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Development of Animal Feed from Waste to Wealth using Napier Grass and Palm Acid Oil (PAO) from Palm Oil Mill Effluent (POME)

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Abstract

This study is to investigate the effectiveness of feeding cattle with a mixture of palm acid oil (PAO) from palm oil mill effluent (POME), water lettuce, coconut waste and Napier grass. These materials will be mixed and form a feed formulation. This study also wants to develop a cattle feed that will help to reduce the water lettuce and coconut waste negative impact to the environment. Besides that, the best formulation of the cattle feed will be determined. The amount of each material will be different for each formula. This cattle feed will use the waste to follow the Green Technology. The formulation of the feed is based from Department of Veterinary Services Feeding Guide book. This study is focus on reducing the negative impact to the environment by utilizing the waste of POME, coconut waste and water lettuce. There are three formulation that was tested on cattle to determine the most suitable formulation. The formulation has different amount of each material. The nutrient in each formulation was calculated based on feeding guides by Department of Veterinary entitled nutrient composition of Malaysian feed materials and guides to feeding of cattle and goats. There are four cattle that was involved in this study. Three cattle were fed with the formulation. Meanwhile, the other one was fed with its regular feeds which is Napier Grass only and act as the control. The result obtained will be compared with the control cattle. The feed intake of each cattle was recorded. The result shows that the formulation is good for high growth performance of the cattle compare to the regular feeds. This is because the formulation has more nutrients in it. In fact, it has more nutrient than the cattle need to grow. The control cattle did not gain as much as formulation A. Thus, this prove that the formulation is effective compare to the regular feeds and it is cheaper. Apart from that, the high growth performance can help to cater the high demand of meats consumption.

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References

- [1] Al-kayiem, H. H. (2013). Experimental Study Of Palm Oil Mill Effluent And Oil Palm Frond Waste Mixture As An Alternative Biomass Fuel 2 . Literature Review 2 . 1 . Characteristic of palm oil mill effluent, 8(6), 703–712.
- [2] Zin, M. (2006). Process Design in Degumming and Bleaching of Palm Oil Research Vote No : 74198 Centre of Lipids Engineering and Applied Research. Design, 24–31.
- [3] Hashim, F. A. (2015). Strategies to Strengthen Livestock Industry in Malaysia.
- [4] Madaki, Y. S., & Lau, S. (2013). Palm oil Effluent (POME) from Malaysia Palm Oil Mills: Waste or Resource. International Journal of Science, Environment and Technology, 2(6), 1138–1155.
- [5] Ministry of Agriculture and Agro Based Industry Malaysia. (2011). Dasar Agromakanan Negara 2011 - 2020, 135.
- [6] Gusain, R., & Suthar, S. (2017). Potential of aquatic weeds (*Lemna gibba*, *Lemna minor*, *Pistia stratiotes* and *Eichhornia* sp.) in biofuel production. Process Safety and Environmental Protection, 109, 233–241.
- [7] Sulaiman, S. A., Roslan, R., Inayat, M., & Yasin Naz, M. (2017). Effect of blending ratio and catalyst loading on co-gasification of wood chips and coconut waste. Journal of the Energy Institute, 1–7.
- [8] Osmond, R., & Stephen Johnson. (2006). Water lettuce. *Primefact 251*, (September 2006).
- [9] Silvenius, F., Grönroos, J., Kankainen, M., Kurppa, S., Mäkinen, T., & Vielma, J. (2017). Impact of feed raw material to climate and eutrophication impacts of Finnish rainbow trout farming and comparisons on climate impact and eutrophication between farmed and wild fish. Journal of Cleaner Production, 164, 1467–1473.
- [10] D'Amato, A., Fasoli, E., & Righetti, P. G. (2012). Harry Belafonte and the secret proteome of coconut milk. Journal of Proteomics, 75(3), 914–920.
- [11] Mohammed, I. Y., Abakr, Y. A., Kazi, F. K., Yusup, S., Alshareef, I., & Chin, S. A. (2015). Comprehensive characterization of Napier grass as a feedstock for thermochemical conversion. Energies, 8(5), 3403–3417.
- [12] Abdulla, I., Arshad, F. M., Bala, B K., Bach, N. L., & Mohammadi, S. (2016). Management of Beef Cattle Production in Malaysia : A Step Forward to Sustainability.
- [13] Rahman, M. M., Rahman, M. R., Nakagawa, T., & Abdullah, R. B. (2015). Effects of wet soya waste supplementation on the intake , growth and reproduction of goats fed Napier grass. *Animal Feed Science and Technology*, 199, 104–112.
- [14] Department of Veterinary Services, D. (2008). Nutrient Composition of Malaysian Feed Materials And Guides To Feeding Of Cattles And Goats. *Feeding Guide Series*.
- [15] Limon & Ahari (2012). Recent Advances In Utilization Of Oil Palm By-Products As Animal Feed, 211–219.
- [16] Rodsamran, P., & Sothornvit, R. (2018). Bioactive coconut protein concentrate films incorporated with antioxidant extract of mature coconut water. Food Hydrocolloids, 79, 243–252.
- [17] Dung, N. T., Cuong, P. K., & Somers, R. (2009). Nutrition and feeding management in dairy cattle.
- [18] Department of Veterinary Services, D. (2008). Nutrient Composition of Malaysian Feed Materials And Guides To Feeding Of Cattles And Goats. *Feeding Guide Series*.
- [19] Department of agriculture, fisheries and forestry B. Q. (2013). Water lettuce *Pistia stratiotes*, (April), 4.
- [20] McGrath, J., Duval, S. M., Tamassia, L. F. M., Kindermann, M., Stemmler, R. T., de Gouvea, V. N., ... Celi, P. (2018). Nutritional strategies in ruminants: A lifetime approach. Research in Veterinary Science, 116(September 2017), 28–39. <https://doi.org/10.1016/j.rvsc.2017.09.011>