

doi:10.1071/AN18767_AC

© CSIRO 2021

Animal Production Science 2021, 61, 800–806

Prediction of dry matter intake by feedlot beef cattle under tropical conditions

H. M. da Silva^{A,C}, A. B. Donadia^A, L. F. Moreno^B, A. S. de Oliveira^A, E. H. B. K. Moraes^B and K. A. K. Moraes^B

^ADairy Cattle Research Lab, Universidade Federal de Mato Grosso, Campus Universitário de Sinop, Sinop, Mato Grosso, 78557-267, Brazil.

^BNúcleo de Estudos em Pecuária Intensiva-NEPI, Universidade Federal de Mato Grosso, Campus Universitário de Sinop, Sinop, Mato Grosso, 78557-267, Brazil.

^CCorresponding author. Email: henrique_10_mello@hotmail.com

Supplementary Material 1. List of publications describing the experiments used in the development model

Abrahamo, J.J.D., do Prado, I.N., Marques, J.D., Perotto, D., Lugao, S.M.B., 2006. Effects of replacing corn with dry cassava by-product on production of feedlot crossbred heifers. *Revista Brasileira de Zootecnia* **35**, 512-518.

Alencar, W.M., Restle, J., Missio, R.L., Neiva, J.N.M., Miotto, F.R.C., de Freitas, I.B., 2015. Feeding behavior and productive performance of steers fed pearl millet grain-based diets containing proportions of babassu mesocarp bran. *Revista Brasileira de Zootecnia* **44**, 425-433.

Arboitte, M.Z., Restle, J., Filho, D.C.A., Brondani, I.L., da Silva, J.H.S., Nornberg, J.L., Kuss, F., 2004. Feedlot performance of 5/8 Nellore-3/8 charolais steers slaughtered at different maturity stages. *Revista Brasileira de Zootecnia* **33**, 947-958.

Augusto, W.F., Ribeiro, G.M., Restle, J., Missio, R.L., Neiva, J.N.M., Miotto, F.R.C., Rocha, H., 2017. Proportions of sugarcane and babassu mesocarp bran in diets for feedlot cattle. *Revista Brasileira de Zootecnia* **46**, 657-663.

Chizzotti, F.H.M., Pereira, O.G., Valadares, S.D., Garcia, R., Chizzotti, M.L., Leao, M.I., Pereira, D.H., 2005. Intake, apparent total tract digestibility and production of Nellore steers fed diets containing different proportions of *Brachiariabrizantha* cv. Marandu and sorghum silages. *Revista Brasileira de Zootecnia* **34**, 2427-2436.

Coan, R.M., Reis, R.A., de Resende, F.D., Sampaio, R.L., Schocken-Iturrino, R.P., Garcia, G.R., Berchielli, T.T., 2008. Economical viability, performance, and carcass characteristics of confined steers fed palisadegrass silage, tanzaniagrass silage or corn silage. *Revista Brasileira de Zootecnia* **37**, 311-318.

Costa, M.A.L., Valadares, S.D., Paulino, M.F., Valadares, R.F.D., Cecon, P.R., Paulino, P.V.R., de Moraes, E., Magalhaes, K.A., 2005. Productive performance, digestibility and carcass characteristics of zebu steers fed diets with different concentrate levels. *Revista Brasileira de Zootecnia* **34**, 268-279.

Cullmann, J.R., Kuss, F., Moletta, J.L., Lancanova, J.A.C., Silveira, M.F., Menezes, L.F.G., Moura, I.C.F., Strack, M., 2017. Production of steers or bulls finished in feedlot at a young age or young steers. *Arquivos Brasileiros de Medicina Veterinária e Zootecnia* **69**, 155-164.

Del Claro, G.R., Zanetti, M.A., Netto, A.S., Vilela, F.G., Melo, M.P., Correa, L.B., Freitas, J.E., 2013. The effects of copper and selenium supplementation in the diet of Brangus steers on performance and rumen fermentation. *Arquivos Brasileiros de Medicina Veterinária e Zootecnia* **65**, 255-261.

Faturi, C., Restle, J., Brondani, I.L., Alves, D.C., Rosa, J.R.P., Kuss, F., de Menezes, L.F.G., 2003. Replacement of sorghum by oat grain for finishing steers. *Revista Brasileira de Zootecnia* **32**, 437-448.

Fontaneli, R. S., Prates, Ê. R., Ramos, P., Barcellos, J. O. 2002. Supplementation of Sorghum Silage with Different Sources of Protein for Beef Cattle. *Revista Brasileira de Zootecnia* **31**, 183-191.

Henrique, W., Amstalden, A., Sampaio, M., Leme, P.R., Lanna, D.P.D., Alleoni, G.F., Filho, J., 2004. Feedlot performance and carcass characteristics of Santa Gertrudis Bulls, fed high concentrate diets with increasing levels of dehydrated citrus pulp pellets. *Revista Brasileira de Zootecnia* **33**, 463-470.

Inácio, J.G., Ferreira, M.D., Silva, R.C., Silva, J.D., De Oliveira, J.C.V., Santos, D.C., Soares, L.F.P., Campos, J., 2017. Sugarcane bagasse as exclusive roughage for dairy heifers. *Revista Brasileira de Zootecnia* **46**, 80-84.

Ítalo, L.C.V., Valadares, S.D., da Silva, F.F., Valadares, R.F.D., Cecon, P.R., Itavo, C., de Moraes, E., Paulino, P.V.R., 2002. Nutritional value of Cynodon grass hay. Intake, degradability and apparent digestibility by means of internal markers. *Revista Brasileira de Zootecnia* **31**, 1024-1032.

Maciel, R.P., Neiva, J.N.M., Restle, J., Miotto, F.R.C., Sousa, L.F., Cunha, O.F., Moron, S.E., Parente, R.R.P., 2016. Performance and carcass characteristics of dairy steers fed diets containing crude glycerin. *Revista Brasileira de Zootecnia* **45**, 677-685.

Magalhaes, K.A., Valadares, S.D., Paulino, M.F., Valadares, R.F.D., Paulino, P.V.R., Chizzotti, M.L., Porto, M.O., Marcondes, M.I., Andreatta, K., 2005. Effects of feeding different levels of cottonseed hulls on production and carcass physical composition and traits of feedlot steers. *Revista Brasileira de Zootecnia* **34**, 2466-2474.

Maia, G.H.B., Barbosa, F.A., Emerick, L.L., Souza, R.C., Figueiredo, T.C., Azevedo, H.D., Cavalcanti, L.F.L., Mandarino, R.A., 2016. Carcass and meat traits of feedlot Nellore bulls fed different dietary energy sources. *Revista Brasileira de Zootecnia* **45**, 265-272.

Mendonca, B.P.C., Lana, R.P., Detmann, E., Goes, R., Castro, T.R., 2015. Crambe meal in finishing of beef cattle in feedlot. *Arquivos Brasileiros de Medicina Veterinária e Zootecnia* **67**, 583-590.

Mercadante, M.E.Z., Caliman, A.P.D., Canesin, R.C., Bonilha, S.F.M., Berndt, A., Frighetto, R.T.S., Magnani, E., Branco, R.H., 2015. Relationship between residual feed intake and enteric methane emission in Nellore cattle. *Revista Brasileira de Zootecnia* **44**, 255-262.

Messana, J.D., Canesin, R.C., Fiorentini, G., Reis, R.A., Arcuri, P.B., Berchielli, T.T., 2014. Intake, performance and estimated methane production of Nellore steers fed soybean grain. *Revista Brasileira de Zootecnia* **43**, 662-669.

Missio, R.L., Brondani, I.L., Alves, D.C., Restle, J., Arboitte, M.Z., Segabinazzi, L.R., 2010. Carcass and beef characteristics of young bulls finished in feedlot and fed diets with different concentrate levels. *Revista Brasileira de Zootecnia* **39**, 1610-1617.

Moreira, W.D., Miotto, F.R.C., Restle, J., Missio, R.L., Neiva, J.N.M., Moreira, R.V., 2016. Crude glycerin levels in pearl millet-based diets for Nellore young bulls in feedlot. *Revista Brasileira de Zootecnia* **45**, 32-38.

Obeid, J.A., Pereira, O.G., Pereira, D.H., Valadares, S.D., de Carvalho, I.P.C., Martins, J.M., 2006. Crude protein levels in beef cattle diets: intake, digestibility and performance. *Revista Brasileira de Zootecnia* **35**, 2434-2442.

Pereira, D.H., Pereira, O.G., Valadares, S.D.C., Garcia, R., Oliveira, A.P., Martins, F.H., Viana, V., 2006. Effects of feeding sorghum silage (*Sorghum bicolor* (L.) Moench) with different concentrate levels on intake, nutrient digestibility, and production of beef cattle. *Revista Brasileira de Zootecnia* **35**, 282-291.

Pereira, E.M., Santos, F.A.P., Nussio, L.G., Pedroso, A.M., Costa, D.F.A., Imaizumi, H., Bittar, C.M.M., 2007. Estimation of metabolisable energy in diets with varying ratios of dried citrus pulp plus corn fed to finishing Canchim bulls. *Revista Brasileira de Zootecnia* **36**, 216-224.

Queiroz, R.C., Bergamaschine, A.F., Bastos, J.F.P., dos Santos, P.C., Lemos, G.C., 2004. Use of product from enzyme and yeast in the cattle diet: Nutrients digestibility and performance in feedlot. *Revista Brasileira de Zootecnia* **33**, 1548-1556.

Rabelo, M.M.A., Pires, A.V., Susin, I., Mendes, C.Q., Oliveira, R.C., Gentil, R.S., Ferreira, E.M., 2008. Effect of raw sugar cane bagasse on performance and ingestive behavior of beef cattle. *Arquivos Brasileiros de Medicina Veterinária e Zootecnia* **60**, 698-704.

Restle, J., Faturi, C., Alves Filho, D.C., Brondani, I.L., Silva, J.H.S.D., Kuss, F., Ferreira, J.J., 2004. Substitution of sorghum grain by soybean hulls in the diet of feedlot finished steers. *Revista Brasileira de Zootecnia* **33**, 1009-1015.

Rosa, J.R.P., da Silva, J.H.S., Restle, J., Pascoal, L.L., Brondani, I.L., Alves, D.C., de Freitas, A.K., 2004. Evaluation of the agronomic behavior of the plant and nutritive value of silage from different corn (*Zea mays*, L.) hybrids. *Revista Brasileira de Zootecnia* **33**, 302-312.

Rubiano, G.A.G., Arrigoni, M.D., Martins, C.L., Rodrigues, E., Goncalves, H.C., Angerami, C.N., 2009. Performance, carcass traits and meat quality of young Canchim, Nellore and crossbreed bulls. *Revista Brasileira de Zootecnia* **38**, 2490-2498.

Santana, A.E.M., Neiva, J.N.M., Restle, J., Miotto, F.R.C., Sousa, L.F., de Araujo, V.L., Parente, R.R.P., Oliveira, R.A., 2015. Productive performance and blood parameters of bulls fed diets containing babassu mesocarp bran and whole or ground corn. *Revista Brasileira de Zootecnia* **44**, 27-36.

Schmidt, P., Nussio, L.G., Queiroz, O.C.M., Santos, M.C., Zopollatto, M., de Toledo, S.G., Daniel, J.L.P., 2014. Effects of *Lactobacillus buchneri* on the nutritive value of sugarcane silage for finishing beef bulls. *Revista Brasileira de Zootecnia* **43**, 8-13.

Silva, F.F., Valadares, S.D., Itavo, L.C.V., Veloso, C.M., Paulino, M.F., Cecon, P.R., Silva, P.A., Galvao, R.M., 2002. Productive performance, during the growing and fattening phases, of Nellore bulls fed diets with different concentrate and protein levels. *Revista Brasileira de Zootecnia* **31**, 492-502.

Silva, S.D.E., Leme, P.R., Putrino, S.M., Valinote, A.C., Filho, J.C.N., Lanna, D.P., 2007. Dry or high moisture corn grains and calcium salts of fatty acids for feedlot Nellore steers. *Revista Brasileira de Zootecnia* **36**, 1426-1434.

Van Cleef, E., Ezequiel, J.M.B., D'Aurea, A.P., Favaro, V.R., Sancanari, J.B.D., 2014. Crude glycerin in diets for feedlot Nellore cattle. *Revista Brasileira de Zootecnia* **43**, 86-91.

Vittori, A., Gesualdi, A., Queiroz, A.C., Resende, F.D., Alleoni, G.F., Razook, G., Figueiredo, L.A., 2007. Productive performance of castrated or non-castrated bovines of different breeds at finishing phase. *Arquivos Brasileiros de Medicina Veterinária e Zootecnia* **59**, 1263-1269.

Supplementary Material 2. List of Publications Describing the Experiments Used in the Evaluation Models

Bassi MS, Ladeira MM, Chizzotti ML, Chizzotti FHM, de Oliveira DM, Neto ORM, de Carvalho JRR, Neto AAN (2012). Oilseeds in zebu cattle diet: intake, digestibility and performance. *Revista Brasileira de Zootecnia* **41**, 353-359.

Bulle, M.L.D., Ribeiro, F.G., Leme, P.R., Antonio, E., Titto, L., Lanna, D.P.D., 2002. Performance of young bulls fed high concentrate diets with sugar cane bagasse as roughage source. *Revista Brasileira de Zootecnia* **31**, 444-450.

Cavalcante, M.A.B., Pereira, O.G., Valadares, S.D., Ribeiro, K.G., Chizzotti, F.H.M., Pereira, D.H., 2005. Crude protein levels in diets of beef cattle: Intake and apparent total tract, intestinal, and ruminal digestibilities of nutrients. *Revista Brasileira de Zootecnia* **34**, 2200-2208.

Clímaco, S.M., Ribeiro, E.L.D., Mizubuti, I.Y., da Silva, L.D.F., Barbosa, M., Bridi, A.M., 2011. Performance and carcass traits of four genetic groups of beef cattle steers finished in feedlot. *Revista Brasileira de Zootecnia* **40**, 1562-1567.

Coutinho Filho, J.L.V., Peres, R.M., Justo, C.L., 2006. Meat production in feedlot Santa Gertrudis young bulls and heifers fed finishing diets. *Revista Brasileira de Zootecnia* **35**, 2043-2049.

Cruz, G.M., Esteves, S.N., Tullio, R.R., Alencar, M.M.D., Oliveira, M.C.D., 2004. Slaughter weights for the production of young bull cattle. 1. Performance on feedlot and cost of production. *Revista Brasileira de Zootecnia* **33**, 635-645.

Ezequiel, J.M.B., Silva, O., Galati, R.L., Watanabe, P.H., Biagioli, B., Faturi, C., 2006. Effects of partial replacement of ground corn with soybean hulls or corn germ meal on production of Nellore steers. *Revista Brasileira de Zootecnia* **35**, 569-575.

Favero, R., Mizubuti, I.Y., Gomes, R.C., Ribeiro, E.L.A., Pereira, E.S., Prado-Calixto, O.P.P., Massaro, S.L., Santos, A.P.S., 2018. Relationships between residual feed intake and feedlot performance, profitability, and carcass traits in Brahman cattle. *Arquivos Brasileiros de Medicina Veterinária e Zootecnia* **70**, 525-534.

Freitas, L.D., Brondani, I.L., Segabinazzi, L.R., Restle, J., Alves, D.C., Pizzuti, L.A.D., da Silva, V.S., Rodrigues, L.D., 2013. Performance of finishing steers fed different sources of carbohydrates. *Revista Brasileira de Zootecnia* **42**, 354-362.

Goulart, R.S., de Alencar, M.M., Pott, E.B., da Cruz, G.M., Tullio, R.R., Alleoni, G.F., Lanna, D.P.D., 2008. Body composition and protein and energy net requirements of steers of four genetic groups finished in feedlot. *Revista Brasileira de Zootecnia* **37**, 926-935.

Machado Neto, O.R.M., Ladeira, M.M., Chizzotti, M.L., Jorge, A.M., de Oliveira, D.M., de Carvalho, J.R.R., Ribeiro, J.D., 2012. Performance, carcass traits, meat quality and economic analysis of feedlot of young bulls fed oilseeds with and without supplementation of vitamin E. *Revista Brasileira de Zootecnia* **41**, 1756-1763.

Mandarino, R.A., Barbosa, F.A., Cabral, S.L.S., Lobo, C.F., Silva, I.S., Oliveira, R.V., Diogo, J.M.S., Guimaraes, R., 2013. Economic performance of zebu cattle under feedlot fed with three high concentrate diets. *Arquivos Brasileiros de Medicina Veterinária e Zootecnia* **65**, 1463-1471.

Menezes, G.C.D., Valadares, S.D., Magalhaes, F.A., Valadares, R.F.D., Prados, L.F., Detmann, E., Pereira, O.G., Leao, M.I., 2011. Intake and performance of confined bovine fed fresh or ensilaged sugar cane based diets and corn silage. *Revista Brasileira de Zootecnia* **40**, 1095-1103.

Missio, R.L., Brondani, I.L., Freitas, L.D., Sachet, R.H., da Silva, J.H.S., Restle, J., 2009. Performance and economic evaluation of young finished feedlot bulls fed different concentrate levels in the diet. *Revista Brasileira de Zootecnia* **38**, 1309-1316.

Oliveira, A.P., Reis, R.A., Bertipaglia, L.M.A., Melo, G.M.P., Berchielli, T.T., Oliveira, J.A., Casagrande, D.R., Balsalobre, M.A.A., 2013. Evaluation of the replacement of Monensin with Sodium Bicarbonate in diets for confined bovines. *Arquivos Brasileiros de Medicina Veterinária e Zootecnia* **65**, 1149-1157.

Pinto, A.P., Abrahao, J.J.D., Marques, J.D., do Nascimento, W.G., Perotto, D., Lugao, S.M.B., 2010. Performance and carcass characteristics of crossbred young bulls finished in a feedlot on diets with sorghum silage substituted by sugar cane. *Revista Brasileira de Zootecnia* **39**, 198-203.

Ribeiro, G.M., Sampaio, A.A.M., Fernandes, A.R.M., Henrique, W., Sugohara, A., Amorim, A.C., 2007. Effect of the protein source and physical processing of the concentrate on the finishing of feedlot young bulls and environmental impact of dejections. *Revista Brasileira de Zootecnia* **36**, 2082-2091.

Ribeiro, J.D., Goncalves, T.D., Ladeira, M.M., Campos, F.R., Tullio, R.R., Neto, O.R.M., de Oliveira, D.M., Bassi, M.S., 2012. Residual feed intake and its effect on carcass and meat characteristics of feedlot Zebu cattle. *Revista Brasileira de Zootecnia* **41**, 1509-1515.

Rodrigues, E., Arrigoni, M.D., Jorge, A.M., Bianchini, W., Martins, C.L., Andrighetto, C., 2010. Muscular and adipose tissue growth of young heifers from different genetic groups in the intensive biological model. *Revista Brasileira de Zootecnia* **39**, 625-632.

Silva, B.C., Pereira, O.G., Pereira, D.H., Garcia, R., Valadares, S.D., Chizzotti, F.H.M., 2005. Intake and apparent digestibility of the nutrients and weight gain of beef cattle fed diets with different proportions of Brachiariabrizantha silage and concentrate. *Revista Brasileira de Zootecnia* **34**, 1060-1069.