkar) bulls. *Asian-Australasian Journal of Animal Sciences*, 27(11), 1554–1561. <https://doi.org/10.5713/ajas.2014.14139>
- Ratnawati D, Isnaini N, and Susilawati T. 2018. Character Motility of Liquid Semen on Ongole Crossbreed (PO), Bali and Madura Bulls with Diluent CEP-2at Cold Storage. *Asian Journal of Microbiology, Biotechnology and Environmental Sciences*. 20(1):21–28.
- Rodriguez, A. M., Schild, C. O., Cantón, G. J., Riet-Correa, F., Armendano, J. I., Caffarena, R. D., Brambilla, E. C., García, J. A., Morrell, E. L., Poppenga, R., & Giannitti, F. (2018). White muscle disease in three selenium deficient beef and dairy calves in Argentina and Uruguay. *Ciencia Rural*, 48(5). <https://doi.org/10.1590/0103-8478cr20170733>
- Rowe, M. (2011). Effect of Supplemental Trace Mineral Source (Organic versus Inorganic) on Bull Semen Quality. *Graduate Theses and Dissertations*. <https://scholarworks.uark.edu/etd/220>
- Roy, B., Baghel, R., Mohanty, T., & Mondal, G. (2013). Zinc and male reproduction in domestic animals: A review. *Indian Journal of Animal Nutrition*, 30(4), 339–350.
- Sabhapati, M., Raina, V. S., Bhakat, M., Mohanty, T. K., Shivahre, P. R., Mondal, G., & Gupta, A. K. (2016). Improvement of sexual behavior and semen quality by therapeutic approach and zinc

- supplementation on Karan Fries. *Indian Journal of Animal Sciences*, 86(6), 655–658.  
<https://doi.org/10.56093/ijans.v86i6.59163>
- Saha, U. (2016). Selenium in Animal Nutrition: Deficiencies in Soils and Forages, Requirements, Supplementation and Toxicity. *International Journal of Applied Agricultural Sciences*, 2(6), 112.  
<https://doi.org/10.11648/j.ijaas.20160206.15>
- Sarastina, Susilawati T, dan Ciptadi G. (2007). Analisa Beberapa Parameter Motilitas Spermatozoa Pada Berbagai Bangsa Sapi Menggunakan Computer Assisted Semen Analysis (CASA). *Jurnal Ternak Tropika*. 6(2):1–12.
- Septiani, D., Effendi, E. M., & Moerfinah. (2017). Penyimpanan Spermatozoa Pada Suhu Preservasi Dan Berbagai Pengencer Semen Terhadap Daya Tahan Hidup Spermatozoa. *Ekolgia: Jurnal Ilmu Dasar*, 17(2), 18–23.
- Setiawan, B., Nurul, I., & Setyawan, I. A. (2020). Influence of Bull Age on Fresh Semen Traits of Bali Cattle. *Russian Journal of Agricultural and Socio-Economic Sciences*, 98(2), 27–30.  
<https://doi.org/10.18551/rjoas.2020-02.04>
- Setiyono, A., Agus Setiadi, M., Mulyawati Kaiin, E., & Wayan Kurniani Karja, N. (2020). Pola Gerakan Spermatozoa Sapi setelah Diinkubasi dalam Media Fertilisasi dengan Imbuhan Heparin dan/atau Kafein. *Jurnal Veteriner*, 21(3), 458–469.  
<https://doi.org/10.19087/jveteriner.2020.21.3.458>
- Singh, A. K., Rajak, S. K., Kumar, P., Kerketta, S., & Yogi, R. K. (2018). Nutrition and bull fertility: A review. *Journal of Entomology and Zoology Studies*, 6(6), 635–643.  
<https://www.researchgate.net/publication/329177644>
- Sukmawati, E., Arifiantini, R. I., & Purwantara, B. (2015). Freezing capacity of sperm on various type of superior bulls. *Jurnal Ilmu Ternak Dan Veteriner*, 19(3).  
<https://doi.org/10.14334/jitv.v19i3.1079>
- Suprijati. (2013). *Seng Organik Sebagai Imbuhan Pakan Ruminansia*. Wartazoa.
- Surai, P. F., & Fisinin, V. I. (2015). Selenium in pig nutrition and reproduction: Boars and semen quality - A review. *Asian-Australasian Journal of Animal Sciences*, 28(5), 730–736.  
<https://doi.org/10.5713/ajas.14.0593>
- Susilawati, T. (2011). *Spermatologi*. Universitas Brawijaya Press.
- Susilawati, T. (2013). *Pedoman Inseminasi Buatan Pada Ternak (Cetakan Pertama)*. Universitas Brawijaya Press.

- Syarifuddin, N. A. (2021). *Daun Kelor Meningkatkan Libido Dan Kualitas Sperma Sapi Bali*. Bintang Pustaka Madani.
- Syarifuddin, N. A., Toleng, L., Rahardja, D. P., & Yusuf, M. (2017). Daun Kelor Sumber Mineral Seng (Zn) Untuk Meningkatkan Libido dan Kualitas Semen Pejantan Sapi Bali. In *Prosiding Seminar Nasional Lahan Basah Tahun 2016 Jilid 1: 180-186*.
- Vázquez-Armijo, J. F., Rojo, R., Salem, A. Z. M., López, D., Tinoco, J. L., González, A., Pescador, N., & Domínguez-Vara, I. A. (2011). Trace elements in sheep and goats reproduction: A review. *Tropical and Subtropical Agroecosystems*, *14*(1), 1–13.
- Vilakazi, D. M., & Webb, E. C. (2004). Effect of age and season on sperm morphology of Friesland bulls at an artificial insemination centre in South Africa. *South African Journal of Animal Science*, *34*(1), 62–69. <https://doi.org/10.4314/sajas.v34i1.4041>
- Vishwanath, R., & Shannon, P. (2000). Storage of bovine semen in liquid and frozen state. *Animal Reproduction Science*, *62*(1–3), 23–53. [https://doi.org/10.1016/S0378-4320\(00\)00153-6](https://doi.org/10.1016/S0378-4320(00)00153-6)
- Widhyari, S. D., Esfandiari, A., Wijaya, A., Wulansari, R., Widodo, S., & Maylina, L. (2015). Tinjauan Penambahan Mineral Zn dalam Pakan Terhadap Kualitas Spermatozoa pada Sapi Friesian holstein Jantan (The Study of Zn Supplementation on Sperm Quality in Friesian holstein Bulls). *Jurnal Ilmu Pertanian Indonesia (JIPI)*, *20*(1), 72–77. [journal.ipb.ac.id/index.php/JIPI](http://journal.ipb.ac.id/index.php/JIPI)
- Yasothei, R. (2014). Importance of Minerals on Reproduction in Dairy Cattle. *International Journal of Science, Environment and Technology*, *3*(6), 2051–2057. [www.ijset.net](http://www.ijset.net)
- Young, S. S., Eskenazi, B., Marchetti, F. M., Block, G., & Wyrobek, A. J. (2008). The association of folate, zinc and antioxidant intake with sperm aneuploidy in healthy non-smoking men. *Human Reproduction*, *23*(5), 1014–1022. <https://doi.org/10.1093/humrep/den036>
- Zhou, S., Zhang, X., Fu, Q., Cheng, Z., Ji, W., & Liu, H. (2022). The use of selenomethionine to reduce ammonia toxicity in porcine spleen by inhibiting endoplasmic reticulum stress and autophagy mediated by oxidative stress. *Ecotoxicology and Environmental Safety*, *242*(July), 113887. <https://doi.org/10.1016/j.ecoenv.2022.113887>

# LAMPIRAN



## Lampiran 1. Hasil Analisis Kualitas Semen Uji-T Dependen

### 1. Volume

#### Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Sebelum Pemberian Mikronutrisi	3.200	5	2.2847	1.0218
	Setelah Pemberian Mikronutrisi	4.840	5	1.2054	.5391

#### Paired Samples Test

		Paired Differences					t	df	Significance	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				One-Sided p	Two-Sided p
					Lower	Upper				
Pair 1	Sebelum Pemberian Mikronutrisi - Setelah Pemberian Mikronutrisi	-1.6400	2.6406	1.1809	-4.9188	1.6388	-1.389	4	.119	.237

### 2. pH

#### Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Sebelum Pemberian Mikronutrisi	6.320	5	.1789	.0800
	Setelah Pemberian Mikronutrisi	6.480	5	.0837	.0374

#### Paired Samples Test

		Paired Differences					t	df	Significance	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				One-Sided p	Two-Sided p
					Lower	Upper				
Pair 1	Sebelum Pemberian Mikronutrisi - Setelah Pemberian Mikronutrisi	-.1600	.1517	.0678	-.3483	.0283	-2.359	4	.039	.078

### 3. Motilitas

#### Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Sebelum Pemberian Mikronutrisi	85.7400	5	5.17749	2.31544
	Setelah Pemberian Mikronutrisi	84.9560	5	2.92541	1.30828

### Paired Samples Test

		Paired Differences					t	df	Significance	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				One-Sided p	Two-Sided p
					Lower	Upper				
Pair 1	Sebelum Pemberian Mikronutrisi - Setelah Pemberian Mikronutrisi	.78400	2.31200	1.03396	-2.08672	3.65472	.758	4	.245	.491

## 4. Viabilitas

### Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Sebelum Pemberian Mikronutrisi	55.20	5	17.167	7.677
	Setelah Pemberian Mikronutrisi	63.20	5	50.331	22.509

### Paired Samples Test

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	Sebelum Pemberian Mikronutrisi - Setelah Pemberian Mikronutrisi	-8.000	41.671	18.636	-59.742	43.742	-.429	4	.690

## 5. Abnormalitas

### Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Sebelum Pemberian Mikronutrisi	72.80	5	22.219	9.937
	Setelah Pemberian Mikronutrisi	45.80	5	20.092	8.986

### Paired Samples Test

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	Sebelum Pemberian Mikronutrisi - Setelah Pemberian Mikronutrisi	27.000	31.393	14.039	-11.979	65.979	1.923	4	.127

## 6. Konsentrasi

### Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Sebelum Pemberian Mikronutrisi	1.25100	5	.307100	.137339
	Setelah Pemberian Mikronutrisi	1.54300	5	.560318	.250582

### Paired Samples Test

		Paired Differences					Significance			
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	One-Sided p	Two-Sided p
					Lower	Upper				
Pair 1	Sebelum Pemberian Mikronutrisi - Setelah Pemberian Mikronutrisi	-.292000	.604034	.270132	-1.042007	.458007	-1.081	4	.170	.341

## Lampiran 2. Hasil Analisis Pola Pergerakan Spermatozoa Uji-T Dependen

### Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	DCL Kontrol	46.2640	5	8.32891	3.72480
	DCL Perlakuan	40.3700	5	14.88570	6.65709
Pair 2	DAP Kontrol	23.5540	5	3.47865	1.55570
	DAP Perlakuan	22.6200	5	1.62668	.72748
Pair 3	DSL Kontrol	14.9500	5	1.58736	.70989
	DSL Perlakuan	14.5940	5	1.08253	.48412

### Paired Samples Test

		Paired Differences					Significance			
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	One-Sided p	Two-Sided p
					Lower	Upper				
Pair 1	DCL Kontrol - DCL Perlakuan	5.89400	13.95147	6.23929	-11.42903	23.21703	.945	4	.199	.398
Pair 2	DAP Kontrol - DAP Perlakuan	.93400	2.31648	1.03596	-1.94229	3.81029	.902	4	.209	.418
Pair 3	DSL Kontrol - DSL Perlakuan	.35600	1.30799	.58495	-1.26808	1.98008	.609	4	.288	.576

### Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	VCL Kontrol	112.8980	5	21.54843	9.63675
	VCL Perlakuan	110.6260	5	10.87646	4.86410
Pair 2	VAP Kontrol	57.8320	5	9.08720	4.06392
	VAP Perlakuan	55.7760	5	3.88118	1.73572
Pair 3	VSL Kontrol	37.0060	5	4.17696	1.86800
	VSL Perlakuan	36.2500	5	2.55355	1.14198

### Paired Samples Test

		Paired Differences					t	df	Significance	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				One-Sided p	Two-Sided p
					Lower	Upper				
Pair 1	VCL Kontrol - VCL Perlakuan	2.27200	17.80530	7.96277	-19.83620	24.38020	.285	4	.395	.790
Pair 2	VAP Kontrol - VAP Perlakuan	2.05600	6.13621	2.74419	-5.56311	9.67511	.749	4	.248	.495
Pair 3	VSL Kontrol - VSL Perlakuan	.75600	2.96405	1.32556	-2.92435	4.43635	.570	4	.299	.599

### Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	STR Kontrol	.6440	5	.03130	.01400
	STR Perlakuan	.6480	5	.00447	.00200
Pair 2	LIN Kontrol	.3300	5	.02345	.01049
	LIN Perlakuan	.3300	5	.01871	.00837
Pair 3	WOB Kontrol	.5140	5	.02302	.01030
	WOB Perlakuan	.5060	5	.02702	.01208
Pair 4	ALH Kontrol	6.2640	5	.37660	.16842
	ALH Perlakuan	6.2140	5	.29687	.13276
Pair 5	BCF Kontrol	21.0820	5	1.31999	.59032
	BCF Perlakuan	20.8400	5	.52474	.23467

### Paired Samples Test

		Paired Differences					t	df	Significance	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				One-Sided p	Two-Sided p
					Lower	Upper				
Pair 1	STR Kontrol - STR Perlakuan	-.00400	.03286	.01470	-.04481	.03681	-.272	4	.399	.799
Pair 2	LIN Kontrol - LIN Perlakuan	.00000	.03240	.01449	-.04023	.04023	.000	4	.500	1.000
Pair 3	WOB Kontrol - WOB Perlakuan	.00800	.04604	.02059	-.04917	.06517	.389	4	.359	.717
Pair 4	ALH Kontrol - ALH Perlakuan	.05000	.44334	.19827	-.50048	.60048	.252	4	.407	.813
Pair 5	BCF Kontrol - BCF Perlakuan	.24200	1.55593	.69583	-1.68994	2.17394	.348	4	.373	.746

## DOKUMENTASI

### Lampiran 3. Dokumentasi Kegiatan Penelitian



## RIWAYAT HIDUP



Nengsih Arisanti, Lahir di Bulukumba pada tanggal 5 Mei 1997. Lahir dari Orang Tua dengan Ayah bernama Aris (Almarhum) dan Ibu Nursanti, S.Sos. Merupakan anak pertama dari 2 (dua) bersaudara. Menempuh pendidikan Sekolah Dasar Negeri (SDN) 45 Dampang, kemudian melanjutkan ke Sekolah Menengah Pertama Negeri (SMPN) 5 Bulukumba dan lulus pada tahun 2012, meneruskan pendidikan ke Sekolah Menengah Atas Negeri (SMAN) 8 Bulukumba dan lulus pada tahun 2015. Pada tahun yang sama penulis melanjutkan pendidikan Starat Satu (S1) Universitas Islam Negeri Alauddin Makassar pada Jurusan Peternakan angkatan 2015 dan lulus pada tahun 2019. Tahun 2020 penulis kembali melanjutkan pendidikan Magister (S2) Universitas Hasanuddin Makassar pada Jurusan Ilmu dan Teknologi Peternakan. Dengan ketekunan dan motivasi yang tinggi untuk terus belajar, penulis berhasil menyelesaikan pengerjaan Tesis yang berjudul **“Pola Pergerakan Spermatozoa Sapi Bali (*Bos sondaicus*) Dengan Pemberian Mikronutrisi Zinc, Selenium dan Vitamin E”** semoga Tesis ini mampu memberikan kontribusi positif bagi dunia Pendidikan.