UNIVERSIDADE ESTADUAL DE MATO GROSSO DO SUL
UNIDADE UNIVERSITÁRIA DE AQUIDAUANA
PROGRAMA DE PÓS-GRADUAÇÃO EM ZOOTECNIA

MEDICAMENTO HOMEOPÁTICO NO DESEMPENHO DE BOVINOS DE CORTE TERMINADOS EM CONFINAMENTO

Acadêmico: Stanley Pereira Ávalo

Aquidauana – MS
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"Dissertação apresentada ao Programa de Pós- graduação em Zootecnia, área de concentração em Produção Animal no Cerrado-Pantanal, da Universidade Estadual de Mato Grosso do Sul, como parte das exigências para a obtenção do título de Mestre em Zootecnia"

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STANLEY PEREIRA ÁVALO

Dissertação submetida ao Programa de Pós-Graduação em Zootecnia, área de concentração em Produção Animal no Cerrado-Pantanal, como requisito para obtenção do grau de Mestre em Zootecnia.

DISSERTAÇÃO APROVADA EM 14/08/2019.

Dr. Marcus Vinícius Morais de Oliveira

Dra. Andrea Roberto Duarte Lopes

Dr. Pedro Nelson Cesar do Amaral

Aos meus Pais, Esposa e Filho dedico...

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SUMÁRIO

LISTA DE TABELAS

RESUMO: Ao longo dos anos, os medicamentos homeopáticos vêm sendo cada vez mais utilizados na alimentação dos animais para melhoria do status metabólico e na prevenção de doenças, atuando assim, na saúde do organismo de maneira tanto direta como indireta. Nesse contexto, este trabalho objetivou avaliar os efeitos do uso da homeopatia no desempenho de bovinos de corte terminados em regime de confinamento. Foram utilizados dezoito novilhos mestiços Nelore, com idade de 24 meses e peso corpóreo inicial de 300 kg. Os animais permaneceram alojados em baias individuais por 100 dias, sendo os primeiros 16 dias para adaptação as instalações, ao manejo e a dieta, e os outros 84, dividido em três períodos de 28 dias, para coleta de dados. As dietas foram elaboradas, na matéria seca, com 40% de silagem de milho e 60% de ração concentrada, composta por 85% de grão de milho triturado e 15% de um núcleo proteico peletizado. Os tratamentos (dietas) testados foram: Controle, composto pela dieta base; e HCMax, dieta base associada ao ConverMax®, um medicamento homeopático voltado para otimização do metabolismo hepático com simultânea atuação no comportamento animal, com redução do estresse e elevação do fator imunológico. O desempenho dos animais foi determinado pela ingestão de matéria seca, expressa em quilogramas por dia, porcentagem de peso corpóreo e em função do peso metabólico; consumos de proteína bruta e fibra em detergente neutro; do ganho de peso médio diário; da conversão alimentar; da digestibilidade dos nutrientes e de parâmetros sanguíneos. Os dados foram submetidos à análise de variância e as médias comparadas pelo teste T de Student, ao nível de 5% de probabilidade. A partir dos resultados analisados, conclui-se que o medicamento homeopático não promoveu efeito significativo sobre o desempenho dos animais.

Palavras chave: infinitesimal, homeopatia, lei dos semelhantes

ABSTRACT: Over the years, homeopathic medicines have been increasingly used in animal feed to improve the metabolic status and prevent disease, thus acting on the organism's health both directly and indirectly. Thereby, this study aimed to evaluate the effects of the use of homeopathy on the performance of feedlot beef cattle. Eighteen steers crossbred Nelore were used, with aged 24 months and initial body weight of 300 kg. The animals were housed in individual stall for 100 days, the first 16 days for adaptation to management and diet, the other 84, divided into 3 periods of 28 days for data collection. The diets were prepared, in dry matter, with 40% corn silage and 60% concentrate, composed of 85% ground corn grain and 15% of a pelletized protein nucleus. The treatments (diets) tested were: Control, composed by the base diet; and HCMax, a basic diet associated with ConverMax®, a homeopathic medicine aimed at optimizing liver metabolism while acting on animal behavior, reducing stress and increasing the immune factor. Animal performance was determined by dry matter intake, expressed in kilograms per day, percentage of body weight and metabolic weight; consumption of crude protein and neutral detergent fiber; the average daily weight gain; feed conversion; nutrient digestibility and blood parameters. Data were subjected to analysis of variance and means compared by Student's T-test at 5% probability. From the analyzed results, it can be concluded that homeopathic medicine did not promote a significant effect on animal performance.

Keywords: evanescent, homeopathy, similar law.

CAPITULO1- CONSIDERAÇÕES GERAIS

1. INTRODUÇÃO

No Brasil, a maior parte do rebanho bovino, aproximadamente 200 milhões de cabeças, é criada em regime de pastoreio, numa área de pastagens com cerca de 174 milhões de hectares (Dias-Filho, 2014). De acordo com Ítavo et al. (2010), os incrementos de produtividade e eficácia dos sistemas de produção de gado de corte brasileiro, deve-se à melhor genética dos animais e a utilização de alternativas combinadas de alimentação e manejo que favoreceram o aumento dos índices zootécnicos e viabilidade econômica da atividade pecuária.

Outro fato importante, é que com o crescimento significativo da utilização dos sistemas de confinamento na última década, vieram muitos benefícios à cadeia produtiva, como o aumento do ganho de peso em épocas desfavoráveis, maximização do uso da terra e melhora na qualidade da carcaça e da carne.

Desta forma, a terminação de bovinos em confinamento vem sendo uma alternativa eficiente para reduzir, de forma significativa, o tempo necessário para o abate dos animais, contribuindo assim, com o aumento de produtividade. Todavia, a alimentação é um dos itens mais caros do confinamento, onerando em torno de um terço do custo total da atividade (Nichele, 2015). Assim, o uso técnicas que potencializem a eficiência de utilização de nutrientes, é de suma importância no que diz respeito à diminuição dos custos de produção e aumento da lucratividade do sistema.

Segundo Teixeira (2015), quando se opta pela criação de bovinos num sistema de confinamento, deve se ficar atento as possíveis complicações metabólicas que poderão ocorrer em função ao alto teor de carboidratos não fibrosos fornecido na dieta. Ressaltando-se ainda sobre as possíveis mudanças fisiológicas e morfológicas do trato gastrintestinal dos animais.

Dentre as várias enfermidades relacionadas ao confinamento, as mais observadas são o timpanismo, enterotoxemia, acidose lática, laminite e

intoxicação por uréia (Souza et al.,2002). Portanto, independente do sistema utilizado, os animais devem ser adaptados à dieta, para que haja uma preparação do trato digestivo, em especial do retículo-rúmen, para as variações de fermentabilidade dos alimentos.

De acordo com Real (2008), nos últimos anos a homeopatia vem se destacando no meio rural, como uma alternativa aos medicamentos alopáticos (antibióticos e anti-inflamatórios), em função de seu menor custo, da mais fácil aplicabilidade e também por não eliminar resíduos químicos no produto animal, possibilitando que a carne e seus derivados, possam ser consumidos sem riscos à saúde humana.

A ANVISA, (2010) define a homeopatia como sendo um método científico para tratamento e prevenção de doenças agudas e crônicas, em que a cura acontece por meio do uso de medicamentos não agressivos que estimulam o organismo a reagir, fortalecendo seus mecanismos de defesa naturais. Devendo o medicamento homeopático ser preparado num processo que consiste na diluição sucessiva da substância homeopática; e obrigado seguir todas as normas sanitárias vigentes expedidas pelos órgãos governamentais de regulamentação e fiscalização. Além disso, os produtos homeopáticos não devem ser utilizados em sua forma natural, mas dinamizados com a finalidade de liberar a energia do medicamento, peculiar a cada princípio ativo e com diferentes dinamizações ou potências.

Neste sentido, o uso de medicamentos homeopáticos pode ser uma alternativa viável e benéfica para bovinos, visto que o caráter energético-molecular deste princípio terapêutico confere aos animais tratados a redução do estresse, a fim de complementar e melhorar a resposta do seu sistema imunológico, permitindo assim a produção de alimentos saudáveis para os humanos (Real, 2008).

O produto homeopático quando administrado de acordo com a Lei dos Semelhantes, atuará pela ação da energia captada pela dinamização. A Lei dos Semelhantes é uma “Lei Natural” cujo enunciado remonta à Hipócrates (400 AC) e afirma que as substâncias quando em doses ponderáveis, provocam num indivíduo sadio, porém sensível, “um conjunto sintomático determinado”, podendo igualmente, em outros indivíduos doentes e sensíveis, fazer desaparecer tais sintomas, se “prescritas em doses hipofisiológicas”

(Kollitsch, 1989). Assim, a ação energética em nível celular, ocorrerá por equilíbrio e reestabilização do organismo independente da causa da doença (De Medio, 1993).

2. REVISÃO DE LITERATURA

2.1 Princípios da Homeopatia

A Homeopatia foi inicialmente desenvolvida como ciência pelo médico alemão Samuel Hahnemann no final do século XVIII, sendo primeiramente utilizada no tratamento em seres humanos e, posteriormente, empregada como método terapêutico nas mais diversas espécies de animais domésticos (Souza, 2002).

O princípio fundamental do funcionamento da homeopatia se baseia na utilização de medicamentos dinamizados, ou seja, medicamentos preparados a partir de substâncias animais, vegetais, minerais e/ou tecidos doentes. Na dinâmica desta preparação, a matéria prima se impregna nas moléculas de álcool/água ou de açúcar, utilizado como meio diluidor, fixando nessas moléculas suas impressões energéticas, sem alterar sua estrutura bioquímica. Consequentemente, os animais são tratados com substâncias inócuas, em termos químicos, porém ativas do ponto de vista energético (Arenales, 2002). Corroborando, Souza (2002) cita o “Principio da Cura pelo Semelhante”, descrita por Hipócrates, o qual baseia-se na elaboração de medicamentos a partir de substâncias que produziu os mesmos sintomas da doença.

Outro princípio que sustenta a homeopatia é a “Lei do Vitalismo”, sendo explicada pela condição que rege e harmoniza os seres vivos, fenômeno imaterial que inexiste na substância mortal e que caracteriza a vida; onde sua essência diferencia as matérias vivas das não vivas (Benites, 2006).

No Brasil, a homeopatia foi introduzida por Benoit Mure, em 1840, tornando-se uma nova opção aos tratamentos alopáticos. Em 1979, fundou-se a Associação Médica Homeopática Brasileira (Costa Filho et al., 2014); e em 1980, a homeopatia tornou-se uma especialidade médica pelo Conselho Federal de Medicina (Correa et al., 2010).

Na medicina veterinária, a homeopatia passou a ser especialidade apenas em 1995, mediante a Resolução nº 625/95 do Conselho Federal de Medicina Veterinária e Zootecnia (Brasil, 1995).

2.2 Utilização da Homeopatia em Bovinos

No Brasil os medicamentos homeopáticos começaram a ser utilizados nos animais domésticos, de maneira efetiva a partir da década de 1970. Segundo Ribeiro et al. (2011), em bovinos o uso de produtos homeopáticos torna os animais mais eficientes e com carcaças mais pesadas, especialmente se forem mantidos confinados.

Corroborando, Souza (2002) infere sobre os efeitos benéficos da homeopatia sobre o controle do estresse e no comportamento sexual de machos inteiros, em especial na redução da manifestação de sodomia, com diminuição da incidência de saltos e montas. Evitando assim, os prejuízos por lesões e traumas e favorecendo o ganho de peso. Lima et al., (2008) também citam que o uso da homeopatia melhora a ação microbiana no rúmen de bovinos, aumentando a atividade proteolítica e permitindo um maior aproveitamento do nitrogênio amoniacal.

Todavia, Ítavo et al. (2010) ao compararem o desempenho de novilhos da raça brangus, de 18 meses de idade em confinamento, recebendo produto homeopático na fase de terminação, concluíram que o uso de homeopatia não proporcionou melhora no desempenho dos animais. De maneira similar, Freitas et al. (2013), também não observaram em bovinos o efeito da homeopatia sobre o desempenho e características de carcaça entre machos inteiros e castrados.

3. OBJETIVOS

3.1 OBJETIVO GERAL

Avaliar o desempenho de bovinos de corte terminados em confinamento com dieta convencional suplementada com medicamento homeopático.

3.1 OBJETIVOS ESPECÍFICOS

Determinar o efeito da homeopatia sobre o ganho de peso, conversão alimentar e digestibilidade dos nutrientes.

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CAPITULO 2 – HOMEOPATHIC MEDICAMENT IN THE PERFORMANCE OF BEEF CATTLE FINISHED IN FEEDLOT.

Artigo elaborado segundo normas da 'Revista Brasileira de Zootecnia'

Abstract

Over the years, homeopathic medicines have been increasingly used in animal feed to improve the metabolic status and prevent disease, thus acting on the organism's health both directly and indirectly. Thereby, this study aimed to evaluate the effects of the use of homeopathy on the performance of feedlot beef cattle. Eighteen steers crossbred Nelore were used, with aged 24 months and initial body weight of 300 kg. The animals were housed in individual stall for 100 days, the first 16 days for adaptation to management and diet, the other 84, divided into 3 periods of 28 days for data collection. The diets were prepared, in dry matter, with 40% corn silage and 60% concentrate, composed of 85% ground corn grain and 15% of a pelletized protein nucleus. The treatments (diets) tested were: Control, composed by the base diet; and HCMax, a basic diet associated with ConverMax®, a homeopathic medicine aimed at optimizing liver metabolism while acting on animal behavior, reducing stress and increasing the immune factor. Animal performance was determined by dry matter intake, expressed in kilograms per day, percentage of body weight and metabolic weight; consumption of crude protein and neutral detergent fiber; the average daily weight gain; feed conversion; nutrient digestibility and blood parameters. Data were subjected to analysis of variance and means compared by Student's T-test at 5% probability. From the analyzed results, it can be concluded that homeopathic medicine did not promote a significant effect on animal performance.

Key-words: infinitesimal, homeopatia, lei dos semelhantes

Introdução

O Brasil é o maior exportador mundial de carne bovina, e a pecuária de corte é responsável por 8,7% do Produto Interno Bruto (PIB) brasileiro, com receita para o ano de 2018 superior a US$ 6,57 bilhões de dólares e com perspectivas futuras de crescimento (ABIEC, 2019).

O rebanho de gado de corte brasileiro é composto essencialmente por animais das raças zebuínas, com destaque para a Nelore, uma raça com comprovada rusticidade e elevada adaptação ao ambiente tropical.

A maior parte dos bovinos é criada em regime de pastoreio (Lanna e Almeida, 2005). Todavia, verifica-se que o sistema de terminação de animais em confinamento tem aumentado ao longo dos anos, e a perspectiva é que continue crescendo, devido principalmente a fatores de sazonalidade na produção de forragens, necessidade de acabamento dos animais num menor período de tempo, em relação aos sistemas tradicionais e alta produtividade por unidade de área explorada. Além de permitir um melhor controle do planejamento nutricional e estratégico da atividade, que implicará no abate de animais mais precoces, com melhor acabamento de carcaça e, consequentemente, num produto cárneo com qualidade diferenciada para o mercado consumidor (Anualpec, 2017).

No Brasil, as dietas dos bovinos terminados em confinamento contêm maior proporção de volumosos. Porém, quando os preços dos alimentos concentrados se tornam economicamente viáveis, maiores quantidades desta matéria prima são recomendados, por apresentarem melhor ganho de peso, menor custo com a mão de obra, e assim, proporcionar um aumento da rentabilidade do sistema (Bulleet al., 2002).

Desta forma, a viabilidade do confinamento se dá em função do controle dos custos de produção, em especial dos ingredientes utilizados na alimentação dos animais.

Vale ressaltar, que quando se utiliza dietas com maiores níveis de concentrado na alimentação dos ruminantes, é necessário algumas alterações no manejo alimentar para manter e prevenir a ocorrência de alterações ou comprometimento da estabilidade ruminal durante este processo, e com isto não afetar o desempenho dos animais (Silva, 2009).

Apesar das pesquisas com produtos homeopáticos em bovinos ainda serem moderados, o uso de componentes homeopáticos concomitante com a suplementação mineral vem crescendo na pecuária brasileira, com o intuito de permitir a automedicação dos animais, e com isso minimizar os níveis de estresse no manejo e assegurar o bem-estar, quando comparados a tratamentos invasivos, com uso de medicação alopática individual (Souza, 2002).

Nesse contexto, este trabalho objetivou avaliar o desempenho de bovinos de corte terminados em confinamento, suplementados com medicamento homeopático.

Material e Métodos

O experimento foi conduzido no Setor de Bovinos da Universidade Estadual de Mato Grosso do Sul (UEMS) / Unidade Universitária de Aquidauana, com as seguintes coordenadas geográficas são: Latitude 20º28’S; Longitude 55º48’W e Altitude de 149 metros. Todos os procedimentos adotados foram aprovados pela Comissão de Ética no Uso de Animais (CEUA) da UEMS que certificou a utilização dos animais de acordo com o protocolo n° 028/2017.

Utilizou-se 18 novilhos inteiros mestiços Nelore, com idade de 24 meses, e peso corpóreo inicial médio de 300±12 kg. Os animais foram mantidos num galpão de

alvenaria e alojados em baias individuais de dimensões 3 x 2 m², com laterais feitas com cordoalha de aço, piso de concreto coberto com palha de arroz, providas de cocho de concreto e bebedouro de ferro automático.

Os animais foram mantidos em regime de confinamento por 100 dias, no período de janeiro a abril, sendo os 16 primeiros dias para adaptação as instalações, ao manejo e a dieta, e os outros 84 para coleta dos dados, sendo este dividido, em três períodos de 28 dias. Na fase de adaptação, os animais receberam silagem de milho e quantidades crecentes de concentrado até a proporção de 40:60%, respectivamente da matéria seca da dieta total. A ração concentrada era composta por 85% de grão de milho triturado e 15% de um núcleo proteico-mineral, enriquecido com medicamento homeopatico, com nome comercial de Convermax®.

Os tratamentos (dietas) testados foram: Controle, composto pela dieta base; e, HCMax, dieta base associada ao ConverMax®, um medicamento homeopático voltado para otimização do metabolismo hepático com simultânea atuação no comportamento animal, com redução da resposta ao estresse e elevação do fator imunológico (Tabela 1).

As dietas foram oferecidas aos animais duas vezes ao dia, às 8:00 e 16:00 horas, em quantidade ajustada de forma a manter as sobras em torno 10% do fornecido, já a água estave permanentemente à disposição dos animais.

O primeiro alimento a ser colocado no cocho era a silagem, seguido do concentrado, e manualmente realizava-se a mistura da dieta, para se obter uma melhor homogeinizaçao do ofertado.

O desempenho dos animais foi determinado através do consumo de matéria seca, expresso em quilograma diário, porcentagem do peso corpóreo e em função do peso metabólico; dos consumos de proteína bruta, fibras em detergente neutro e ácido, extrato etéreo e matéria mineral; do ganho de peso médio diário; da conversão alimentar

e da digestibilidade dos nutrientes. Para isso, tanto os alimentos ofertados, silagem e concentrado, como as sobras do dia anterior, foram pesados e amostrados diariamente pela manhã, sendo as respectivas aliquotas armazenadas no freezer por 28 dias, formando uma amostra composta do período por animal.

Posteriormente, as amostras de silagem, concentrado e sobras foram descongeladas à temperatura ambiente, e realizada análises dos teores de matéria seca (MS), proteína bruta (PB), extrato etéreo (EE) e matéria mineral (MM) de acordo com AOAC (1990), e da fibra em detergente neutro (FDN) e detergente ácido (FDA) pelo método proposto por Van Soest et al. (1991). A realização das analises bromatologicas foram efetuadas no Laboratório de Nutrição Animal da UEMS / Unidade Universitária de Aquidauana.

Os teores de Carboidratos Totais (CT) foram determinados pela equação proposta por Sniffen et al., (1992):

$$CT = \{100 - [PB\ (\%MS) + EE\ (\%MS) + MM\ (\%MS)]\}.$$

Enquanto que os Carboidratos Não Fibrosos (CNF) foram calculados com a equação proposta por Hall (2000):

$$CNF = \{100 - [(PB\ (\%MS) - \%PB\ \text{derivada da uréia} + \%\ \text{de uréia}) + FDN\ (\%MS) + EE\ (\%MS) + MM\ (\%MS)]\}.$$

As pesagens dos animais foram realizadas em intervalos de 28 dias, estabelecendo se um jejum de sólidos e líquidos de 12 horas, de modo a se obter o peso corporeo inicial e final de cada periodo experimental.

Para determinação da digestitibilidade aparente dos nutrientes (DAN), foi realizada durante 24 horas a coleta total de fezes dos animais no 21° dia de cada periodo experimental. Assim, conforme cada animal defecava, imediatamente as fezes eram coletadas por meio de raspagem do piso, acondicionada em sacos identificados e

alocados em frente a cada baia, os quais foram posteriormente pesados. Ao longo das 24 horas, de cada animal, foram retiradas e armazenadas no freezer sub-amostras das fezes livres de impurezas. Desta forma ao final do período, obteve-se a quantidade total de fezes excretada por cada animal e uma amostra fecal, que posteriormente foi utilizada para as avaliações bromatológicas.

Após o término do experimento, as amostras de cada período foram descongeladas e secas em estufa de circulação forçada de ar à 65ºC por 72 horas, e moídas individualmente em moinhos de faca, utilizando peneira com crivos de 2 mm para obter uma amostra composta por animal/tratamento /período, sendo estas homogeneizadas em quantidades iguais com base no peso seco, e então uma sub-amostra foi moída em peneira com crivos de 1 mm, e analisadas em laboratório, para determinação dos teores MS, PB, FDN, FDA, EE, MM, e os respectivos calculos de CT e CNF.

Os consumos de matéria seca total (CMST) e matéria seca de nutrientes (CMSNut) foram estimados pela diferença entre a quantidade de alimentos fornecido e quantidade de sobras.

Os coeficientes de digestibilidade aparente dos nutrientes (DAN), da MS, PB, FDN, FDA, EE, MM, CT e CNF foram estimados por diferença entre a quantidade do nutriente consumido e a quantidade excretada nas fezes do mesmo nutriente, pela equação:

DAN (%) = [((MS Ingerida x % Nutriente) – (MS Excretada x % Nutriente) / (MS Ingerida
x % Nutriente)) x 100))].

Já os Nutrientes Digestíveis Totais (NDT) foram calculados a partir da equação, proposta por Sniffen et al., (1992):

NDT (g/dia) = {(PB Ingerida – PB Fezes) + (CT Ingerido – CT Fezes) + {2,25 x (EE Ingerido - EE Fezes)]}.

As coletas de sangue foram realizadas na fase de adaptação, e posteriormente no 28° dia de cada período experimental, juntamente da realização da pesagem dos animais. As amostras coletadas foram retiradas diretamente na veia caudal, utilizando-se tubos de vacuntainer contendo 2 gotas de heparina para impedir a coagulação do sangue, e acondicionadas em caixas térmicas com gelo.

Imediatamente após a coleta as amostras de sangue foram centrifugadas por 20 minutos a 3000 rpm, conforme descrito por Kerr (2003), e as aliquotas de plasma coletado foram armazenadas em tubos de eppendorfs identificados por animal, de acordo com o tratamento e para cada período. Em seguida realizou-se análise da concentração de glicose e ureia, utilizando-se kits comerciais de métodos enzimáticos-colorimétricos, sendo as leituras efetuadas em espectofotometro.

Os dados foram submetidos a análises estatísticas utilizando-se o Software R. O delineamento foi o inteiramente casualizado (DIC), onde cada animal representou uma unidade experimental, sendo o modelo matemático descrito pela equação:

$Yij = \mu + ti + eij,$

onde: Yij é a observação feita na parcela para o tratamento i na repetição j;

μ representa uma constante inerente a toda parcela;

ti representa o efeito do tratamento i HCMax;

eij é o erro experimental na parcela i, j.

Inicialmente os dados passaram pelo teste de normalidade do erro e da homogeneidade; e, posteriormente, adotou-se o teste T de Student, ao nível de 5% de probabilidade ($P<0,05$), como sendo o significativo para todas as variáveis.

Resultados

Não foi observada influência (P>0,05) do medicamento homeopático nas variáveis pesos corpóreos inicial (PCI) e final (PCF); consumo de matéria seca, expressa em kg/animal/dia (CMS), percentagem do peso corpóreo (CMSPC) e em função do peso metabólico (CMSPM); consumos de proteína bruta (CPB), fibra em detergente neutro (CFDN), fibra em detergente ácido (CFDA), extrato etéreo (CEE) e matéria mineral (CMM); ganhos de peso médio diário (GMD) e total (GPT); e da conversão alimentar (CA) dos animais (Tabela 2).

Também não foram observados efeitos estatísticos (P>0,05) do medicamento homeopático sobre a digestibilidade dos nutrientes (Tabela 3), havendo uma similaridade entre os valores observados nos animais alimentados com a dieta controle e os com HCMax.

As concentrações plasmáticas de glicose e uréia também não foram influenciadas (P>0,05) pelas dietas ofertadas aos animais (Tabela 4).

Discussão

Os medicamentos homeopáticos, de acordo com a Lei dos Semelhantes, promovem alterações em nível celular, através da energia imprimida nas dinamizações. Conferindo aos animais tratados com fins terapêuticos uma redução no estresse e uma melhora no sistema imunológico (De Medio, 1993). Arenales (2002) relata ainda que os medicamentos homeopáticos são largamente empregados na dieta dos bovinos, atuando de forma lenta no organismo e não depositando resíduos do produto no animal. A

facilidade de administrar o medicamento homeopático é outra vantagem a ser considerada, pelo fato da preparação da medicação ser realizada de acordo com a aceitabilidade individual, não havendo necessidade de ingestão de grandes doses.

Neste ensaio, os novilhos terminados em confinamento apresentaram consumo, ganho de peso e conversão alimentar similar, independentemente da dieta ingerida. Desta maneira, o tratamento com homeopatia, não proporcionou melhora estatisticamente significativa na capacidade de transformação dos nutrientes ingeridos em ganho de peso, em relação ao tratamento controle (Tabela 2). Essa resposta provavelmente ocorreu, devido a igualdade nutricional entre os tratamentos, e do bom estado nutricional e fisiológico dos animais, em especial das condições do fígado. Assim, o medicamento homeopático teve pouco efeito sobre as células hepáticas, em especial dos hepatócitos que representam mais de 80% dessas células.

Ítavo et al., (2010) ao avaliarem em bovinos mantidos em regime de confinamento, recebendo dieta com uma relação volumoso:concentrado na proporção de 60:40%, respectivamente, um medicamento homeopático (Fator Nutri Pró Final®), com características de ser um promotor de crescimento e melhorador da capacidade dos animais em absorver os nutrientes, de modo a potencializar o aproveitamento dos alimentos, também não observaram efeito do uso do tratamento com homeopatia para as variáveis consumo de matéria seca e conversão alimentar,

Neste ensaio, de maneira semelhante, a digestibilidade dos nutrientes também não apresentou diferenças significativas entre os tratamentos, indicando que os animais de ambas as dietas apresentaram um processo digestivo eficiente e uma similaridade no status metabólico. Esse fato já era esperado haja vista que as dietas, foram elaboradas com os mesmos ingredientes e não houve diferenças no processamento físico dos alimentos e nem alterações na frequência do fornecimento das dietas. Além disso, os

animais utilizados eram da mesma idade e com as mesmas características genéticas. Não havendo, portanto, efeitos clássicos que afetassem a digestibilidade, como diferenças no hábito alimentar, taxa de consumo e permanência do alimento no trato digestivo.

As concentrações plasmáticas de glicose neste trabalho também apresentaram similaridade (P>0,05), com média de 51,31mg/dL, e, portanto, não foram influenciadas pelas dietas ofertadas, permanecendo dentro da faixa de normalidade de 45 a 74 mg/dL, relatada por González et al., (2000).

A mensuração da concentração de glicose no plasma sanguíneo serve como um indicativo do metabolismo energético animal, todavia, em ruminantes o singular mecanismo homeostático, inibe alterações expressivas nessa variável. Assim, mudanças no nível de glicose sanguínea indicam transtorno nutricional severo, elevada desnutrição e/ou processos avançados de estresse. De acordo com Kozloski (2009), como pouca glicose provém do trato digestivo, o fígado se torna o principal órgão responsável pela síntese de glicose, a partir de moléculas precursoras da via gliconeogênica, sendo o ácido propiônico o maior responsável pela produção de glicose, seguido pelos aminoácidos gliconeogênicos e pelo ácido lático.

Cafazzo et al., (2013) correlacionam positivamente a glicose com o estresse pois, em resposta a situação de risco ocorre a liberação do glicocorticoide, cortisol que resulta no aumento da concentração de glicose no plasma. Paiva et al., (2013) afirmam que possa ocorrer elevação dos níveis de glicose sérica devido maiores quantidades de carboidratos não fibrosos na dieta, já que com a fermentação no rúmen, haverá o aumento de ácido propiônico, responsável pela síntese de glicose.

As concentrações plasmáticas de ureia também não foram influenciadas (P>0,05) pelos tratamentos, com média de 31,7 mg/dL, sendo superior aos valores de

referência descritos por González et al., (2000) de 20 a 30 mg/dL. No entanto, inferior ao limite de 34,3mg/dL proposto por Valadares et al. (1997) para se obter a máxima eficiência microbiana, em nível ruminal.

Indicando que possivelmente, à lenta degradação da principal fonte protéica da dieta, pode não ter permitido a máxima otimização da fermentação ruminal, o que estimularia a menor produção de proteína microbiana e um aumento do nível de ureia plasmática.

Conclusões

Apesar de apresentar ganhos de peso superiores, bem como melhor conversão alimentar, nas condições desse experimento, o uso de medicamento homeopático não proporcionou melhoria estatística no desempenho dos animais terminados em confinamento.

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Tabelas

Tabela 1- Composição percentual dos ingredientes das dietas, expressos na matéria seca, e os respectivos teores de matéria seca (MS), proteína bruta (PB), extrato etéreo (EE), matéria mineral (MM), fibra em detergente neutro (FDN), fibra em detergente ácido (FDA) carboidratos totais (CT), carboidratos não fibrosos (CNF) e nutrientes digestíveis totais (NDT).

Ingredientes	Controle	HCMax
Milho farelo%	85	85
Núcleo proteico-mineral %	15	15
Medicamento homeopático	-	+

Teor - %	Dieta	Componentes da dieta		
		Silagem de milho	Farelo de milho	Núcleo proteico-mineral[1]
MS	65,28	35,90	84,35	87,78
PB	11,08	9,82	8,71	30,12
EE	3,56	3,17	4,14	2,36
MM	4,66	4,10	1,41	25,55
FDN	30,38	55,90	12,88	16,13
FDA	17,52	37,65	3,82	5,89
CT	83,66	87,21	87,44	46,54
CNF	63,52	56,90	74,55	30,41
NDT	74,84	65,82	81,24	78,65

[1] Palatabilizante; Farinha de algas; Farinha de trigo; Farelo de soja; Milho moído; Carbonato de cácio (4,9%); Fosfato Bicálcio a 20% (2,5%); Sal branco (2,4%); Cloreto de potássio (2,4%); Premix Engorda H (3,0%); Uréia pecuária (3,0%); Cálcio (35g/kg); Fósforo (5000mg/kg); Sódio (9000mg/kg); Magnésio (5000mg/kg); Enxofre (2000mg/kg); Potássio (12g/kg); Cobalto (5mg/kg); Iodo (5mg/kg); Manganês (169mg/kg); Selênio (1,8mg/kg); Zinco (250mg/kg); Flúor (50mg/kg); e Virginiamicina (200mg/kg).

Tabela 2-Desempenho de novilhos de corte terminados em confinamento, com ou sem a inclusão de medicamento homeopático.

Variáveis [1,2]	Dietas		Valor P	CV(%)
	Controle	HCMax		
PCI (kg)	353,79	348,08	0,654	13,30
PCF (kg)	398,68	395,98	0,831	11,67
CMS (kg/dia)	10,65	10,45	0,696	17,99
CMSPC (% PC)	1,86	1,86	0,920	13,60
CMSPM (g/dia)	124,63	123,62	0,842	15,04
CPB (kg /dia)	3,14	3,07	0,619	15,11
CFDN (kg/dia)	4,93	4,67	0,294	18,44
CFDA (kg/dia)	1,86	1,80	0,442	14,84
CEE (kg/dia)	0,65	0,60	0,083	16,50
CMM (kg/dia)	2,68	2,56	0,328	17,13
GMD (kg/dia)	1,60	1,71	0,385	27,24
GPT (kg)	44,89	47,90	0,385	27,24
CA	6,96	6,27	0,146	25,83

[1] Peso corpóreo inicial (PCI) e final (PCF); consumo de matéria seca, expressa em kg/animal/dia (CMS), % do peso corpóreo (CMSPC) e em função do peso metabólico (CMSPM); consumos de proteína bruta (CPB), fibra em detergente neutro (CFDN), fibra em detergente ácido (CFDA), extrato etéreo (CEE) e matéria mineral (CMM); ganho de peso diário (GMD) e total (GPT); e conversão alimentar (CA).

[2] Não houve diferenças estatísticas ao nível de 5% de probabilidade, de acordo com o teste T de Student.

Tabela 3-Coeficientes de digestibilidade, teores de nutrientes digestiveis totais (NDT) e energia digestível (ED), de novilhos de corte terminados em confinamento, com ou sem a inclusão de um medicamento homeopático.

Variáveis[1,2]	Dietas		Valor P	CV(%)
	Controle	HCMax		
DMS	77,59	79,30	0,458	10,70
DPB	89,71	90,36	0,706	6,98
DFDN	71,40	74,66	0,381	18,56
DFDA	64,30	65,34	0,811	24,53
DCT	81,10	81,23	0,709	1,50
DCNF	89,11	89,03	0,614	0,64
DEE	92,94	94,79	0,168	5,20
DMM	80,21	82,53	0,346	11,04
%NDT	81,08	81,47	0,406	2,14
ED (kcal/kg)[3]	3,57	3,59	0,406	2,14

[1]Digestibilidade da matéria seca (DMS), da proteína brutal (DPB), da fibra em detergente neutro (DFDN), da fibra em detergente ácido (DFDA), do carboidrato total (DCT), do carboidrato não fibroso (DCNF), do extrato etéreo (DEE), da matéria mineral (DMM); Nutrientes Digeríveis Totais (NDT) e da Energia Digestível (ED).

[2] Não houve diferenças estatísticas ao nível de 5% de probabilidade, de acordo com o teste T de Student.

[3] ED=(%NDT/100)*4,409, segundo NRC (2000).

Tabela 4- Níveis de glicose e ureia no plasma sanguíneo, de novilhos de corte terminados em confinamento, com ou sem a inclusão de um medicamento homeopático.

Variáveis [1]	Dietas		Valor P	CV (%)
	Controle	HCMax		
Glicose - mg /dL	51,49	51,13	0,883	17,47
Ureia - mg / dL	31,44	31,99	0,678	15,44

[1] Não houve diferenças estatísticas ao nível de 5% de probabilidade, de acordo com o teste T de Student.

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CAPITULO 3. CONSIDERAÇÕES FINAIS

Sugere-se a realização de novos estudos, com dietas contendo maiores níveis energéticos, a fim de desafiar os animais, para que seja possível observar o efeito da homeopatia sobre as características avaliadas.

APÊNDICE

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After completing the submission of the manuscript by

[1] Revised January 2017.

using the Manuscript Central™ online system, the corresponding author will be asked to email the file named Assurance of Contents and Copyright and will be responsible for stating the information required in the document regarding the manuscript and all co-authors. A template with the same name has been already prepared by the Brazilian Society of Animal Science and is available on the journal website at https://www.rbz.org.br/assurance.

The original text of the template must NOT be altered but only completed with the requested information. The corresponding author must fill it out properly, sign it, initial all pages, scan and email it to RBZ's office e-mail address secretariarbz@sbz.org.br confirming all authors` participation in the manuscript.

The manuscript will not be considered for peer reviewing without this form. The deadline will be set allowing a period of 15 days for delivery of forms, after which the editorial office will act by withdrawing the manuscript.

2.2.

Language

Submissions will only be accepted in the English language (either American or British spelling). The editorial board of RBZ reserves the right to demand that authors revise the translation or to cancel the processing of the manuscript if the English version submitted contains errors of spelling, punctuation, grammar, terminology, jargons or semantics that can either compromise good understanding or not follow the Journal's standards. It is strongly recommended that the translation process be performed by a professional experienced in scientific writing familiar with Animal Science, preferably a native speaker of English.

2.3. Publication costs

Processing fee

The payment of the processing fee is a prerequisite for submitting manuscripts to referees. The processing fee is of R$ 53.00 (Fifty-three reals and no cents) for both members and non-members of the Brazilian Society of Animal Science (BSAS). Payment must be done according to guidance available on the SBZ website (www.sbz.org.br).

Publication fee

Revista Brasileira de Zootecnia adopt an Open Access policy and OA articles are freely accessible through the journal's website at http://www.scielo.br/rbz at the time of publication. The current article publication fee in the journal is of R$ 160.00 (One hundred and sixty reals and no cents) per page if at least one author is a member of the BSAS. The member must be the first author or the corresponding author of the manuscript. If no authors are BSAS members, the publication fee is of R$ 260.00 (Two hundred and sixty reals and no cents) per journal page. The Real is the present-day currency of Brazil. Its sign is R$.

2.4. Care and use of animals

The ***Revista Brasileira de Zootecnia*** is committed to the highest ethical standards of animal care and use. Research presented in manuscripts reporting the use of animals must guarantee to have been conducted in accordance with applicable federal, state, and local laws, regulations, and policies governing the care and use of animals. The author should ensure that the manuscript contains a statement that all procedures were performed in compliance with relevant laws and institutional

guidelines and, whenever pertinent, that the appropriate institutional committee(s) has approved them before commencement of the study.

2.5. Types of articles

Full-length research article
A full-length research paper provides a complete account of the experimental work. The text should represent the research process and foster its cohesive understanding and a coherent explanation regarding all the experimental procedures and results and must provide the minimal information necessary for an independent reproduction of the research.

Short communication
A succinct account of the ◊inal results of an experimental work, which has full justi◊ication for publication, although with a volume of information which is not suf◊icient to be considered a full-length research article. The results used as the basis to prepare the short communication cannot be used subsequently, neither partially nor wholly, for the presentation of a full-length article.

Technical note
An evaluation report or proposition of a method, procedure or technique that correlates with the scope of RBZ. Whenever possible, one should show the advantages and disadvantages of the new method, procedure or technique proposed, as well as its comparison with those previously or currently employed, presenting the proper scienti◊ic rigor in analysis, comparison, and discussion of results.

Board-invited reviews
An approach that represents state-of-the-art or critical view of issues of interest and relevance to the scienti◊ic community. It can only be submitted by invitation of the editorial board of RBZ. The invited reviews will be subjected to the peer-review process.

Editorial
Notes to clarify and establish technical guidelines and/ or philosophy for designing and making of articles to be submitted and evaluated by RBZ. The editorials will be drafted by or at the invitation of the editorial board of RBZ.

3. Guidelines to prepare the manuscript

3.1. Structure of a full-length research article

Figures, Tables, and Acknowledgments should be sent as separated ◊iles and not as part of the body of the manuscript.

The article is divided into sections with centered headings, in bold, in the following order: Abstract, Introduction, Material and Methods, Results, Discussion, Conclusions, Acknowledgments (optional) and References. The heading is not followed by punctuation.

3.1.1. Manuscript format
The text should be typed by using Times New Roman font at 12 points, double-space (except for Abstract and Tables, which should be set at 1.5 space), and top, bottom, left and right margins of 2.5, 2.5, 3.5, and 2.5 cm, respectively.

The text should contain up to 25 pages, sequentially numbered in arabic numbers at the bottom. The ◊ile must be edited by using Microsoft Word® software.

3.1.2. Title
The title should be precise and informative, with no more than 20 words. It should be typed in bold and centered as the example: **Nutritional value of sugar cane for ruminants.** Names of sponsor of grants for the research should always be presented in the Acknowledgments section.

3.1.3. Authors
The name and institutions of authors will be requested at the submission process; therefore they should not be presented in the body of the manuscript. Please see the topic 4. Guidelines to submit the manuscript for details.

The listed authors should be no more than eight.

The list of authors must contain all authors` full name with no initials, current email address, and complete information about their af◊iliation. This list must follow the same authorship order presented in the Assurance of Contents and Copyright.

Spurious and “ghost” authorships constitute an unethical behavior. Collaborative inputs, hand labor, and other types of work that do not imply intellectual contribution may be mentioned in the Acknowledgments section.

3.1.4. Abstract
The abstract should contain no more than 1,800 characters including spaces in a single paragraph. The information in the abstract must be precise. Extensive abstracts will be returned to be adequate with the guidelines.

The abstract should summarize the objective, material and methods, results and conclusions. It should not contain any introduction. References are never cited in the abstract.

The text should be justi◆ied and typed at 1.5 space and come at the beginning of the manuscript with the word ABSTRACT capitalized, and initiated at 1.0 cm from the left margin. To avoid redundancy the presentation of signi◆icance levels of probability is not allowed in this section.

3.1.5. Key Words

At the end of the abstract list at least three and no more than six key words, set off by commas and presented in alphabetical order. They should be elaborated so that the article is quickly found in bibliographical research. The key words should be justi◆ied and typed in lowercase. There must be no period mark after key words.

3.1.6. Introduction

The introduction should not exceed 2,500 characters with spaces, brie◆ly summarizing the context of the subject, the justi◆ications for the research and its objectives; otherwise it will be rerouted for adaptation. Discussion based on references to support a speci◆ic concept should be avoided in the introduction.

Inferences on results obtained should be presented in the Discussion section.

3.1.7. Material and Methods

Whenever applicable, describe at the beginning of the section that the work was conducted in accordance with ethical standards and approved by the Ethics and Biosafety Committee of the institution.

Please provide ethics comittee number as follows: “Research on animals was conducted according to the institutional committee on animal use (protocol number).

As for the location of the experiment, it should contain city, state, country, and geographical coordinates (latitude, longitude, elevation). Names of universities, laboratories, farms or any other intitutions must not be mentioned.

A clear description on the speci◆ic original reference is required for biological, analytical and statistical procedures. Any modi◆ications in those procedures must be explained in detail.

The presentation of the statistical model as a separate sentence from the text and as a numbered equation is mandatory whenever the research is about designed experiments, observational studies or survey studies. All terms, assumptions, and ◆itting procedures must be fully described to allow readers for a correct identi◆ication of the experimental unit.

3.1.8. Results

The author must write two sections by separating results and discussion. In the Results section, suf◆icient data, with means and some measure of uncertainty (standard error, coef◆icient of variation, con◆idence intervals, etc.) are mandatory, to provide the reader with the power to interpret the results of the experiment and make his own judgment. The additional guidelines for styles and units of RBZ should be checked for the correct understanding of the exposure of results in tables. The Results section cannot contain references.

3.1.9. Discussion

In the Discussion section, the author should discuss the results clearly and concisely and integrate the ◆indings with the literature published to provide the reader with a broad base on which they will accept or reject the author’s hypothesis.

Loose paragraphs and references presenting weak relationship with the problem being discussed must be avoided. Neither speculative ideas nor propositions about the hypothesis or hypotheses under study are encouraged.

3.1.10. Conclusions

Be absolutely certain that this section highlights what is new and the strongest and most important inferences that can be drawn from your observations. Include the broader implications of your results. The conclusions are stated by using the present tense.

Do not present results in the conclusions, except when they are strictly important for the generalization.

3.1.11. Acknowledgments

This section is optional. It must come right after the conclusions.

The Acknowledgments section must NOT be included in the body of the manuscript; instead, a ◆ile named Acknowledgment should be prepared and then uploaded as “supplemental ◆ile NOT for review”. This procedure helps RBZ to conceal the identity of authors from the reviewers.

3.1.12. Use of abbreviations

Author-derived abbreviations should be de◆ined at ◆irst use in the abstract, and again in the body of the manuscript, and in each table and ◆igure in which they are used.

The use of author-de◆ined abbreviations and acronyms should be avoided, as for instance: T3 was higher than T4, which did not differ from T5 and T6. This type of writing is appropriate for the author, but of complex understanding by the readers, and characterizes a verbose and imprecise writing.

3.1.13. Tables and Figures

It is essential that tables be built by option “Insert Table” in distinct cells, on Microsoft Word® menu (No tables with

values separated by the ENTER key or pasted as ◆igure will be accepted). Tables and ◆igures prepared by other means will be rerouted to author for adequacy to the journal guidelines.
Tables and ◆igures should be numbered sequentially in Arabic numerals, presented in two separate editable ◆iles to be uploaded (one for the tables and one for the ◆igures), and must not appear in the body of the manuscript.
They may be uploaded separately and in a higher number of ◆iles if the size of the ◆iles hampers the upload.

The title of the tables and ◆igures should be short and informative, and the descriptions of the variables in the body of the table should be avoided.
In the graphs, designations of the variables on the X and Y axes should have their initials in capital letters and the units in parentheses.

Non-original ◆igures, i.e., ◆igures published elsewhere, are only allowed to be published in RBZ with the express written consent of the publisher or copyright owner. It should contain, after the title, the source from where they were extracted, which must be cited.

The units and font (Times New Roman) in the body of the ◆igures should be standardized.

The curves must be identi◆ied in the ◆igure itself. Excessive information that compromises the understanding of the graph should be avoided.

Use contrasting markers such as circles, crosses, squares, triangles or diamonds (full or empty) to represent points of curves in the graph.

Figures should be built by using Microsoft Excel® to allow corrections during copyediting, and uploaded as a separate editable Microsoft Word® ◆ile, named "Figures" during submission. Use lines with at least 3/4 width. Figures should be used only in monochrome and without any 3-D or shade effects. Do not use bold in the ◆igures.

The decimal numbers presented within the tables and ◆igures must contain a point, not a comma mark.

Mathematical formulas and equations must be inserted in the text as an object and by using Microsoft Equation or a similar tool.

3.1.14. References

Reference and citations should follow the Name and Year System (Author-date)

3.1.15. Citations in the text

The author's citations in the text are in lowercase, followed by year of publication. In the case of two authors, use 'and'; in the case of three or more authors, cite only the surname of the ◆irst author, followed by the abbreviation et al.
Examples:
Single author: Silva (2009) or (Silva, 2009)
Two authors: Silva and Queiroz (2002) or (Silva and Queiroz, 2002)
Three or more authors: Lima et al. (2001) or (Lima et al., 2001)

The references should be arranged chronologically and then alphabetically within a year, using a semicolon (;) to separate multiple citations within parentheses, e.g.: (Carvalho, 1985; Britto, 1998; Carvalho et al., 2001).

Two or more publications by the same author or group of authors in the same year shall be differentiated by adding lowercase letters after the date, e.g., (Silva, 2004a,b).

Personal communication can only be used if strictly necessary for the development or understanding of the study. Therefore, it is not part of the reference list, so it is placed only as a footnote. The author's last name and first and middle initials, followed by the phrase "personal communication", the date of notification, name, state and country of the institution to which the author is bound.

3.1.16. References section

References should be written on a separate page, and by alphabetical order of surname of author(s), and then chronologically.

Type them single-spaced, justi◆ied, and indented to the third letter of the ◆irst word from the second line of reference.

All authors' names must appear in the References section.

The author is indicated by their last name followed by initials. Initials should be followed by period (.) and space; and the authors should be separated by semicolons. The word 'and' precedes the citation of the last author.

Surnames with indications of relatedness (Filho, Jr., Neto, Sobrinho, etc.) should be spelled out after the last name (e.g., Silva Sobrinho, J.).

Do not use ampersand (&) in the citations or in the reference list.

As in text citations, multiple citations of same author or group of authors in the same year shall be differentiated by adding lowercase letters after the date.
In the case of homonyms of cities, add the name of the state and country (e.g. Gainesville, FL, EUA; Gainesville, VA, EUA). Sample references are given below.

Articles
The journal name should be written in full. In order to standardize this type of reference, it is not necessary to quote the website, only volume, page range and year. Do not use a comma (,) to separate journal title from its volume; separate periodical volume from page numbers by a colon (:).

Miotto, F. R. C.; Restle, J.; Neiva, J. N. M.; Castro, K. J.; Sousa, L. F.; Silva, R. O.; Freitas, B. B. and Leão, J. P. 2013. Replacement of corn by babassu mesocarp bran in diets for feedlot young bulls. Revista Brasileira de Zootecnia 42:213-219.

Articles accepted for publication should preferably be cited along with their DOI.

Fukushima, R. S. and Kerley, M. S. 2011. Use of lignin extracted from different plant sources as standards in the spectrophotometric acetyl bromide lignin method. Journal of Agriculture and Food Chemitry, doi: 10.1021/jf104826n (in press).

Books
If the entity is regarded as the author, the abbreviation should be written first accompanied by the corporate body name written in full.
In the text, the author must cite the method utilized, followed by only the abbreviation of the institution and year of publication.
e.g.: "...were used to determine the mineral content of the samples (method number 924.05; AOAC, 1990)".

Newmann, A. L. and Snapp, R. R. 1997. Beef cattle. 7th ed. John Wiley, New York.
AOAC - Association of Official Analytical Chemistry. 1990. Official methods of analysis. 15th ed. AOAC International, Arlington, VA.

Book chapters
The essential elements are: author (s), year, title and subtitle (if any), followed by the expression "In", and the full reference as a whole. Inform the page range after citing the title of the chapter.

Lindhal, I. L. 1974. Nutrición y alimentación de las cabras. p.425-434. In: Fisiologia digestiva y nutrición de los ruminantes. 3rd ed. Church, D. C., ed. Acríbia, Zaragoza.

Theses and dissertations
It is recommended not to mention theses and dissertations as reference but always to look for articles published in peer-reviewed indexed journals. Exceptionally, if necessary to cite a thesis or dissertation, please indicate the following elements: author, year, title, grade, university and location.

Castro, F. B. 1989. Avaliação do processo de digestão do bagaço de cana-de-açúcar auto-hidrolisado em bovinos. Dissertação (M.Sc.). Universidade de São Paulo, Piracicaba.
Palhão, M. P. 2010. Induced codominance and double ovulation and new approaches on luteolysis in cattle. Thesis (D.Sc.). Universidade Federal de Viçosa, Viçosa, MG, Brazil.

Bulletins and reports
The essential elements are: Author, year of publication, title, name of bulletin or report followed by the issue number, then the publisher and the city.

Goering, H. K. and Van Soest, P. J. 1970. Forage fiber analysis (apparatus, reagents, procedures, and some applications). Agriculture Handbook No. 379. ARS-USDA, Washington, D.C., USA.

Conferences, meetings, seminars, etc.
Quote a minimal work published as an abstract, always seeking to reference articles published in journals indexed in full.

Casaccia, J. L.; Pires, C. C. and Restle, J. 1993. Confinamento de bovinos inteiros ou castrados de diferentes grupos genéticos. p.468. In: Anais da 30ª Reunião Anual da Sociedade Brasileira de Zootecnia. Sociedade Brasileira de Zootecnia, Rio de Janeiro.
Weiss, W. P. 1999. Energy prediction equations for ruminant feeds. p.176-185. In: Proceedings of the 61th Cornell Nutrition Conference for Feed Manufacturers. Cornell University, Ithaca.

Article and/or materials in electronic media
In the citation of bibliographic material obtained by the Internet, the author should always try to use signed articles, and also it is up to the author to decide which sources actually have credibility and reliability.

In the case of research consulted online, inform the address, which should be presented between the signs

< >, preceded by the words "Available at" and the date of access to the document, preceded by the words "Accessed on:".

Rebollar, P. G. and Blas, C. 2002. Digestión de la soja integral en rumiantes. Available at: <http://www.ussoymeal.org/ruminant_s.pdf.> Accessed on: Oct. 28, 2002.

Quotes on statistical software

The RBZ does not recommend bibliographic citation of software applied to statistical analysis. The use of programs must be informed in the text in the proper section, Material and Methods, including the specific procedure, the name of the software, its version and/or release year.

"... statistical procedures were performed using the MIXED procedure of SAS (Statistical Analysis System, version 9.2.)"

3.2. Structure of the article for short communication and technical note

The presentation of the title should be preceded by the indication of the type of manuscript whether it is a short communication or a technical note, which must be centered and bold.

The structures of short communications and technical notes will follow guidelines set up for full-length papers, limited, however, to 14 pages as the maximum tolerated for the manuscript.

Processing and publishing fees applied to communications and technical notes are the same for full-length papers.

3.3. Additional guidelines for style and units – Use of percentage

Because of the intense use of units in percentage form (%), the Editorial Board of ***Revista Brasileira de Zootecnia*** defines that percentage should be exceptionally and seldom used only for description of relative variations (e.g., variation of a result obtained in a given treatment in relation to other treatment) and not as an absolute unit of measurement.

3.3.1. Chemical or feed composition of diets

Chemical compositions of diets or feedstuffs have to be expressed as mass contents, e.g., g kg^{-1} of dry matter or g kg^{-1} as fed.

Examples:

Food composition of the concentrate mixture supplied to animals

Item	Incorrect (%)	Correct (g kg^{-1} as fed)
Corn grain	70.0	700
Soybean meal	27.0	270
Urea	1.0	10
Mineral mixture	2.0	20

Chemical composition of corn silage

Item	Incorrect (%)	Correct (g kg^{-1} as fed)
Dry matter[1]	35.23	352.3
Organic matter[2]	95.45	954.5
Crude protein[2]	7.86	78.6
Ether extract[2]	2.35	23.5
Neutral detergent fiber corrected for ash and protein[2]	55.86	558.6
Non-fibrous carbohydrates[2]	29.38	293.8
Non-protein nitrogen[3]	32.45	324.5

[1] Incorrect: percent as fed. Correct: g kg^{-1} as fed.
[2] Incorrect: dry matter percentage. Correct: g kg^{-1} dry matter.
[3] Incorrect: total nitrogen percentage. Correct: g kg^{-1} total nitrogen.

3.3.2. Measures of intake

Measures of intake have to be expressed as mass consumed per mass unit per unit of time.

Example:
Incorrect: "... animals presented average intake of 2.52% of body weight..."
Correct: "... animals presented average intake of 25.2 g kg^{-1} d^{-1} of body weight..."

3.3.3. Units expressed as coefficients

In animal science, it is common to produce variables given by the ratio between two variables. Therefore, because they represent direct measures made at the experimental unit and not relative comparisons among different situations (e.g., among treatments), those variables have to be expressed as mass unit per mass unit.

Most common examples:

Measures of digestibility coefficients:

Incorrect: "... the apparent digestibility coefficient of dry matter was 62.5%..."
Correct: "... the apparent digestibility coefficient of dry matter was 0.625..." (In this example, because it is a fractional measure, it is understood that it is expressed as g g^{-1} or kg kg^{-1}). Another possibility is to express it as 625.0 g kg^{-1} of dry matter.

Measures of fractions in degradation assays or body fraction yields or microbial growth

Incorrect: "... estimate of potentially degradable insoluble fraction of protein was 36.2%..."

Correct: "... estimate of potentially degradable insoluble fraction of protein was 36.3 g/100 g..." Another possibility is to express it as 363.0 g kg^{-1} of crude protein.

Incorrect: "...average carcass dressing was 52.1% of body weight..."

Correct: "...average carcass dressing was 52.1 kg/100 kg of body weight..."

Incorrect: "... a microbial yield ef◆iciency of 12.53% in comparison with intake of total digestible nutrients..."

Correct: "... a microbial yield ef◆iciency of 125.3 g of microbial protein per kg of total digestible nutrients..."

Rates or variations over time in enzymatic measures or degradation assays or transit in the gastrointestinal tract

Incorrect: "... passage rate of ◆ibrous material in the rumen environment was 3.5%/h..."

Correct: " passage rate of ◆ibrous material in the rumen environment was 0.035 h^{-1}..." The number of decimal places to be presented should not exceed four; otherwise use scienti◆ic notation, i.e., a × 10^b, or change the scale of measurements.

Coef◆icients of correlation and determination, and descriptive levels of probability

Coef◆icients of correlation and determination, and levels of probability are fractions and should not be expressed as percentage.

Incorrect: "... the coef◆icient of determination of the model was 92.53% "

Correct: " . the coef◆icient of determination of the model was 0.9253 "

Incorrect: "...variables were strongly correlated (r = -82.39%) "

Correct: "...variables were strongly correlated (r = -0.8239) "

Incorrect: "... α = 5%."

Correct: "... α = 0.05."

3.3.4. Correct use of percentages

As previously highlighted, percentage should be used only for description of relative variations. And it must be used with parsimony.

Example:

Table 1 - Serum urea nitrogen concentrations (SUN, mg dL^{-1}) ... in grazing cattle

Item	Suplement[1]			CV (%)
	Control	Protein	Starch	
SUN	9.5b	14.3a	9.4b	7.8

[1] Means within rows followed by different letters are different by the Tukey test (P<0.05).

" protein supplementation increased SUN concentration by 50.5% in relation to the control "

3.4. Additional guidelines for style and units – Representation of dispersion

The clear, cohesive and correct representation of the results of a research paper is a key component of the characteristics that comprise comprehension, quality and reliability of the scienti◆ic publishing process.

However, the direct observation of the manuscripts submitted and the papers published by RBZ enlightens the plurality of the forms of exposure of the indicators of signi◆icance and dispersion (measures of uncertainty) of the results presented.

The Editorial Board of RBZ understands that the number of particularities in the form of exposing the results is directly proportional to the number of experimental designs and arrangements, as well as the number of statistical methods utilized.

Nevertheless, standard guidelines should and can be adopted by the authors in order to make the manner of exposure of the results more homogeneous. Thus, the guidelines presented below, which comprise the most common situations, must be followed by the authors for the correct establishment of the publishing style of Revista Brasileira de Zootecnia.

3.4.1. About the representation of the descriptive levels of probability for type I error (P-value)

Following the international trend of results exposure in research papers, the authors are recommended to present P-values from the statistical analyses to the readers, regardless of the critical level of probability adopted in the manuscript (α value). Whatever methods have been applied will not alter the discussion content at all. However, this makes the presentation of results more clear and allows the reader to make "judgments" on the results if they have a different view from that presented

by the authors. Reference notes for signi◆icance (e.g., use of asterisks) should be avoided.

It is mandatory that the P-value be presented with three decimal places. It must not be displayed with 2 decimal places, for it can generate ambiguity of interpretation (e.g., let us suppose that one assumes α = 0.05. If two variables tested independently present P-values of 0.049 and 0.051, the rounding off for the two decimal places will make a P-value of 0.05 for both; however, one shows signi◆icant effect, whereas the other does not.)

3.4.2. About the critical level of probability (the α value) adopted in the manuscript and the significance representation throughout the text

For the right discernment between signi◆icance and non-signi◆icance in hypothesis testing, according to the Neyman-Pearson school, there is the need for establishing a (maximum) critical level of probability acceptable for type I error, from which the differences must be assumed as non-significant, most commonly known as "α value". This must be properly exposed at the end of the description of the statistical procedures, because it is part of the methods set for the research paper.

Example: "...α = 0.05."

The choice of the α value must be done during the experimental planning, considering the factors inherent to the environment and the experimental material and the natural variability of the response variables to be assessed at the assay. Although the α value refers nominally to control of type I error, it must be pointed out that the probability of occurrence of type I and II errors commonly manifest antagonistically. Therefore, more strict α values (e.g., 0.01) represent a great control of type I error, but may reduce the level of control of type II error. In this way, it is up to the researcher, after the proper experimental considerations, to de◆ine the priorities of control of the statistical errors in their conditions and to adopt the pertinent α level.

If an author chose to make assertions about signi◆icance or no signi◆icance based on the previous choice of α, the indication of signi◆icance must agree with that choice. For instance, let us take a study conducted with α = 0.05. In this study, the analysis of variance showed a P-value of 0.019. When presenting this to the reader in the text, the author must utilize: "…a difference was observed (P<0.05)."

For expressions in the text, use the letter P (capital letter), not in italic and without spaces. Example: "…intake increased (P<0.05), but there was no change in weight gain (P>0.05)." Additionally, for an RBZ's convention, the symbols ≤ or ≥ must not be used. Use only < or >. Do not use the form "P=0.XX".

The basic theory of hypothesis testing shows us the fact that there are two, and only two, distinct regions under a distribution of probability when this is utilized in the test: acceptance region of H0 and rejection region of H0 (or region of no rejection of H0 and region of no acceptance of H0, as some areas would rather use).
This leads us to the warning about two common mistakes involving the interpretation of signi◆icance: the use of the term "tendency" or "trend" and the quali◆ication of signi◆icance (according to the Neyman-Pearson school).
To illustrate the ◆irst mistake, let us suppose that an author is conducting a research project in whose planning α = 0.05. At the analyses, for one of the variables, a P-value of 0.061 was observed. Due to the proximity of this value to the α value, the researcher presents in their text: "…for the X variable there was tendency for difference…"

Considering the summarized idea of tests and hypotheses presented previously, this type of argument is invalid, since there is no region of "tendency for acceptance of H0" or "tendency for rejection of H0". Thus, the value of the statistics calculated can only be included in the regions of "rejection" or "not rejection" of H0. In this sense, the proximity of the value to α does not matter, contrarily to which region the statistics' calculated value suits.

Otherwise, to illustrate the second mistake, let us take a research paper in whose planning α = 0.05. In this case, two variables presented at ANOVA, P-values of 0.035 and 0.002. Some may state that the ◆irst result is taken as signi◆icant, and the second as "highly" signi◆icant, which characterizes quali◆ication. Again, there is the warning: the proximity between the values of P and α does not matter. Hence, there are no "little", "very", "highly" or "poorly" signi◆icant results, but only signi◆icant or non-signi◆icant.

There is an increasing tendency among authors worldwide to commingle the Fisher school with the Neyman-Pearson school, i.e., to present significance level and compromise statistical precision with body of evidence in rejecting or not rejecting the null hypothesis. The Fisher school is based on body or strength of

evidence, which means that the lower the P-value, the stronger the evidence. By body of evidence we mean that for some reason, such as some experimental conditions that could be controlled but were not, or some variable or variables that are known to interfere on treatment effects but were not dealt with for some particular reason (cost, rain, drought, etc.), a researcher is not forced to conclude in favor of the maintenance of the status quo simply because he (she) found P=0.058. Therefore, we strongly suggest the presentation of the confidence intervals because they combine the magnitude of a treatment effect with statistical precision and, as such, it circumvents the accept-reject dichotomy of the null hypothesis. Confidence intervals move us away from that dichotomy (Stang et al., 2010)[1].

The probability that a continuous random variable equals any one value is ZERO. That's why confidence intervals are built, because instead of making inference about the true value of a parameter, we are now interested in inferring that the true value of the parameter lies within some interval, i.e., the confidence interval. For all practical applications this means that estimates have to be given as the estimate of the mean plus or minus a certain amount (Mood et al., 1974)[2]. Therefore, $P\left[\bar{x} - t_{1-\alpha/2}\sqrt{s^2/n} < \mu < \bar{x} + t_{1-\alpha/2}\sqrt{s^2/n}\right] = 0.95$ means that the probability that the random interval $\left(\bar{x} - t_{1-\alpha/2}\sqrt{s^2/n}, \bar{x} + t_{1-\alpha/2}\sqrt{s^2/n}\right)$ covers the unknown true mean μ equals 0.95. The length of the interval is $2t_{1-\alpha/2}\sqrt{s^2/n}$ and is dependent on sample size (n) and sample variance (s^2). The value $t_{1-\alpha/2}$ is some statistics that could be computed from sample size and on the prior establishment of the significance level(α). Therefore, if authors want to present confidence intervals, they must previously define them. As possible examples we list:

"…. the means were presented as $\bar{x}\left(\bar{x} - t_{1-\alpha/2}\sqrt{s^2/n}, \bar{x} + t_{1-\alpha/2}\sqrt{s^2/n}\right)$.";

"… and confidence intervals for the means presented as $\bar{x} + t_{1-\alpha/2}\sqrt{s^2/n}$.".

There are statistical softwares that present confidence intervals as outputs, and in such cases, the length of the intervals presented can be calculated as the *upper* minus the *lower* limits of the confidence interval. Therefore, provided that the assumption about the distribution of errors holds true, for a given statistics computed from the data, $t_{1-\alpha/2}\sqrt{s^2/n} = (upper - lower)/2$. For all cases reported above, s^2 = RMS, in which RMS is the residual mean square.

3.4.3. Suggestions of styles for the representation of P-values and dispersion indicators in Tables for the most common experimental designs and arrangements[3]

Balanced experiments with qualitative treatments, conducted without the adoption of experimental arrangements, and considering homogeneous variances among treatments

In these situations, this form of table is recommended:

Table 1 - Voluntary intake of animals fed a diet with different energetic sources

Item	Energetic source[1]			P-value	CV (%)
	Alpha	Beta	Gamma		
	kg d^{-1}				
Dry matter	6.301a	5.302b	5.892ab	0.036	5.3
…					
	g kg^{-1} of body weight				
Neutral detergent fiber	12.5a	10.4b	11.2b	0.045	4.8

[1] Means in the same row followed by different letters are different by the Tukey test (P<0.05).

In this example, the coefficient of variation (CV) is calculated as:

$$CV\,(\%) = \frac{\sqrt{RMS}}{\bar{Y}} \times 100$$

in which: RMS = residual mean square; and $\bar{Y}$ = overall mean obtained from all the observations.

Although CV is widely adopted in Brazil, there is a trend for its replacement in the international journals by the standard error of the mean. This also shows as reality for the users of PROC MIXED of SAS, which does not compute CV values for ANOVA. If this is the option for the authors, the tables can be put together as:

Table 2 - Total digestibility coefficients (g g^{-1}) of animals fed diets containing different energetic sources

Item	Energetic source[1]			P-value	SEM
	Alpha	Beta	Gamma		
Dry matter	0.605b	0.612b	0.669a	0.0172	0.035
…					

[1] Means in the same row followed by different letters are different by the Tukey test (P<0.05).

[1] Stang, A.; Poole, C. and Kuss, O. 2010. The ongoing tyranny of statistical significance testing in biomedical research. European Journal of Epidemiology 25:225-230.

[2] Mood, A. M.; Graybill, F. A. and Boes, D. C. 1974. Intoduction to the theory of statistics. McGraw-Hill Kogakusha, LTD., Tokyo.

[3] All the examples herein described are hypothetical. None of them was taken from real experimental situations.

The standard error of the mean must be expressed with the same number of decimal places applied to the means, and can be represented in the table by the acronym "SEM" or by the notation $S_{\bar{X}}$. For the speci◊ic case of this example, SEM is calculated as:

$$S_{\bar{X}} = \frac{\sqrt{RMS}}{\sqrt{n}}$$

in which: RMS = residual mean square; and n = number of observations in each treatment.

It is important to emphasize that in case of supposition of homogeneous variances among treatments, only one indicator of variance must be presented; the indication of different standard errors to the different treatments is inconsistent with the presuppositions of the analyses.

Balanced experiments balanced with qualitative treatments, conducted without the adoption of experimental arrangements and considering heterogeneous variances among treatments

This type of experimental interpretation has become common with the evolution of the statistical software, especially with the utilization of PROC MIXED, from SAS. In this case, as different variances will be assumed among treatments, each treatment must be followed by its respective indicator of dispersion; in this case, the standard error may be used. Another possibility is to present the associated con◊idence intervals for treatment means.

Table 3 - Characteristics of the metabolism of nitrogen compounds in animals fed different protein sources

Item	Protein source[1]			P-value
	Omega	Pi	Kapa	
Serum urea nitrogen (mg dL^{-1})	12.35±1.36b	17.18±1.75a	18.54±0.98a	0.023
...				

[1] Means in the same row followed by different letters are different by the Tukey-Kramer test (P<0.05).

We stress that the indicator of dispersion presented in Table 1 is inherent to the treatment's mean (thence the association by the symbol ±). In this case, the standard error is mandatory (standard deviation must not be used). The presentation of the con◊idence intervals may offer a rather comprehensive data description.

Balanced experiments with quantitative treatments, conducted without the adoption of experimental arrangements and considering homogeneous variances among treatments

The differences between quantitative treatments must not be interpreted by means of conventional tests of multiple comparisons (e.g., Tukey, LSD, Duncan, SNK, Dunnett). Utilize appropriate tests of multiple comparisons (e.g., The Williams test) or utilize regression models (linear or nonlinear).

A common and usually ef◊icient form to interpret can be achieved by performing orthogonal decomposition of the sum of squares for treatments in contrasts associated with the different order effects (e.g., linear, quadratic, cubic, etc.). This decomposition can be done through the adjustment of equation of linear regression corresponding to the highest signi◊icant order effect[4].

In the case of orthogonal decomposition, it must be emphasized that experiments carried out with "p" levels (in the case above, four levels of additive in the diet; p = 4) provide evaluation of "p-1" order effects (in the example, p – 1 = 3; linear, quadratic and cubic).

The adoption of the maxim "models of cubic or superior order do not make sense" must be careful, and in some cases, this can distort the presentation and interpretation of results.

Example:

Table 4 - Performance characteristics of animals fed diets containing different levels of additive

Item	Additive (g kg^{-1} of dry matter)				CV (%)	P-value[1]		
	0	3	6	9		L	Q	C
Intake (g)[2]	125	135	147	152	3.8	0.015	0.225	0.567
...								

[1] L, Q and C - linear, quadratic and cubic effects, concerning the inclusion of additive in the diet.

[2] $\hat{Y} = 125.8 + 3.10 \times X$ ($r^2 = 0.976$).

In some cases where high-degree effects are not signi◊icant, one can proceed to its grouping in the interpretation of the experiment as "lack of ◊it", which can reduce the number of columns in the tables.

Example:

Table 5 - Performance characteristics of animals fed diets containing different levels of additive

Item	Additive (g kg^{-1} of dry matter)					CV (%)	P-value[1,2]		
	0	3	6	9	12		L	Q	LF
Intake (g)[3]	125	135	147	152	161	4.1	0.032	0.359	0.603
...									

[1] L and Q - effects of linear and quadratic order concerning the inclusion of additive in the diet.

[2] LF - lack of ◊it.

[3] $\hat{Y} = 126.2 + 2{,}966 \times X$ ($r^2 = 0.985$).

[4] When ◊itting the linear regression models, use the notation "r^2" (lowercase) for functions with a single independent variable (e.g., simple linear) and "R^2" (capital letter) for the functions with more than one independent variable or for polynomial models (e.g., quadratic).

One example is shown in Figure 1, which simulates the interpretation of the concentration of rumen ammonia nitrogen as a function of the time after feeding. Observing the points equivalent to the average concentrations obtained in each period, it can be easily seen that the concentration of ammonia nitrogen rises up to the point of highest concentration more intensely than it declines after this point. So, at the interval evaluated, the elevation and reduction of the concentration of ammoniacal nitrogen are asymmetric in relation to the point of maximum concentration. The interpretation of this by a model of second degree (quadratic) implicitly assumes that elevation and reduction happen with the same intensity, i.e., symmetrically in relation to the point of maximum concentration (which ends up distorting the location of the maximum point). In this case, as can be seen in Figure 1, the description is more coherent and logically done by function of the third degree (asymmetric in relation to the maximum point).

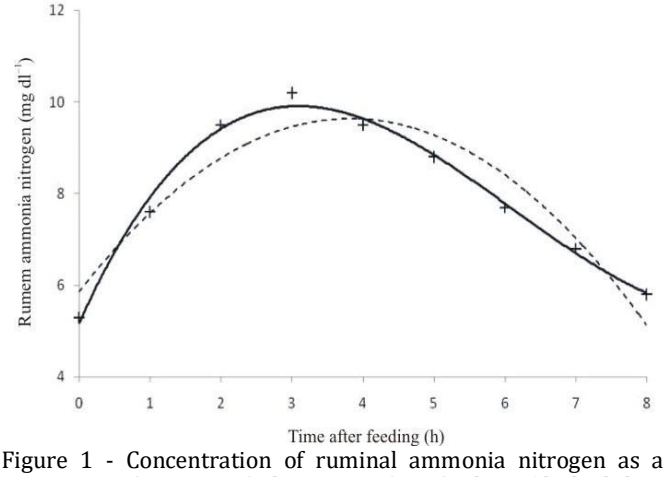

Figure 1 - Concentration of ruminal ammonia nitrogen as a function of the time after feeding (dashed line indicates quadratic function; continuous line indicates cubic function).

Balanced experiments with qualitative treatments, conducted with the adoption of experimental arrangements and considering homogeneous variances among treatments

The adoption of experimental arrangements (e.g., factorial, split plot) is common in experiments in the animal science area, and the information from their application must be adequately exposed to the reader.

As an example, in factorial arrangements the treatments are de◆ined by the combination of the different levels (quantitative or qualitative) of the factors studied. They start to build the aim of studies in terms of their possible interaction or their direct (independent) effects, should they not interact with themselves, on the response variables. Hence, this piece of information (interaction and/or independent effects) must be presented coherently to the reader.
Example:

Table 6 - Voluntary intake in ruminants fed low-quality forage supplemented with nitrogen compounds and/or starch

Item	WN		N		SEM	P-value[1]		
	WS	S	WS	S		N	S	N × S
	g kg^{-1} of body weight							
NDFap	11.2	10.5	12.8	12.0	1.1	0.003	0.046	0.485
...								

WN - without nitrogen compounds; N - with nitrogen compounds; WS - without starch; S - with starch; NDFap - Neutral detergent ◆iber corrected for ash and protein.
[1] N, S and N × S - effects of supplementation with nitrogen compounds, supplementation with starch and their interaction, respectively.

3.5. Additional guidelines for style and units – Abbreviation

The use of de◆ined abbreviations and acronyms by the authors, especially for treatments, should be avoided. When necessary, the abbreviation should be de◆ined the ◆irst time it is used in the summary (abstract) and again in the body of the manuscript.

There is no need to de◆ine symbols for chemical elements or simple compounds. Units of weights and measures conform to international standards; therefore it is incorrect to create new abbreviations.

Abbreviations in the titles and tables should be avoided. Long terms or expressions that aesthetically do not ◆it as written in tables should be spelled out as footnote of the table or ◆igure.

Example: "Average contents of dry matter (DM), crude protein (CP), acid detergent ◆iber (ADF), neutral detergent ◆iber (NDF), ether extract (EE), mineral matter (MM), organic matter (OM), total carbohydrates (TC), non-◆iber carbohydrates (NFC), and total digestible nutrients (TDN) of the ingredients of the experimental diets."
Suggestion: "Chemical composition of the experimental diets"

Do not start a sentence with an abbreviation, acronym or symbol.
Wrong: "TC is a parameter that in◆luences the ◆inal quality of the silage."

Suggestion: Total carbohydrate composition in luences the nal quality of the silage.

The use of abbreviations and acronyms in the summary should be limited. Too many abbreviations in the text makes it aesthetically cluttered and impairs the comprehension. The description by using abbreviations is appropriate for the author, but dif cult to interpret for the reader, who will need to stop reading to consult the descriptions in the text.

Units of measure are not abbreviated when they follow a number in full at the beginning of a sentence.
Wrong: 2 L of water were added to the contents for analysis (...)
Suggestion: Two liters of water were added (...)

All abbreviations are written as singular, although they can be plural in the context (VFA instead of VFAs). Abbreviations are generally not permitted in either the title or conclusions.

3.5.1. Abbreviations

AA = amino acid
AAI = essential amino acid(s)
ACTH = adrenocorticotropic hormone
ADDM = apparent digestibility of dry matter
ADF = acid detergent ber
ADFI =average daily feed intake (differs from DMI)
ADG = average daily gain
ADIN = acid detergent insoluble nitrogen
ADL = acid detergent lignin
ADP = adenosine diphosphate
AI = arti cial insemination
AIA = acid insoluble ash
AMP = adenosine monophosphate
ANOVA = analysis of variance
ATP = adenosine triphosphate
ATPase = adenosine triphosphatase
avg = average (use only in tables)
BCS = body condition score
BHBA = β-hydroxybutyrate
BLUE =best linear unbiased estimator
BLUP = best linear unbiased predictor
bp = base pair
BSA = bovine serum albumin
bST = bovine somatotropin
BTA = *Bos taurus* autosome
BUN = blood urea nitrogen
BW = body weight
CCW= cold carcass weight
cDNA = complementary deoxyribonucleic acid
CF = crude ber
CI = con dence interval*
CLA = conjugated linoleic acid
CN = casein
CoA = coenzyme A
Co-EDTA = Cobalt ethylenediaminetetraacetate
CP = crude protein
cRNA = complementary ribonucleic acid
CV = coef cient of variation*
DCAD = dietary cation-anion difference
DE = digestible energy
df = degrees of freedom*
DFD(meat) = dark, rm, and dry
DIM = days in milk
DM = dry matter
DMI = dry matter intake
DNA = deoxyribonucleic acid
DNase = deoxyribonuclease
EBV = estimated breeding value
eCG = equine chorionic gonadotropin
ECM = energy-corrected milk
EDTA = ethylenediaminetetraacetic acid
EE = ether extract
EFA = essential fatty acid
EIA = enzymeimmunoassay
ELISA = enzyme-linked immunosorbent assay
EPD = expected progeny difference
ETA = estimated transmitting ability
FA = fatty acid
FCM = fat-corrected milk
FFA = free fatty acids
FSH = follicle-stimulating hormone
GAPDH = glyceraldehyde 3-phosphate dehydrogenase
GC-MS = gas chromatography-mass spectrometry
GE = gross energy
GH = growth hormone
GHRH = growth hormone-releasing hormone
GLC = gas-liquid chromatography
GLM = general linear model
GnRH = gonadotropin-releasing hormone
h2 = heritability*
hCG = human chorionic gonadotropin
HCW = hot carcass weight
HEPES = N-2-hydroxyethyl piperazine-N'-ethanesulfonic acid
HPLC = high performance (pressure) liquid chromatography
HTST = high temperature, short time
i.d. = inside diameter
i.m. = intramuscular
i.p. = intraperitoneal
i.v. = intravenous
IFN = interferon
Ig = immunoglobulin

IGF = insulin-like growth factor
IGFBP =insulin-like growth factor-binding protein
IL = interleukin
IMI = intramammary infection
IR = infrared re◆lectance
IVDMD = *in vitro* dry matter disappearance
LA = lactalbumin
LD50 = lethal dose 50%
LG = lactoglobulin
LH = luteinizing hormone
LHRH = luteinizing hormone-releasing hormone
Lig = lignin
LM = *longissimus*(*dorsi*) muscle
LPS = lipopolysaccharide
LSD = least signi◆icant difference*
LSM = least squares means*
mAb = monoclonal antibody
ME = metabolizable energy
MEn = metabolizable energy corrected for nitrogen balance
MIC = minimum inhibitory concentration
ML = maximum likelihood
MP = adenosine monophosphate
MP = metabolizable protein
mRNA = messenger ribonucleic acid
MS = mean square*
mtDNA = mitochondrial deoxyribonucleic acid
MUFA = monounsaturated fatty acids
MUN = milk urea nitrogen
n = number of samples*
NAD = nicotinamide adenine dinucleotide
NADH = reduced form of NAD
NADP = nicotinamide adenine dinucleotide phosphate
NADPH2 = reduced form of NADP
NAGase = N-acetyl-ß-D-glucosaminidase
NAN = nonammonia nitrogen
NDF = neutral detergent ◆iber
NE = net energy
NEFA = nonesteri◆ied fatty acids
NEg = net energy for gain
NEl = net energy for lactation
NEm = net energy for maintenance
NEm+p =net energy for maintenance and production
NEp = net energy for production
NFC = non◆iber carbohydrates
NPN = nonprotein nitrogen
NRC = National Research Council
NS = nonsigni◆icant*
NSC = nonstructural carbohydrates
o.d. = outside diameter
OM = organic matter
PAGE = polyacrylamide gel electrophoresis
PBS = phosphate-buffered saline
PCR = polymerase chain reaction
pfu = plaque-forming unity
PG = prostaglandin
PGF2α = prostaglandin F2α
PMNL = polymorphonuclear neutrophilic leukocyte
PMSG = pregnant mare's serum gonadotropin
PSE = pale, soft, and exudative (meat)
PTA = predicted transmitting ability
PUFA = polyunsaturated fatty acids
QTL = quantitative trait loci
r = correlation coef◆icient*
R^2 = coef◆icient of determination*
RDP = rumen-degradable protein
REML = restricted maximum likelihood
RFLP = restriction fragment length polymorphism
RIA = radioimmunoassay
RNA = ribonucleic acid
RNase = ribonuclease
rRNA = ribosomal ribonucleic acid
RUP = rumen-undegradable protein
s.c. = subcutaneous
SCC = somatic cell count
SCM = solids-corrected milk
SD = standard deviation*
SDS = sodium dodecyl sulfate
SE = standard error*
SEM = standard error of the mean*
SFA = saturated fatty acids
SNF = solids-not-fat
SNP = single nucleotide polymorphism
sp., spp. = one species, several species
SPC = standard plate count
SS = sums of squares*
SSC = sus scrofa chromosome
SSPE = saline-sodium phosphate-edta buffer
ST = somatotropin
TCA = trichloroacetic acid
TDN = total digestible nutrients
TLC = thin layer chromatography
TMR = total mixed ration
Tris = tris(hydroxymethyl)aminomethane
TSAA = total sulfur amino acids
UF = ultra◆iltration, ultra◆iltered
UHT = ultra-high temperature
UV = ultraviolet
VFA = volatile fatty acids
wt = weight (use only in tables)

Physical units and other units

× = crossed with, times
°C = celsius (with number)

* Use generally restricted to tables and parenthetical expressions.

μ (pre◆ix) = micro
μCi = microcurie
μE = micro-einstein
μF = microfarads
μg = microgram
μg kg^{-1} = parts per billion
μL = microliter
amu = atomic mass unit
atm = atmosphere
bp = base pair
ca. = circa
cal = calorie
cc, cm^3 = cubic centimeter
cfu = colony-forming unit
Ci = curie
cm = centimeter
cM = centimorgan
cm^2 = centimeter, square
cP = centipoise
cpm = counts per minute
cps = counts per second
CPU = central processing unit
cu = cubic
D = density
d = day(s)
Da = dalton
dL = deciliter
Eq = equivalents
g = gram
g = gravity
h = hour(s)
ha = hectare
Hz = cycles per second (hertz)
IU = international unit
J = joule
K = Kelvin
k (pre◆ix) = kilo
kb = kilobase
Kbp = kilobase pair
KB = kilobyte
kcal = kilocalorie
keV = kiloelectron volts
kg = kilogram
kPa = kilopascal
KU = Klett units
L = liter
ln = logarithm (natural)
log10 = logarithm (base 10)
lx = lux
M (pre◆ix) = mega
m (pre◆ix) = milli
m = meter
M = molar (concentration)
mg kg^{-1} = parts per million
min = minute(s)
mL = milliliter
mM = millimolar (concentration)
mm Hg = millimeters of mercury
mm^3 = cubic millimeter
mmol = millimole (mass)
mo = month(s)
mol = mole (number, mass)
n (pre◆ix)= nano
N = Newton
N = normal (concentration)
ng = nanogram
p (pre◆ix) = pico
P = probability
Pa = Pascal
pfu = plaque-forming unit
pg = picogram
rpm = revolutions per minute
RU = rennet activity unit
s = second(s)
U = unit
use lx = foot-candle
use mmol kg^{-1} = osmolality
V = volt
vol = volume
vol vol^{-1} (use parenthetically) = volume/volume
W = Watt
wk = week(s)
wt vol^{-1} (use parenthetically) = weight/volume
yr = year(s)
Time: The 24h clock should be used, e.g.: 14.00 hours; 14.30 hours

4. Guidelines to submit the manuscript

4.1. The Manuscript Central™ online system

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4.2.

The cover letter

It is expected that the corresponding author writes a letter that explains the reasons why the editor would want to publish your manuscript.

See an example of what should go in this letter:

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• Primarily it is important to emblazon the relevance of the subject studied in a concise manner.

• If there is any novelty on your work, please report this to the editor. It is also important to stress the originality of the research, if it is the case.

• What is the main ♦inding of the study?

• Additional results but less relevant shall be mentioned then.

• What is the implication of the ♦indings of the study?

• Inform the editor if there is any patent related to your study.

• If any part of this study has already been published, tell the editor that this is the case of preliminary result, or only partial. Also inform the location, the event and the date of such publication. Otherwise, state that this is an original study that has not been published either in part or as a whole.

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