

DAFTAR PUSTAKA

- Abdnour, S. A., Hassan, M. A. E., Mohammed, A. K., Alhimaidi, A. R., Al-Gabri, N., Al-Khaldi, K. O., & Swelum, A. A. (2020). The Effect of Adding Different Levels of Curcumin and its Nanoparticles to Extender on Post-Thaw Quality of Cryopreserved Rabbit Sperm. *Animals*, 10(9), 1–13. <https://doi.org/10.3390/ani10091508>.
- Aliyah, S. N., Santoso, H., & Hasan, Z. (2022). Analisis Normalitas dan Abnormalitas Spermatozoa Segar Sapi Limousin (*Bos taurus*) dan Sapi Bali (*Bos sondaicus*) Sebelum Proses Pembekuan Di Balai Besar Inseminasi Buatan Singosari Malang. *Sciscitatio*, 3(1), 47–55. <https://doi.org/10.21460/sciscitatio.2022.31.85>.
- Alkali, I. M., Asuku, S. O., Colombo, M., Bukar, M. M., Waziri, M. A., & Luvoni, G. C. (2022). Spermatozoa Survival in Egg Yolk-Based and Soybean-Based Extenders at Ambient and Chilling Temperature in Domestic Turkeys (*Meleagris gallopavo*). *Animals*, 12(5), 648. <https://doi.org/10.3390/ani12050648>.
- Anastácio da Silva, E., Corcini, C. D., Junior, F. A. A. C., Martins, D., Gheller, S. M. M., Hädrich, G., Dora, C. M., & Junior, A. S. V. (2022). Probe Ultrasonification of Egg Yolk Plasma Forms Low-Density Lipoprotein (LDL) Nanoparticles that Efficiently Protect Canine Semen during Cryofreezing. *Journal of Biological Chemistry*, 298(7), 101975. <https://doi.org/10.1016/j.jbc.2022.101975>.
- Andi Syarifuddin, N., Latief Toleng, A., & Prawira Rahardja, D. (2018). Analisis Semen Berbasis Komputerisasi (CASA) Untuk Memprediksi Fertilitas Sperma Sapi Bali. *Prosiding Seminar Nasional Lingkungan Lahan Basah*, 3(1), 80–85. <http://snllb.ulm.ac.id/prosiding/index.php/snllb-lit/article/view/22>.
- Anel-López, L., Garcia-Alvarez, O., Maroto-Morales, A., Iniesta-Cuerda, M., Ramón, M., Soler, A. J., Fernández-Santos, M. R., & Garde, J. J. (2015). Reduced Glutathione Addition Improves both the Kinematics and Physiological Quality of Post-Thawed Red Deer Sperm. *Animal Reproduction Science*, 162, 73–79. <https://doi.org/10.1016/j.anireprosci.2015.09.012>.
- Ansari, M. S., Rakha, B. A., Akhter, S., Akhter, A., Blesbois, E., & Santiago-Moreno, J. (2021). Effect of Glutathione on Pre and Post-Freezing Sperm Quality of Indian Red Jungle Fowl (*Gallus gallus murghi*). *Theriogenology*, 172, 73–79. <https://doi.org/10.1016/j.theriogenology.2021.06.008>.

- Ansari, M. S., Rakha, B. A., Andrabi, S. M., & Akhter, S. (2010). Usefulness of Powdered and Fresh Egg Yolk for Cryopreservation of Zebu Bull Spermatozoa. *Reproductive Biology*, 10(3), 235–240. [https://doi.org/10.1016/S1642-431X\(12\)60043-6](https://doi.org/10.1016/S1642-431X(12)60043-6).
- Anzar, M., Rajapaksha, K., & Boswall, L. (2019). Egg Yolk-Free Cryopreservation of Bull Semen. *PLOS ONE*, 14(10), e0223977. <https://doi.org/10.1371/journal.pone.0223977>.
- Ariantie, O. S., Amrozi, A., Yusuf, T. L., Rochman, N. T., & Purwantara, B. (2021). The Production of Freeze-Dried Egg Yolk Powder and Its Effect on the Quality of Garut Ram Liquid Semen. *Jurnal Kedokteran Hewan*, 15(2), 37–46. <https://doi.org/10.21157/j.ked.hewan.v15i2.19669>.
- Arif, A. A., Maulana, T., Kaiin, E. M., Purwantara, B., & Arifiantini, R. I. (2022). The Quality of Frozen Semen of Limousin Bull in Various Semen Diluents. *Tropical Animal Science Journal*, 45(3), 284–290. <https://doi.org/10.5398/tasj.2022.45.3.284>.
- Arifiantini, R. I., & Yusuf, T. L. (2006). Keberhasilan Penggunaan Tiga Pengencer Dalam Dua Jenis Kemasan Pada Proses Pembekuan Semen Sapi Frisien Holstein. *Majalah Ilmiah Peternakan*, 9(3), 164180. <https://doi.org/10.24843/MIP>.
- Arruda, L. C. P., Tobal, L. F. M., Carneiro, G. F., & Guerra, M. M. P. (2021). Zinc Oxide Nanoparticles Alter the Membrane Potential of Mitochondria from Post-Thawed Ram Spermatozoa. *Small Ruminant Research*, 202, 106466. <https://doi.org/10.1016/j.smallrumres.2021.106466>.
- Azura, S., Ratnani, H., Susilowati, S., Samik, A., & Soepranianondo, K. (2020). Effect of α -Tocopherol Supplementation in Diluents on the Motility, Viability and Plasma Membrane Integrity of Simmental Bull Spermatozoa after Cooling. *Ovozoa*, 9(1), 1–6. <https://e-journal.unair.ac.id/OVZ/index>.
- Baharun, A., Arifiantini, R. I., Karja, N. W. K., & Said, S. (2021). Seminal Plasma Protein Profile Based on Molecular Weight and Their Correlation with Semen Quality of Simmental Bull. *Journal of the Indonesian Tropical Animal Agriculture*, 46(1), 20–28. <https://doi.org/10.14710/JITAA.46.1.20-28>.
- Bai, D. P., Lin, X. Y., Huang, Y. F., & Zhang, X. F. (2018). Theranostics Aspects of Various Nanoparticles in Veterinary Medicine. *International Journal of Molecular Sciences*, 19(11), 3299. <https://doi.org/10.3390/ijms19113299>.
- Baiee, F., Haron, W., Yusoff, R., Ariff, O., Yimer, N., Hammadi, S., Ahmedeltayeb, T., & Kaka, A. (2018). Modification of Electro-Ejaculation Technique to Minimise Discomfort during Semen Collection in Bulls. *Pakistan Journal of*

- Zoology*, 50(1), 83–89. <https://doi.org/10.17582/journal.pjz/2018.50.1.83.89>.
- Basioura, A., Michos, I., Ntemka, A., Karagiannis, I., & Boscos, C. M. (2020). Effect of Iron Oxide and Silver Nanoparticles on Boar Semen CASA Motility and Kinetics. *Journal of the Hellenic Veterinary Medical Society*, 71(3), 2331–2338. <https://doi.org/10.12681/jhvms.25084>.
- Benko, F., Lenický, M., Lukáč, N., & Tvrda, E. (2021). Negative Impact of Cryopreservation and Cryodamage on Bovine Spermatozoa: A Review. *Slovak Journal of Animal Science*, 54(3), 151–156.
- BSN. (2017). *Semen Beku – Bagian 1: Sapi*. Badan Standarisasi Nasional Indonesia.
- Bustani, G. S., & Baicee, F. H. (2021). Semen Extenders: An Evaluative Overview of Preservative Mechanisms of Semen and Semen Extenders. *Veterinary World*, 14(5), 1220–1233. <https://doi.org/10.14202/vetworld.2021.1220-1233>.
- Danaei, M., Dehgankhold, M., Ataei, S., Hasanzadeh Davarani, F., Javanmard, R., Dokhani, A., Khorasani, S., & Mozafari, M. R. (2018). Impact of Particle Size and Polydispersity Index on the Clinical Applications of Lipidic Nanocarrier Systems. *Pharmaceutics*, 10(2), 1–17. <https://doi.org/10.3390/pharmaceutics10020057>.
- Džidić, A., Zamberlin, Š., Antunac, N., & Šalamon, D. (2021). Review on the Advances in Dairy Milk Chemistry. *Journal of Central European Agriculture*, 22(3), 497–509. <https://doi.org/10.5513/JCEA01/22.3.3202>.
- El-Sayed, A., & Kamel, M. (2020). Advanced Applications of Nanotechnology in Veterinary Medicine. *Environmental Science and Pollution Research*, 27(16), 19073–19086. <https://doi.org/10.1007/s11356-018-3913-y>.
- Fernandes, M., Hernández, P. R., Simões, J., & Barbas, J. P. (2021). Effects of Three Semen Extenders, Breeding Season Month and Freezing–Thawing Cycle on Spermatozoa Preservation of Portuguese Merino Sheep. *Animals*, 11(9), 2619. <https://doi.org/10.3390/ani11092619>.
- Fernandez-Novo, A., Santos-Lopez, S., Barrajón-Masa, C., Mozas, P., de Mercado, E., Cáceres, E., Garrafa, A., González-Martín, J. V., Pérez-Villalobos, N., Oliet, A., Astiz, S., & Pérez-Garnelo, S. S. (2021). Effect of Extender, Storage Time and Temperature on Kinetic Parameters (CASA) on Bull Semen Samples. *Biology*, 10(8), 806. <https://doi.org/10.3390/biology10080806>.
- Florena, F. F., Faizal, F., & Viridi, S. (2021). Experimental and simulation Study of Solid Flows in Beads Mill. *Advanced Powder Technology*, 32(8), 2703–2711. <https://doi.org/10.1016/j.apt.2021.05.029>.

- Fournaise, T., Burgain, J., Perroud-Thomassin, C., & Petit, J. (2021). Impact of the Whey Protein/Casein Ratio on the Reconstitution and Flow Properties of Spray-Dried Dairy Protein Powders. *Powder Technology*, 391, 275–281. <https://doi.org/10.1016/j.powtec.2021.06.026>.
- Fu, Q., Pan, L., Huang, D., Wang, Z., Hou, Z., & Zhang, M. (2019). Proteomic Profiles of Buffalo Spermatozoa and Seminal Plasma. *Theriogenology*, 134, 74–82. <https://doi.org/10.1016/j.theriogenology.2019.05.013>.
- Furqon, A., Novianti, I., Septian, W. A., Putri, R. F., Nugraha, C. D., & Suyadi, S. (2021). The Effect of Different Breeds and Ages on Semen. *TERNAK TROPIKA Journal of Tropical Animal Production*, 22(2), 147–152. <https://doi.org/10.21776/ub.jtapro.2021.022.02.9>.
- Galarza, D. A., de Guevara, M. L., Beltrán-Breña, P., Sánchez-Calabuig, M. J., Rizos, D., López-Sebastián, A., & Santiago-Moreno, J. (2019). Influence of Sperm Filtration and the Addition of Glycerol to UHT Skimmed Milk- and TEST-Based Extenders on the Quality and Fertilizing Capacity of Chilled Ram Sperm. *Theriogenology*, 133, 29–37. <https://doi.org/10.1016/j.theriogenology.2019.04.027>.
- Geng, F., Xie, Y., Wang, Y., & Wang, J. (2021). Depolymerization of Chicken Egg Yolk Granules Induced by High-Intensity Ultrasound. *Food Chemistry*, 354, 129580. <https://doi.org/10.1016/j.foodchem.2021.129580>.
- Hassanein, E. M., Hashem, N. M., El-Azrak, K. E. D. M., Gonzalez-Bulnes, A., Hassan, G. A., & Salem, M. H. (2021). Efficiency of GnRH-Loaded Chitosan Nanoparticles for Inducing LH Secretion and Fertile Ovulations in Protocols for Artificial Insemination in Rabbit Does. *Animals*, 11(2), 440. <https://doi.org/10.3390/ani11020440>.
- Hitler, L., Nyong'a, M. T., Ali, I., Sadia, A., Waliaula, K. P., Ogalo, O. J., & Udochukwu, A. O. (2017). Mechanism, of Biophysicochemical Interactions and Cellular Uptake at the Nano-Bio Interface: A Review. *European Journal of Biophysics*, 5(4), 66–78. <https://doi.org/10.11648/j.ejb.20170504.12>.
- Iskandari, N. N., Madyawati, S. P., Wibawati, P. A., Suprayogi, T. W., Prastiya, R. A., & Agustono, B. (2020). Perbandingan Pengencer Tris Kuning Telur dan Susu Skim Kuning Telur Terhadap Persentase Motilitas, Viabilitas dan Integritas Membran Plasma Spermatozoa Kambing Sapera pada Penyimpanan Suhu 5°C. *Jurnal Medik Veteriner*, 3(2), 196. <https://doi.org/10.20473/jmv.vol3.iss2.2020.196-202>.
- Ismail, A. A., Abdel-Khalek, A. K. E., Khalil, W. A., Yousif, A. I., Saadeldin, I. M., Abomughaid, M. M., & El-Harairy, M. A. (2020). Effects of Mint, Thyme, and Curcumin Extract Nanoformulations on the Sperm quality, Apoptosis,

- Chromatin Decondensation, Enzyme Activity, and Oxidative Status of Cryopreserved Goat Semen. *Cryobiology*, 97, 144–152. <https://doi.org/10.1016/j.cryobiol.2020.09.002>.
- Izanloo, H., Soleimanzadeh, A., Bucak, M. N., Imani, M., & Zhandi, M. (2021). The Effects of Varying Concentrations of Glutathione and Trehalose in Improving Microscopic and Oxidative Stress Parameters in Turkey Semen during Liquid Storage at 5 °C. *Cryobiology*, 101, 12–19. <https://doi.org/10.1016/j.cryobiol.2021.07.002>.
- Khalifa, E. I., & Khalil, W. A. (2016). Impact of Conventional and Non-Conventional Extenders on Rams Semen Quality During Storage at 5°C. *Journal of Animal and Poultry Production*, 7(10), 383–391. <https://doi.org/10.21608/jappmu.2016.48746>.
- Khalil, W. A., El-Harairy, M. A., Zeidan, A. E. B., & Hassan, M. A. E. (2019). Impact of Selenium Nano-Particles in Semen Extender on Bull Sperm Quality after Cryopreservation. *Theriogenology*, 126, 121–127. <https://doi.org/10.1016/j.theriogenology.2018.12.017>.
- Khalil, W. A., El-Harairy, M. A., Zeidan, A. E., Hassan, M. A., & Mohey-Elsaeed, O. (2018). Evaluation of Bull Spermatozoa during and after Cryopreservation: Structural and Ultrastructural Insights. *International Journal of Veterinary Science and Medicine*, 6, S49–S56. <https://doi.org/10.1016/j.ijvsm.2017.11.001>.
- Khatimah, K., Yusuf, M., Utami, R. F., Toleng, A. L., Masturi, Sahiruddin, & Masir, U. (2021). Comparison of Chicken-Egg Yolk and Duck-Egg Yolk in Tris-Citric Acid as Extender to Maintain the Quality of Post-Thawing Bali Bull Semen. *IOP Conference Series: Earth and Environmental Science*, 788(1), 012148. <https://doi.org/10.1088/1755-1315/788/1/012148>.
- Kogan, T., Dahan, D. G., Laor, R., Argov-Argaman, N., Zeron, Y., Komsky-Elbaz, A., Kalo, D., & Roth, Z. (2021). Association between Fatty Acid Composition, Cryotolerance and Fertility Competence of Progressively Motile Bovine Spermatozoa. *Animals*, 11(10), 2948. <https://doi.org/10.3390/ani11102948>.
- Kumar, N., Lone, S. A., Prasad, J. K., Jan, M. H., & Ghosh, S. K. (2016). Effect of Egg Yolk Powder on Freezability of Murrah Buffalo (*Bubalus bubalis*) Semen. *Veterinary World*, 9(6), 601–604. <https://doi.org/10.14202/vetworld.2016.601-604>.
- Kurnia, A., Soeparna, Arifiantini, I., & Hidayat, R. (2020). Performa Sapi Simmental yang Diberi Imbuhan Selenium dan Zink dalam Pakan. *Acta Veterinaria Indonesiana*, 8(1), 24–31. <https://doi.org/10.29244/avi.8.1.24-31>.

- Lata, M., & Mondal, B. C. (2021). Applications of Nanotechnology in Animal Husbandry. *Vigyan Varta*, 2(3), 63–71. <https://doi.org/10.4103/1110-208x.194379>.
- Loureiro, K. C., Lima-Verde, I. B., Johannesson, A., Ntallaris, T., Jager, A., Štepánek, P., Mendonça, M. D., Severino, P., & Morrell, J. M. (2020). Effects of Cashew Gum and Nanoparticles on Cooled Stallion Semen. *Acta Veterinaria Scandinavica*, 62(1), 1–9. <https://doi.org/10.1186/s13028-020-00530-6>.
- Lukusa, K., Hassen, A., & Lehloenya, K. (2021). Dietary Selenium Supplementation, Clarified Egg Yolk Extender and Slow Cooling Improve Cryopreserved Sperm Characteristics of Saanen Buck. *Asian Pacific Journal of Reproduction*, 10(1), 43–48. <https://doi.org/10.4103/2305-0500.306437>.
- Madrigali, A., Rota, A., Panzani, D., Castellani, S., Shawahina, M., Hassan, A., Di Iacovo, F., Rossignoli, C., & Camillo, F. (2021). Artificial Insemination in Sheep with Fresh Diluted Semen: Comparison between Two Different Semen Extenders and Management Protocols. *Tropical Animal Science Journal*, 44(3), 255–260. <https://doi.org/10.5398/tasj.2021.44.3.255>.
- Magdanz, V., Gebauer, J., Sharan, P., Eltoukhy, S., Voigt, D., & Simmchen, J. (2019). Sperm–Particle Interactions and Their Prospects for Charge Mapping. *Advanced Biosystems*, 3(9), 1–9. <https://doi.org/10.1002/adbi.201900061>.
- Malik, A., Jaelani, A., Widaningsih, N., Ni'mah, G. K., Raviani, Sakiman, & Sasongko, N. (2018). Effect of Different Concentration of Fish Oil in Skim Milk-Egg Yolk Extenders on Post-Thawed Semen Qualities of Kalang Swamp Buffalo Bull. *Asian Pacific Journal of Reproduction*, 7(3), 139–142. <https://doi.org/10.4103/2305-0500.233576>.
- Martins, V. E. D., Pinto, S. C. C., Chaves, R. M., Baros Filho, A. K. D., Laskoski, L. M., & Souza, F. A. (2020). Antioxidant Effect on Viability of Boar Semen Cooled to 15°C. *Arquivo Brasileiro de Medicina Veterinaria e Zootecnia*, 72(1), 145–152. <https://doi.org/10.1590/1678-4162-11294>.
- Mehdipour, M., Kia, H. D., Moghaddam, G., & Hamishehkar, H. (2018). Effect of Egg Yolk Plasma and Soybean Lecithin on Rooster Frozen-Thawed Sperm Quality and Fertility. *Theriogenology*, 116, 89–94. <https://doi.org/10.1016/j.theriogenology.2018.05.013>.
- Miguel-Jimenez, S., Del Alamo, M. M. R., Álvarez-Rodríguez, M., Hidalgo, C. O., Peña, A. I., Muñoz, R., Rodríguez-Gil, J. E., & Mogas, T. (2020). In Vitro Assessment of Egg Yolk-, Soya Bean Lecithin- and Liposome-Based Extenders for Cryopreservation of Dairy Bull Semen. *Animal Reproduction Science*, 215, 106315. <https://doi.org/10.1016/j.anireprosci.2020.106315>.

- Minitube. (2021). Manual AndroVision ®. *Minitub Manual 12500/0000*.
- Montaser, M. (2016). Applications of Nanotechnology in Orthopedics. *Benha Medical Journal*, 33(1), 1. <https://doi.org/10.4103/1110-208x.194379>.
- 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>.
- Mousavi, S. M., Towhidi, A., Zhandi, M., Amoabediny, G., Mohammadi-Sangcheshmeh, A., Sharafi, M., & Hussaini, S. M. H. (2019). Comparison of Two Different Antioxidants in a Nano Lecithin-Based Extender for Bull Sperm Cryopreservation. *Animal Reproduction Science*, 209, 106171. <https://doi.org/10.1016/j.anireprosci.2019.106171>.
- Mulia, B. H., Widianti, A., Manansang, J., Setiadi, D. R., Yoelinda, V. T., Nugraha, T. P., Karja, N. W. K., & Arifiantini, R. I. (2021). Establishment of Semen Collection Technique Using Electroejaculator and Semen Cryopreservation of Javan Leopard (*Panthera pardus melas* Cuvier, 1809). *Veterinary World*, 14(12), 3156–3163. <https://doi.org/10.14202/vetworld.2021.3156-3163>.
- Muniyappanavar, S., Tandle, M. K., Vinay, P. T., Bijurkar, R. G., Suranagi, M. D., Kulkarni, S., & Bhagavantappa, B. (2020). Effect of Supplementation of Glutathione and α -Tocopherol in Tris and Skim Milk Based Extenders on Motility Parameters of Ram Semen at Refrigeration Temperature. *International Journal of Current Microbiology and Applied Sciences*, 9(3), 3063–3071. <https://doi.org/10.20546/ijcmas.2020.903.351>.
- Murphy, E. M., O'Meara, C., Eivers, B., Lonergan, P., & Fair, S. (2018). Comparison of Plant- and Egg Yolk-Based Semen Diluents on in Vitro Sperm Kinematics and in Vivo Fertility of Frozen-Thawed Bull Semen. *Animal Reproduction Science*, 191, 70–75. <https://doi.org/10.1016/j.anireprosci.2018.02.010>.
- Mustofa, I., Susilowati, S., Suprayogi, T. W., Akintunde, A. O., Oktanella, Y., & Purwanto, D. A. (2023). Epigallocatechin-3-gallate Chitosan Nanoparticles in an Extender Improve the Antioxidant Capacity and Post-Thawed Quality of Kacang Goat Semen. *F1000Research*, 12, 32. <https://doi.org/10.12688/f1000research.127744.1>.
- Nadri, T., Towhidi, A., Zeinoaldini, S., Martínez-Pastor, F., Mousavi, M., Noei, R., Tar, M., & Sangcheshmesh, A. M. (2019). Lecithin Nanoparticles Enhance the Cryosurvival of Caprine Sperm. *Theriogenology*, 133, 38–44. <https://doi.org/10.1016/j.theriogenology.2019.04.024>.

- Nadri, T., Towhidi, A., Zeinoaldini, S., Riazi, G., Zhandi, M., & Sharafi, M. (2020a). Supplemental Glutathione Improves Post-Thaw Quality of Holstein Bulls Sperm in a Nanomicelle Based Extender. *Iranian Journal of Applied Animal Science*, 10(4), 615–622.
- Nadri, T., Zeinoaldini, S., Towhidi, A., Riazi, G. H., Zhandi, M., & Sharafi, M. (2020b). Effect of Supplementation of Lecithin Nanoparticles-Based Extender With Reduced Glutathione on Freezability of Bull Sperm. *Animal Production*, 22(3), 471–477. <https://doi.org/10.22059/jap.2020.287470.623434>.
- Nagata, M. P. B., Egashira, J., Katafuchi, N., Endo, K., Ogata, K., Yamanaka, K., Yamanouchi, T., Matsuda, H., Hashiyada, Y., & Yamashita, K. (2019). Bovine Sperm Selection Procedure Prior to Cryopreservation for Improvement of Post-Thawed Semen Quality and Fertility. *Journal of Animal Science and Biotechnology*, 10(1), 1–14. <https://doi.org/10.1186/s40104-019-0395-9>.
- Nalley, W. M. M., Meidina, T. S. A., Kurnia, A., & Arifiantini, R. I. (2019). The Addition of Fish Salmon Omega-3 in Tris Egg Yolk Diluents on the Quality of Simmental Bull Frozen Semen. *Asian Journal of Agriculture and Biology*, 7(3), 467–473.
- Nazari, H., Ahmadi, E., Fahraji, H. H., Afzali, A., & Davoodian, N. (2021). Cryopreservation and its Effects on Motility and Gene Expression Patterns and Fertilizing Potential of Bovine Epididymal Sperm. *Veterinary Medicine and Science*, 7(1), 127–135. <https://doi.org/10.1002/vms3.355>.
- Novita, C. I., Sari, R., & Sari, E. M. (2021). The Effect of Jamblang Leaves Extract (*Syzygium cumini*) Inclusion Skim Milk-Egg Yolk Extender on Motility, Abnormality and Viability of Aceh Cattle Spermatozoa Stored at 4°C. *Buletin Peternakan*, 45(1), 6. <https://doi.org/10.21059/buletinpeternak.v45i1.60455>.
- Novita, R. (2020). Pengaruh Lama Waktu Thawing Terhadap Kualitas Semen Beku Sapi Simmental Secara Mikroskopis. *Tropical Animal Science*, 2(2), 66–73. <https://doi.org/10.36596/tas.v2i2.483>.
- Orzołek, A., Rafalska, K. T., Otowska, W. A., Kordan, W., Korzekwa, A. J., & Kozłowski, K. (2021). Influence of Zinc and Manganese Nanoparticles on Selected Parameters of Turkey Spermatozoa Stored in a Liquid State at 4 °C. *Animals*, 11(11), 3289. <https://doi.org/10.3390/ani11113289>.
- Pasyah, I., Rosadi, B., & Darmawan. (2021). Pengaruh Penyimpanan Pada Suhu 5°C Terhadap Motilitas, Persentase Hidup (Viabilitas) Dan Abnormalitas Semen Sapi Simmental. *Jurnal Ilmiah Ilmu-Ilmu Peternakan*, 24(1), 11–18.
- Perumal, P. (2018). Low Density Lipoprotein in Cryopreservation of Semen. *Asian Pacific Journal of Reproduction*, 7(3), 103–116. <https://doi.org/10.4103/2305>

0500.233571.

- Perumal, P., Chang, S., Ezung, E., Khan, M. H., Vupru, K., & Khate, K. (2018). Effect of Egg Yolk Powder on Cryopreservation of Mithun Semen. *Indian Journal of Animal Sciences*, 88(1), 46–49.
- Pipan, M. Z., Casal, M. L., Šterbenc, N., Klun, I. V., & Mrkun, J. (2020). Vitrification Using Soy Lecithin and Sucrose: A New Way to Store the Sperm for the Preservation of Canine Reproductive Function. *Animals*, 10(4), 653. <https://doi.org/10.3390/ani10040653>.
- Piras, C. C., Fernández-Prieto, S., & De Borggraeve, W. M. (2019). Ball Milling: A Green Technology for the Preparation and Functionalisation of Nanocellulose Derivatives. *Nanoscale Advances*, 1(3), 937–947. <https://doi.org/10.1039/c8na00238j>.
- Pramanik, P. S., Giri, S. N., & Gupta, P. K. (2021). Cryo-Preservation of Buffalo Semen in Skim Milk Egg Yolk, Skim Milk, Citric Acid Whey Egg Yolk and Citric Acid Whey Extenders. *Journal of Entomology and Zoology Studies*, 9(2), 530–533.
- Prastika, Z., Susilowati, S., Agustono, B., Safitri, E., Fikri, F., & Prastiya, R. A. (2018). Motilitas dan Viabilitas Spermatozoa Sapi Rambon di desa Kemiren Banyuwangi. *Jurnal Medik Veteriner*, 1(2), 38–42. <http://journal.unair.ac.id>.
- Pravat, S., & Yadav, S. (2022). Assessment of Nano-Derived Particles, Devices and Systems in Animal Science: A Review. *Malaysian Animal Husbandry Journal (MAHJ)*, 2(1), 09–18. <https://doi.org/10.26480/mahj.01.2022.09.18>.
- Pytlik, J., Savvulidi, F., Georgijević, Ducháček, J., Vrhel, M., Nagy, S., & Stádník, L. (2022). Effect of Extender on the Quality and Incubation Resilience of Cryopreserved Holstein Bull Semen. *Czech Journal of Animal Science*, 67(3), 75–86. <https://doi.org/10.17221/196/2021-CJAS>.
- Raheja, N., Choudhary, S., Grewal, S., Sharma, N., & Kumar, N. (2018). A Review on Semen Extenders and Additives Used in Cattle and Buffalo Bull Semen Preservation. *Journal of Entomology and Zoology Studies*, 6(3), 239–245. <https://doi.org/E-ISSN: 2320-7078>.
- Rahman, M., Gofur, M., Rahman, M., Bari, F., & Juyena, N. (2018). Effect of Skim Milk and Tris-citrate Extenders to Preserve the Semen of Indigenous Ram of Bangladesh. *Asian Journal of Biology*, 5(2), 1–11. <https://doi.org/10.9734/ajob/2018/39448>.
- Ramadhana, R., Abinawanto, & Gustiano, R. (2021). Effect of Skim Milk on Sperm Motility of Brek Fish, *Systomus orphoides* (Valenciennes, 1842) for Short

- Term Preservation. *Proceedings of the 3rd KOBI Congress, International and National Conferences (KOBICINC 2020)*, 14, 296–302. <https://doi.org/10.2991/absr.k.210621.050>.
- Rasad, S. D., Solihati, N., Winangun, K., Avicenna, M. F., Yusrina, A., Melinda, M., & Rauf, A. N. (2019). Evaluation of Pasundan Cattle Semen Quality in Three Different Types of Extender. *IOP Conference Series: Earth and Environmental Science*, 247(1), 012011. <https://doi.org/10.1088/1755-1315/247/1/012011>.
- Ratnawati, D., Isnaini, N., & Susilawati, T. (2019). Factors Affecting Spermatozoa Motility Analysis Using CASA. *Wartazoa*, 29(3), 145–152. <https://doi.org/10.14334/wartazoa.v29i3.2012>.
- Roy, D., Ye, A., Moughan, P. J., & Singh, H. (2020). Composition, Structure, and Digestive Dynamics of Milk From Different Species - A Review. *Frontiers in Nutrition*, 7, 577759. <https://doi.org/10.3389/fnut.2020.577759>.
- Saadeldin, I. M., Khalil, W. A., Alharbi, M. G., & Lee, S. H. (2020). The Current Trends in Using Nanoparticles, Liposomes, and Exosomes for Semen Cryopreservation. *Animals*, 10, 2281. <https://doi.org/10.3390/ani10122281>.
- Saleh, D. M., Sumaryadi, M. Y., Nugroho, A. P., & Hidayah, C. N. (2022). Effect of the Addition of Egg Yolk to Skim Milk Extender and Storage Time on the Motility and Fertility of Kampung Rooster Spermatozoa. *Proceedings of the International Conference on Improving Tropical Animal Production for Food Security (ITAPS 2021)*, 101–104. <https://doi.org/10.2991/absr.k.220309.021>.
- Salmah, N., Toleng, A. L., Yusuf, M., Masturi, Sahiruddin, Hasrin, & Masir, M. (2021). Motility, Viability and Abnormality of the Frozen Bali Bull Semen with Andromed and Egg Yolk-Tris Extender. *Hasanuddin Journal of Animal Science*, 3(1), 8–14. <https://doi.org/10.20956/hajas.v3i1.14171>.
- Samanta, L., Parida, R., Dias, T. R., & Agarwal, A. (2018). The Enigmatic Seminal Plasma: A Proteomics Insight from Ejaculation to Fertilization. *Reproductive Biology and Endocrinology*, 16(1), 1–11. <https://doi.org/10.1186/s12958-018-0358-6>.
- Satrio, F. A., Karja, N. W. K., Setiadi, M. A., Kaiin, E. M., Kurnia, A., & Purwantara, B. (2022). Productivity and Fresh Semen Characteristics of Simmental Bull Different Ages. *Jurnal Kedokteran Hewan - Indonesian Journal of Veterinary Sciences*, 16(1), 23–28. <https://doi.org/10.21157/j.ked.hewan.v16i1.23487>.
- Shahin, M. A., Khalil, W. A., Saadeldin, I. M., Swelum, A. A. A., & El-Harairy, M. A. (2020). Comparison between the Effects of Adding Vitamins, Trace

- Elements, and Nanoparticles to SHOTOR Extender on the Cryopreservation of Dromedary Camel Epididymal Spermatozoa. *Animals*, 10(1), 78.
- Shi, L., Jin, T., Hu, Y., Ma, Z., Niu, H., & Ren, Y. (2020). Effects of Reduced Glutathione on Ram Sperm Parameters, Antioxidant Status, Mitochondrial Activity and the Abundance of Hexose Transporters During Liquid Storage at 5 °C. *Small Ruminant Research*, 189, 106139. <https://doi.org/10.1016/j.smallrumres.2020.106139>.
- Shoimah, U. S., Dakhlan, A., Sulastri, & Hamdani, M. D. I. (2021). Use of Body Measurements to Predict Live Body Weight of Simmental Bull in Lembang Artificial Insemination Center, West Java. *IOP Conference Series: Earth and Environmental Science*, 888(1), 012030. <https://doi.org/10.1088/1755-1315/888/1/012030>.
- Silva, N. C., Leão, K. M., Pádua, J. T., Marques, T. C., Neto, F. R. A., Dode, M. A. N., & Cunha, A. T. M. (2021). Effect of Different Cryopreservation Extenders Added with Antioxidants on Semen Quality and in Vitro Embryo Production Efficiency in Cattle. *Anais Da Academia Brasileira de Ciencias*, 93(3), 1–14. <https://doi.org/10.1590/0001-3765202120191229>.
- Singh, A. K., Kumar, A., & Bisla, A. (2021). Computer-Assisted Sperm Analysis (CASA) in Veterinary Science: A Review. *Indian Journal of Animal Sciences*, 91(6), 419–429. <https://www.researchgate.net/publication/354630993%0AComputer-assisted>.
- Suhartati, L., Udin, Z., & Rizqan, R. (2020). Laju Penurunan Suhu Terhadap Kualitas Semen Beku Sapi Limousin Menggunakan Medium Pengencer Susu Segar dan Tris Kuning Telur. *Jurnal Peternakan Indonesia (Indonesian Journal of Animal Science)*, 22(3), 284. <https://doi.org/10.25077/jpi.22.3.284-291.2020>.
- Sukirman, I., Sukmawati, E., Rasad, S. D., & Solihati, N. (2020). The Influence of Breed and Type of Extender on the Quality of Bull Semen. *Animal Production*, 21(2), 64–70. <https://doi.org/10.20884/1.jap.2019.21.2.641>.
- Sun, L., Fan, W., Wu, C., Zhang, S., Dai, J., & Zhang, D. (2020a). Effect of Substituting Different Concentrations of Soybean Lecithin and Egg Yolk in Tris-Based Extender on Goat Semen Cryopreservation. *Cryobiology*, 92, 146–150. <https://doi.org/10.1016/j.cryobiol.2019.12.004>.
- Sun, L., He, M., Wu, C., Zhang, S., Dai, J., & Zhang, D. (2021). Beneficial Influence of Soybean Lecithin Nanoparticles on Rooster Frozen–Thawed Semen Quality and Fertility. *Animals*, 11(6), 1769. <https://doi.org/10.3390/ani11061769>.

- Sun, L., Wu, C., Xu, J., Zhang, S., Dai, J., & Zhang, D. (2020b). Addition of Butylated Hydroxytoluene (BHT) in Tris-Based Extender Improves Post-Thaw Quality and Motion Dynamics of Dog Spermatozoa. *Cryobiology*, 97, 71–75. <https://doi.org/10.1016/j.cryobiol.2020.10.006>.
- Susilawati, T. (2014). *Sexing Spermatozoa* (Edisi I). Universitas Brawijaya Press (UB Press). <http://www.ubpress.ub.ac.id>.
- Susilowati, S., Sardjito, T., Mustofa, I., Widodo, O. S., & Kurnijasanti, R. (2021). Effect of Green Tea Extract in Extender of Simmental Bull Semen on Pregnancy Rate of Recipients. *Animal Bioscience*, 34(2), 198–204. <https://doi.org/10.5713/ajas.20.0025>.
- Susilowati, T. (2011). *Spermatologi* (Edisi I). Universitas Brawijaya Press (UB Press). <http://www.ubpress.ub.ac.id>.
- Szablicka, D., Wysokińska, A., Pawlak, A., & Roman, K. (2022). Morphometry of Boar Spermatozoa in Semen Stored at 17 °C—The Influence of the Staining Technique. *Animals*, 12(15). <https://doi.org/10.3390/ani12151888>.
- Tethool, A. N., Ciptadi, G., Wahjuningsih, S., & Susilawati, T. (2022). Karakteristik dan Jenis Pengencer Semen Sapi Bali: Suatu Review. *Jurnal Ilmu Peternakan Dan Veteriner Tropis (Journal of Tropical Animal and Veterinary Science)*, 12(1), 45–57. <https://doi.org/10.46549/jipvet.v12i1.214>.
- Trisnayanti, N. P. (2020). Metode Sintesis Nanopartikel. *Kimia Nano B*, 1–14. <https://www.researchgate.net/publication/340090488>.
- Turaja, K. I. B., Vega, R. S. A., Saludes, T. A., Tandang, A. G., Bautista, J. A. N., Salces, A. J., & Rebancos, C. M. (2019). Influence and Total Antioxidant Capacity of Non-Enzymatic Antioxidants on the Quality and Integrity of Extended and Cryopreserved Semen of Murrah Buffalo (*Bubalus bubalis*). *Philippine Journal of Science*, 148(4), 619–626.
- Ugur, M. R., Abdelrahman, A. S., Evans, H. C., Gilmore, A. A., Hitit, M., Arifiantini, R. I., Purwantara, B., Kaya, A., & Memili, E. (2019). Advances in Cryopreservation of Bull Sperm. *Frontiers in Veterinary Science*, 6, 268. <https://doi.org/10.3389/fvets.2019.00268>.
- Upadhyay, V. R., Ramesh, V., Dewry, R. K., Kumar, G., Raval, K., & Patoliya, P. (2021). Implications of Cryopreservation on Structural and Functional Attributes of Bovine Spermatozoa: An Overview. *Andrologia*, 53(8), 1–16. <https://doi.org/10.1111/and.14154>.
- Van der Horst, G. (2020). Computer Aided Sperm Analysis (CASA) in Domestic Animals: Current Status, Three D Tracking and Flagellar Analysis. *Animal*

- Reproduction Science*, 220(December 2019), 106350.
<https://doi.org/10.1016/j.anireprosci.2020.106350>.
- Víquez, L., Barquero, V., Soler, C., Roldan, E. R. S., & Valverde, A. (2020). Kinematic Sub-Populations in Bull Spermatozoa: A Comparison of Classical and Bayesian Approaches. *Biology*, 9(6), 1–16.
<https://doi.org/10.3390/biology9060138>.
- Wei, L. J., Alkarkhi, A. F. M., & Huda, M. (2019). Physicochemical Properties of Egg Yolk Powder from Eggs of Different Types of Bird. *International Journal on Advanced Science, Engineering and Information Technology*, 9(1), 373–378. <https://doi.org/10.18517/ijaseit.9.1.3046>.
- Widyastuti, R., Syamsunarno, M. R., & Ghozali, M. (2018). Aplikasi Krioprotektan Ekstraseluler Tunggal Secara Efektif Mempertahankan Kualitas Sperma Manusia Pascavitrifikasi. *Majalah Kedokteran Bandung*, 50(4), 247–253.
<https://doi.org/10.15395/mkb.v50n4.1319>.
- Xie, Y., Wang, J., Wang, Y., Wu, D., Liang, D., Ye, H., Cai, Z., Ma, M., & Geng, F. (2020). Effects of High-Intensity Ultrasonic (HIU) Treatment on the Functional Properties and Assemblage Structure of Egg Yolk. *Ultrasonics - Sonochemistry*, 60, 104767. <https://doi.org/10.1016/j.ultsonch.2019.104767>.
- Yang, Y., Zhao, Y., Xu, M., Wu, N., Yao, Y., Du, H., Liu, H., & Tu, Y. (2019). Changes in Physico-Chemical Properties, Microstructure and Intermolecular Force of Preserved Egg Yolk Gels during Pickling. *Food Hydrocolloids*, 89, 131–142. <https://doi.org/10.1016/j.foodhyd.2018.10.016>.
- Yuniar, T. U., Saleh, D. M., & Mugiyono, S. (2021). The Effect of Addition of Egg Yolk to Skim Milk Diluent and Storage Time at 5°C on Spermatozoa Quality of Pelung Rooster. *ANGON: Journal of Animal Science and Technology*, 3(1), 29–46.
<http://jnp.fapet.unsoed.ac.id/index.php/angon/article/view/1082%0Ahttp://jn.p.fapet.unsoed.ac.id/index.php/angon/article/download/1082/440>.
- Zamiri, M. J. (2020). Update on Semen Cryopreservation in Sheep and Goats: A Review. *Journal of Livestock Science and Technologies*, 8(1), 1–15.
<https://doi.org/10.22103/jlst.2020.15927.1321>.
- Zeidan, A. E. B., El-Sharabassy, A. M., Dowidar, Y. A., Ashour, A. M., Amer, A. M., Ahmadi, E. A. A., Abou-Aiana, R. M., Farouk, M. H., & Arafat, M. H. (2019). Influence of Glutathione Addition to the Extender on the Cooled-Stored Stallion Spermatozoa. *Assiut Veterinary Medical Journal*, 65(16), 171–178. <https://doi.org/10.21608/kvmj.2019.110201>.

- Zhang, H., Ye, H., Shao, Y., Wu, S., Yu, J., Ji, C., Wang, S., & Zeng, S. (2018). The Effects of Egg Yolk Concentration and Particle Size on Donkey Semen Preservation. *Journal of Equine Veterinary Science*, 65, 19–24. <https://doi.org/10.1016/j.jevs.2018.03.002>.
- Zhang, X., Ma, G., & Wei, W. (2021). Simulation of Nanoparticles Interacting with a Cell Membrane: Probing the Structural Basis and Potential Biomedical Application. *NPG Asia Materials*, 13(1), 52. <https://doi.org/10.1038/s41427-021-00320-0>.