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GESSICA LUANA PEREIRA NERI

AVALIAÇÃO DO FARELO DE SOJA EXTRUSADO NA ALIMENTAÇÃO DE BOVINOS DE CORTE

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Trabalho de conclusão de curso de graduação apresentado, como requisito para obtenção do grau de Bacharel em Agronomia da Universidade Federal da Fronteira Sul.

Orientador: Prof. Dr. Bernardo Berenchtein

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AVALIAÇÃO DO FARELO DE SOJA EXTRUSADO NA ALIMENTAÇÃO DE BOVINOS DE CORTE

RESUMO - Objetivou-se através deste estudo, avaliar o ganho de peso e a digestibilidade de bovinos de corte, alimentados com dois tipos de dietas: Farelo de soja extrusado (T1) e Farelo de soja convencional (T2), durante 60 dias em fase de terminação. Foram utilizados 20 novilhos da raça Angus (21 meses e peso inicial 270 ±3 kg), divididos em 10 animais por tipo de dieta (tratamento). Os dados de desempenho final mostraram diferenças significativas (P≤0,05) entre os tratamentos em Peso Vivo Final, Ganho Diário de Peso (GDP) e Eficiência Alimentar (EA), com o tratamento 1 (farelo de soja extrusado) apresentando resultados superiores ao tratamento 2 (farelo de soja convencional). Não houve diferença significativa (P>0,05) no Consumo Diário de Ração entre as dietas.As digestibilidades aparentes de Matéria Seca, Proteína Bruta, Extrato Etéreo e Fibra em Detergente Neutro foram consistentes com a literatura, não apresentando diferenças significativas (P>0,05) entre os tratamentos. O farelo de soja extrusado apresentou maior eficiência em relação ao ganho de peso e eficiência alimentar. Estudos futuros devem avaliar os custos de produção relacionados a essa substituição.

Palavras-chave: Bovinos, digestibilidade, ganho de peso, farelo de soja, extrusado.

EVALUATION OF EXTRUDED SOYBEAN MEAL IN BEEF CATTLE DIETS

ABSTRACT - This study aimed to evaluate the weight gain and digestibility of beef cattle fed with two types of diets: extruded soybean meal (T1) and conventional soybean meal (T2) over 60 days in the finishing phase. Twenty Angus steers (21 months old, initial weight 270 ± 3 kg) were used, divided into 10 animals per diet (treatment). Final performance data showed significant differences ($P<0.05$) between treatments in Final Live Weight, Average Daily Gain (ADG), and Feed Efficiency (FE), with treatment 1 (extruded soybean meal) showing superior results compared to treatment 2 (conventional soybean meal). There was no significant difference ($P>0.05$) in Daily Feed Intake between diets. Apparent digestibilities of DM, CP, EE, and NDF were consistent with the literature, showing no significant differences ($P>0.05$) between treatments. Extruded soybean meal demonstrated greater efficiency in terms of weight gain and feed efficiency. Future studies should evaluate the production costs related to this substitution.

Keywords: Cattle, weight gain, digestibility, soybean meal, extruded.

LISTA DE TABELAS

LISTA DE ABREVIATURAS E SIGLAS

UFFS	Universidade Federal da Fronteira Sul
T1	Tratamento 1
T2	Tratamento 2
PNA	Proteína inibidora de tripsina
NRC	National Research Council
PB	Proteína bruta
NDT	Nutriente digestíveis totais
EM	Energia metabolizável
MS	Matéria seca
MM	Matéria mineral
EE	Extrato etéreo
FDN	Fibra em detergente neutro
FDA	Fibra em detergente ácido
PV	Peso vivo
GPV	Ganho diário de peso
EA	Eficiência alimentar
CDR	Consumo diário
CV	Coeficiente de variação
P	Limite de significância
DAp	Digestibilidade aparente
PNDR	Proteína não degradável no rúmem

SUMÁRIO

1.INTRODUÇÃO

Devido a grande demanda de bovinos de corte para produção de carne, somadas às necessidades de renda rápida e com menor investimento do produtor, torna-se necessária a avaliação de diferentes ingredientes para a dieta de animais de produção, com alta aceitabilidade, com menor perda ruminal e baixo custo.

Assim como relatado por Paulino et al. (2003), no Brasil, é comum que os sistemas de produção de bovinos sejam baseados em pastagens. No entanto, devido ao melhoramento genético, a exigência nutricional dos animais vem aumentando com o passar dos anos, sendo assim, a demanda por alimentos diferentes para compor a dieta, leva à contínuas pesquisas, visando atender estas exigências e entender os diferentes processos de fermentação e digestão desses alimentos (Ezequiel et al., 2006).

Segundo Silva et al. (2002) para o melhor aproveitamento dos resíduos agrícolas e de menor investimento na nutrição dos animais, como bovinos, se fazem necessários estudos aprofundados sobre um alto potencial dos coprodutos da agroindústria. A nutrição de ruminantes merece uma atenção singular, em relação às exigências e aos custos dos insumos e concentrados (Jobim et al., 2010).

Entre os coprodutos da agroindústria, existem diferentes tipos de farelo de soja disponíveis no mercado, com vastas composições e aplicações nas matrizes nutricionais de animais de produção. Entre eles, podemos citar o farelo de soja desengordurado, obtido após a extração do óleo, amplamente utilizado na alimentação humana e animal, devido ao seu alto teor proteico e versatilidade em produtos como alimentos processados e substitutos de carne. Por outro lado, o farelo semi-integral de soja contém quantidades moderadas de lipídios residuais e é frequentemente empregado na alimentação animal, especialmente em rações para aves e suínos, devido ao seu equilíbrio entre proteínas, fibras e carboidratos. Cada tipo de farelo de soja tem suas características específicas que determinam

sua aplicação tanto na indústria alimentícia quanto na nutrição animal, proporcionando soluções eficazes em termos de nutrição e custo-benefício (Rostagno et al., 2017).

Outrossim, outros produtos oriundos da agroindústria de processamento da soja são gerados, podem ser utilizados na alimentação de ruminantes e monogástricos. O farelo de soja convencional é um dos mais utilizados na produção. Outro exemplo é o farelo de soja extrusado, usado principalmente na alimentação de ruminantes, que ao passar por fontes de calor e pressão, tem uma boa inativação dos fatores antinutricionais, sendo, portanto, utilizado sem acarretar transtornos nutricionais (Silva et al., 2002; Brisola et al., 1998 a). A soja extrusada tem sido bastante estudada em dietas de animais não ruminantes, no entanto, em ruminantes, pelo elevado valor de lipídeos em sua composição, os estudos avaliando o uso da mesma são escassos, em função de possíveis reduções na digestibilidade das dietas (Brisola et al., 1999 b).

Já a soja integral e seus derivados, têm grande utilização na alimentação de bovinos, por ter uma boa granulometria, ser uma ótima fonte de proteína, além de diminuir os custos de produção (Silva et al. 2002). E ainda, é uma ótima fonte de proteína e energia, pois o processo de extrusão elimina fatores antinutricionais da soja crua, podendo contribuir significativamente na terminação de outras espécies, tais como os suínos (Fedalto et al*.* 1999). Em tempo, é importante salientar que alguns fatores antinutricionais (PNA, fatores alergênicos e ácido fítico) são considerados termo resistentes, e em razão disso, são necessários processos com elevadas temperaturas com o propósito de reduzir ou eliminar a presença destes (Rostagno et al., 2011).

Pensando nisso, o farelo de soja extrusado, por ser um produto que não leva a adição de solventes para extração do farelo, tendo assim maior conservação das características e valores nutricionais, pode proporcionar melhor digestibilidade para não ruminantes e maior aproveitamento pós-rúmen para ruminantes.

Na literatura, verificam-se poucos trabalhos envolvendo a utilização do farelo de soja extrusado na formulação de suplementos para bovinos de corte em terminação. Sendo assim, o presente trabalho foi desenvolvido com objetivo de avaliar o efeito do uso do farelo de soja extrusado no desempenho de bovinos de

corte e na digestibilidade das dietas, em comparação com o farelo de soja convencional.

2. MATERIAIS E MÉTODOS

O experimento foi conduzido em uma propriedade rural localizada na cidade de Faxinalzinho – RS e no laboratório de bromatologia e nutrição animal da Universidade Federal da Fronteira Sul (UFFS) – *campus* Erechim (RS) no período entre março e maio de 2024.

Foram utilizados 20 novilhos machos da raça, predominantemente, Angus, com aproximadamente 21 meses de idade e peso médio inicial 270±3 kg. Depois do tratamento com ivermectina para controle de parasitas, foi feita a identificação com brincos numerados para cada animal, os animais foram distribuídos em um delineamento em blocos casualizados, com 2 tratamentos e 10 repetições cada, dentro de uma instalação coberta, com área média 200 m^2 dividida ao meio e com 10 animais (repetições) cada, com 4 cochos de água e com cocho de alimentação.

As dietas foram formuladas de acordo com NRC (2000), conforme demonstrado na tabela 1.

Tabela 1 – Dietas experimentais

	Dieta 1	Dieta 2
Ingrediente	KG	KG
Silagem	1,50	1,50
Milho moído	4,840	4,40
Farelo de soja 46% solv	-	0,990
Farelo de Soja Extrusado	0,535	-
Sal mineral	0,120	0,120
TOTAL	6,95	7,01
Composição Nutricional		
Nutriente	Dieta 1	Dieta 2
MS (%)	65,2	65,3
PB (MS%)	12,13	14,90
NDT (MS%)	73,6	73,0
EM (kg/dia)	1,316	1,287

MS- Matéria seca
PB - proteína bruta.
NDT - nutrientes digestíveis totais.
EM - energia metabolizável.

A dieta foi fornecida uma vez ao dia aos animais, atingindo 100% do consumo da dieta fornecida, sem sobras. Os ingredientes foram misturados no implemento desensilador e disponibilizados no cocho.

Antes do início do experimento, os animais foram submetidos a um jejum alimentar por 15 horas para aferir o peso inicial e controlar o ganho diário dos animais. Após a introdução da dieta, os animais foram pesados todos os dias pela manhã sempre antes de receberem a dieta para fazer a avaliação do ganho de peso diário. Todos os animais passaram individualmente pela balança do tipo Guanabara - 3000 kg.

2.1 Ensaio de digestibilidade

No 39° dia foi feita coleta das fezes excretadas dos animais, individualmente, para o ensaio de digestibilidade. Essas amostras foram pesadas armazenadas a – 10

°C e, posteriormente, foram pré-secas em estufa de circulação forçada de ar a 55 °C por 72 horas, processadas no moinho de facas tipo WILLYER AL - 032S e submetidas às análises laboratoriais de digestibilidade.

As análises para determinação dos teores de matéria seca (MS), matéria mineral (MM) e extrato etéreo (EE) seguiram as recomendações de Silva and Queiroz (2002).

Para as determinações de fibra em detergente neutro (FDN), fibra em detergente ácido(FDA) e lignina foi utilizado sacos de TNT (tecido não-tecido) em um analisador de fibra de acordo com (Van soest et al., 1991).

O coeficiente de digestibilidade aparente (DAp) dos nutrientes da dieta foi determinado segundo McDonald et al. (2011):

$$Digestibilidadeaparente\ deX(\%) = \frac{(X\ consumido - Xexcretado)}{X\ consumido} * 100$$

Onde X = nutriente avaliado.

2.2 Análise estatística

A Análise estatística dos dados coletados foi realizada utilizando o pacote estatístico SASv. 9.4. (SAS Institute Inc., Cary NC, EUA). Todas as variáveis estudadas foram submetidas a análise de variância utilizando o teste T à 5% de probabilidade.

3. RESULTADOS

Os dados de desempenho dos animais ao final do experimento encontram-se na Tabela 02.

Foram observadas diferenças significativas (P<0,05) entre os tratamentos testados nas variáveis de Peso Vivo Final, Ganho Diário de Peso (GDP) e Eficiência Alimentar (EA), onde, no tratamento 1, com o uso do Farelo de Soja extrusado como fonte principal de proteína, foram observados valores superiores em relação ao Tratamento 02, com o uso do Farelo de Soja convencional na Dieta.

Em relação ao Consumo Diário de Ração (CDR), não foram observados, na tabela, efeitos significativos (P>0,05) entre as dietas (tratamentos).

Tabela 2 - Desempenho de Bovinos alimentados com Dieta com Farelo de Soja extruxado (T1) e Dieta Padrão (T2).

Tratamento	Peso vivo inicial (kg)	Peso vivo final(kg)	GDP(kg)	CDR(kg)	EA
T1	269,4	362,1	1,55	6,95	0,22
T2	270,5	354,0	1,39	7,00	0,20
CV, %	-	1,56	2,40	2,47	2,72
P	-	<0,05	<0,001	NS	<0,001

GDP - ganho diário de peso; CDR - consumo diário; EA - eficiência alimentar; CV - coeficiente de variação; P - limite de significância.

Tabela 3 - Digestibilidade Aparente (DAp) da Dieta com Farelo de Soja extrusado (T1) e Dieta Padrão (T2).

Tratamento	DApMS, %	DApPB, %	DApEE, %	DApFDN, %
T1	66,27	72,90	84,27	55,49
T2	65,25	72,37	85,12	54,28
CV, %	2,47	1,56	2,40	2,47
P	NS	NS	NS	NS

As digestibilidades aparentes da MS, PB, EE e FDN não diferiram (P>0,05) entre os tratamentos, demonstrando resultados dentro do padrão encontrado na literatura. É importante salientar que a avaliação foi realizada em relação à dieta total e não apenas em relação aos ingredientes teste.

4. DISCUSSÕES

Conforme demonstrado na tabela 2, o tratamento 1, com o farelo de soja extrusado como fonte principal de proteína, apresentou resultados superiores (P<0,05) em relação ao Peso Vivo Final, Ganho Diário de Peso e Eficiência Alimentar.

Tais resultados são semelhantes aos encontrados por Brisola *et al.* (1998 a), os quais demonstraram que o farelo de soja extrusado pode proporcionar ganhos significativos em relação ao farelo de soja convencional, como no ganho de peso, consumo e conversão alimentar quando utilizadas na alimentação de bezerros.

A proteína bypass, ou Proteína não Degradada no Rúmen (PNDR), de ambos os farelos utilizados neste estudo têm níveis parecidos entre si, com excelente padrão de aproveitamento pelos animais, sendo assim, ambos apresentaram resultados positivos no desempenho dos animais. Segundo Ribeiro *et al.*(2007), animais alimentados com farelo de soja tendem a ter ganho diário de peso perto de 1,55 kg/dia, e demonstrados por Silva *et al*. (1999a), de aproximadamente 1,57 kg/dia para animais mestiços, sendo os resultados observados no presente estudo, semelhantes aos apresentados pelos referidos autores.

Outrossim, os resultados obtidos neste estudo são semelhantes aos de Paixão *et al*. (2007) e aos 1,35 kg/dia observados por Ezequiel *et al*. (2006) em seus estudos. Tais valores sugerem que a forma de processamento do farelo de soja pode influenciar o ganho de peso dos animais.

Quanto à digestibilidade da MS do farelo de soja extrusado, no tratamento 1, quando avaliado em conjunto com outros ingredientes na dieta, permaneceu em torno de 66,27%, resultados estes, bastante inferiores aos resultados de Brisola *et al*.(1999), com 91,85%, acredita-se que o fornecimento da cana-de-açúcar para os animais do experimento de Brisola *et al*.(1999) favorece a digestibilidade aumentado-a significativamente.

Já os resultados do tratamento 2, o qual tinha o Farelo de Soja convencional como fonte principal de proteína, (65,25%) são semelhantes aos de Pina *et al*.

(2006), com cerca de 68,19%. Pode-se inferir que, provavelmente, isso pode ter acontecido pelas formas e tipos de processamento dos farelos de soja como relatado por Branco *et al*. (2006).

Em relação aos valores obtidos na avaliação de digestibilidade da PB das dietas contendo o farelo de soja extrusado e o farelo de soja convencional, os valores (72,90 e 72,37%) se mostraram inferiores aos resultados de Brisola *et al*. (1998) com 81,16%, este resultado pode ser decorrente da adição dos demais ingredientes da dieta, que são diferentes dos utilizados no presente estudo, como a cana-de-açúcar, poder tem grandes quantidades de sacarose aumenta a digestibilidade de outros ingredientes.

Todavia, os resultados deste estudo são semelhantes aos de Pina *et al*. (2006) com 72,57% e Wernersbach *et al*. (2006), os quais afirmam que o uso de ingredientes farelados ou extrusados na alimentação de vacas em lactação não alteram à digestibilidade da PB.

Em relação à digestibilidade do EE, os farelos de soja extrusado e convencional, demonstraram valores satisfatórios, 84,27% e 85,12%, respectivamente. Resultados estes semelhantes aos resultados obtidos por Wernersbach *et al*. (2006) com 85,12% e Pina *et al*. (2006) com 82,65%. É importante salientar que a literatura demonstra resultados bastante amplos em relação à digestibilidade da porção lipídica dos ingredientes, sendo provavelmente, resultante da porcentagem de EE disponível em cada um dos ingredientes avaliados.

Por fim, os resultados da digestibilidade de FDN obtidos no presente estudo foram de 55,49% e 54,28%, semelhantes aos obtidos nos estudos de Pina *et al*. (2006) com 50,87%. Tais resultados ocorrem devido a rápida degradação do farelo de soja mencionada por Blackwelder *et al*. (1998), os quais avaliaram a degradabilidade do farelo de soja convencional e obtiveram o valor de 50,76%, os quais se aproximam dos obtidos neste estudo.

5. CONCLUSÕES

Após a realização deste estudo, nas condições do experimento, a qual foi semelhante ao manejo corriqueiro aplicado aos bovinos de corte em confinamento, pode-se concluir que o farelo de soja extrusado pode ser utilizado, apresentando resultados superiores ao farelo de soja convencional em relação ao desempenho dos animais e não acarretando prejuízos na digestibilidade das dietas. Novos estudos devem ser realizados em relação aos custos de produção atribuídos a esta substituição.

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ANEXO I – Normas para publicação de artigos na Revista Brasileira de Zootecnia.

Revista Brasileira de Zootecnia

Brazilian Journal of Animal Science
e-ISSN 1806-9290
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Instructions to authors - 2024[1]

[1] Revised in May 2024.

1. Focus and scope

The Revista Brasileira de Zootecnia is a publication dedicated to the broad field of Animal Science. We publish highquality, original scientific research that spans across diverse areas within the discipline. The scope of RBZ encompasses a wide range of topics, including aquaculture, biometeorology and animal welfare, forage crops and grasslands, animal and forage plants breeding and genetics, animal reproduction, ruminant and non-ruminant nutrition, meat science and muscle biology, livestock precision, and animal production systems and agribusiness. Through covering these varied topics, RBZ aims to cater to a broad audience of researchers, educators, practitioners, and policymakers who are engaged in the study and application of Animal Science.

2. Editorial policies

2.1. Preprints

Manuscripts deposited on preprint servers are accepted for submission to RBZ, provided that the license (CC-BY) and DOI of the preprint are clearly informed. We recommend the use of "SciELO Preprints" for authors looking to submit their preprints.

During the review process, RBZ editors may consider comments and additional information from the preprint server to aid in their evaluation. Relevant insights from this phase can be integrated into the decision-making process.

Immediately after the publication of the article in RBZ, it is the authors' responsibility to inform the DOI of the article published to the Preprint server to ensure that the peer-reviewed version is accessible, maintaining the integrity of the published research.

2.2. Peer review process

The Revista Brasileira de Zootecnia employs a single-anonymized (also known as "single-blind") peer review system to maintain the highest standards of quality and credibility. In this system, while the authors' identities are known to both editors and reviewers, the reviewers remain anonymous to the authors throughout the process.

The peer review process begins immediately upon manuscript submission. Initially, the manuscripts are analyzed for their adequacy to the scope and submission norms expressed in the "Instructions to authors". Then, the supplementary documentation (Assurance of Contents and Open Science Compliance forms and the cover letter) is checked before the manuscript is forwarded for review. Once a manuscript meets these initial requirements, it undergoes a similarity check using the Crossref Similarity Check software (iThenticate) to ensure originality. Afterward, the manuscript is reviewed by a scientific editor who acts as the editor-in-chief (EIC) in the specific subject area of the manuscript. This EIC conducts a preliminary review to verify if the manuscript aligns with the journal's scope and evaluates its scientific merit and relevance to the journal's focus. The EIC assigns the manuscript to a handling editor, here called associate editor (AE), who also evaluates its scientific merit and relevance to the journal's focus. The AE selects a minimum of two reviewers with expertise in the specific study area of the manuscript. Reviewers assess the manuscript independently and submit their evaluations to the AE, focusing on the scientific validity, originality, and significance of the manuscript. The AE carefully reviews these assessments and makes a recommendation to the EIC based on the reviewers' comments and on their own judgment. The recommendation can be for the manuscript to be accepted, revised (major or minor), or rejected. The EIC then reviews these recommendations and includes their own observations to issue a decision letter to the authors.

Throughout the peer review process, we maintain strict confidentiality so that no conflict of interest compromises the integrity of the review. Editors and reviewers are required to disclose any potential conflict—whether positive or negative—that could compromise their capacity to deliver an impartial and objective review.

Communication with authors must be conducted through the scientific editor (EIC). Authors are allowed to suggest opposed reviewers for consideration by the EIC.

Adhering to the good practices of open science, the name(s) of the editor(s) responsible for the evaluation will be published in the final version of the manuscript.

2.3. Open data

The RBZ encourages authors to make all underlying content of the manuscript—including data, software codes, and other materials—publicly available in reputable data repositories, unless

restricted by legal or ethical considerations. We recommend "SciELO Data" as a suitable repository.

When choosing a data repository, authors should make sure that it adheres to the FAIR principles, which emphasize that data should be findable, accessible, interoperable, and reusable. Authors should also consider the reliability, reputation, accessibility, and visibility of the repository to guarantee that their data can be effectively shared and utilized by other researchers.

2.4. Fees

Publication fee:

For manuscripts in which at least one author is a member of the Sociedade Brasileira de Zootecnia, the publication fee is set at R$215.00 (two hundred and fifteen Brazilian reals) per formatted page. The SBZ member must be either the first author or the corresponding author.

If no authors are SBZ members, the publication fee is R$323.00 (three hundred twenty-three Brazilian reals) per formatted journal page.

No submission fee:

There is no submission fee, ensuring that the decision to submit a manuscript to RBZ is not hindered by financial constraints.

2.5. Ethics and misconduct, correction, and retraction

The Revista Brasileira de Zootecnia follows the SciELO Guidelines on Best Practices for Strengthening Ethics in Scientific Publication and the ethical principles of the Committee on Publication Ethics (COPE) to preserve the integrity and transparency in the manuscript review and publication processes. The journal is committed to publishing errata, retractions, and expressions of concern whenever necessary.

Ethics and misconduct policy:

- The Revista Brasileira de Zootecnia investigates allegations of misconduct, employing plagiarism detection software and requiring authors to confirm their contributions and disclose conflicts of interest.
- The editor-in-chief oversees the ethical standards, including the investigation of misconduct and the decision-making process for corrections or retractions.

Handling misconduct:

- Upon suspicion or evidence of misconduct, an investigation is initiated, potentially involving the authors, their institutions, or funding agencies.
- The Revista Brasileira de Zootecnia follows COPE's flowcharts for addressing various types of misconduct.

Retractions and corrections:

- Misconduct findings may lead to retraction or expression of concern, with the article remaining indexed as retracted.
- Errors or failures that do not constitute misconduct are corrected through errata, published promptly to maintain the accuracy of the scientific record.

2.6. Conflict of interest

A conflict of interest may be of personal, commercial, political, academic, or financial nature. Conflicts of interest may occur when authors, reviewers, or editors have interests that may influence the preparation or evaluation of manuscripts. When submitting the manuscript, authors are responsible for recognizing and disclosing financial or other conflicts, even potentially, that may have influenced their work. They must inform this in a signed document attached to the submission platform (Cover Letter). For more information see: Disclosure of Financial and Non-Financial Relationships and Activities, and Conflicts of Interest. Editors and reviewers also must disclose any potential biases and recuse themselves from the review or decision-making process if a conflict exists to ensure an unbiased and fair evaluation of manuscripts.

Measures in case of conflict of interest:

- In instances in which a conflict of interest is identified during the review process, the case is forwarded to the editor-in-chief for investigation and, depending on the level, the evaluation process of the manuscript will be interrupted.
- When a conflict of interest is identified post-publication, RBZ will take appropriate measures in line with international scientific journal standards. This may include the publication of a correction, expression of concern, or, in severe cases, retraction of the paper.

2.7. Similarity check

Manuscripts received through ScholarOne Manuscripts™ are submitted to a similarity check software (iThenticate) before they are forwarded to editors for evaluation and after they are accepted for publication, due to changes in the text during revision(s) and inclusion of new references to the databases. There is no specific percentage that prevents a manuscript from being reviewed; instead, we assess the results of the similarity check on a case-by-case basis.

Verification policy:

- Consequences of detected similarity: RBZ takes instances of significant similarity to other published works seriously, as this may indicate plagiarism, which is a critical violation of ethical standards in scientific publishing. Manuscripts found to have substantial overlap with previously published content will be subject to rejection.
- Authors' responsibility: Authors bear full responsibility for the originality and accuracy of the content presented in their manuscripts. They must apply proper citation practices and acknowledgment of prior work, adhering to the highest ethical standards.
- Sanctions: When plagiarism is detected, the RBZ editorial board will impose appropriate sanctions that may include barring the authors from submitting to the journal for a determined period, depending on the degree of the infraction.
- Non-original figures: Authors must secure express written permission from copyright holders to republish figures in the RBZ. The original source must be cited immediately following the figure caption.

2.7. Gender and sex issues

The editorial board of RBZ, as well as the authors who publish in the journal, must adhere to the guidelines on Sex and Gender Equity in Research (SAGER). Furthermore, RBZ implements a gender equity policy in the composition of its editorial board.

2.9. Ethics committee

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 manuscript must contain a statement that all procedures were performed in compliance with relevant laws and institutional guidelines and, whenever pertinent, that the appropriate institutional ethics committee(s) has (have) approved them before commencement of the study.

Example: "Research on animals was conducted according to the ethics committee on animal use of the (institution name) (case/protocol number)".

2.10. Copyright

All contents of the Revista Brasileira de Zootecnia, unless otherwise stated, are licensed under a Creative Commons Attribution license (CC-BY).

Authors retain copyright of the articles published by RBZ under the Creative Commons Attribution license (CC-BY), allowing unrestricted use, distribution, and reproduction in any medium, provided proper citation of the original work is given. Authors assign to the journal the right of first publication.

3. Guidelines to prepare the manuscript

3.1. Types of articles

Full-length research article

A full-length research paper provides a comprehensive account of experimental work. The manuscript should detail the research process to facilitate a thorough understanding and provide a coherent explanation of all experimental procedures and results. It must include sufficient information to allow for the independent replication of the research.

Short communication

This format offers a concise account of the final results of experimental work that warrants publication, yet lacks the volume of information typical of a full-length research article. Results presented in a short communication must not be used again, in part or in whole, for a full-length article submission.

Technical note

Technical notes describe evaluations or propositions of methods, procedures, or techniques relevant to the scope of RBZ. Authors should discuss the advantages and disadvantages of the proposed method, procedure, or technique and compare it to existing methods. Thorough scientific rigor in the analysis, comparison, and discussion of results is required.

Board-invited reviews

These articles provide a state-of-the-art analysis or a critical perspective on topics of interest and relevance to the scientific community. Board-invited reviews can only be submitted following an invitation from the RBZ editorial board. Like other submissions, reviews are subject to the peer-review process.

Editorials

Editorials serve to clarify and articulate the guiding principles and technical guidelines for manuscripts submitted to the Revista Brasileira de Zootecnia. These pieces are written by the editorial board or by contributors specifically invited by the board. Editorials provide insight into the journal's editorial philosophy, offer commentary on current trends or issues within the field of Animal Science, and may outline changes or updates in the journal's submission and evaluation policies. As such, they play a critical role in shaping the direction and standards of the journal.

3.2. Language

Manuscript submitted to RBZ must be in English, either in American or British writing styles. The editorial board reserves the right to require authors to revise the translation or to discontinue the processing of the manuscript if the text contains spelling, punctuation, grammar, terminology, jargon, or semantic errors that may impede understanding or fail to meet the journal's standards.

While AI tools can be employed to assist with language polishing, their use does not negate the need for thorough review by a professional. It is strongly recommended that the translation and language proofreading be conducted by a professional experienced in scientific writing and familiar with Animal Science, preferably a native English speaker so that the manuscript not only meets the high linguistic standards required for publication but also adheres to the specific terminological precision demanded by the scientific community.

3.3. Structure of a full-length research article

The article is organized into distinct sections, each with numbered headings that are bolded and aligned to the left, presented in the following sequence:

1. Introduction
2. Material and methods
3. Results
4. Discussion
5. Conclusions

Subsequent sections, including Data availability, Author contributions, Conflict of interest, Acknowledgments, Financial support, and References, should remain unnumbered. The Materials and methods, Results, and Discussion sections may contain subsections as determined by the authors. These subsections should enhance readability and provide clarity, accuracy, and conciseness to the text.

In addition to these sections, authors must include a "Declaration of Generative AI in Scientific Writing" if AI tools were used in the preparation of the manuscript. This declaration should follow the "Financial support" section and must clearly outline the nature and extent of AI involvement in the manuscript.

3.3.1. Manuscript format

The manuscript should be typed in Cambria font at a size of 12 points, with double spacing throughout the main text. Exceptions are for the Abstract and Tables, which should be set at 1.5 spacing. Margins should be set at 2.5 cm at the top, bottom, and right sides, and 3.5 cm on the left side. All lines must be numbered. The document must be prepared and edited using Microsoft Word® software.

3.3.2. Title

The title should be precise and informative, with no more than 20 words. It should be typed in bold and centered.

3.3.3. Authors and affiliations

The name and institutions of authors should be presented in the manuscript and in the submission process on ScholarOne. Consider carefully the list and order of authors and provide the definitive list at the initial submission. Authors must have made substantial contributions in the conception and/or development of the research and/or manuscript writing and necessarily in the revision and approval of the final version.

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

Upon submission of a manuscript, it is advised that no alterations to authorship be made. This includes changes to the list of authors, the order of authors, and the designation of the corresponding author. Any potential authorship modifications during the evaluation process, such as additions, deletions, reordering of authors, or changes to the corresponding author, can only be implemented with the unanimous agreement of all authors and the approval of the editor-in-chief.

No authorship changes will be considered after manuscript acceptance. Any disputes related to authorship should be resolved by the individuals and their respective institutions before manuscript submission. The journal and its editorial board will not mediate any authorship disputes among contributors.

In the manuscript, the authorship (in the correct order) must contain all authors' full names with no initials and complete information about their affiliation (of when the study was developed). The authorship must be identical to that presented in the Assurance of Contents form and on ScholarOne submission. Double-check the spelling of every author's name.

Mark the corresponding author with an asterisk and inform their current e-mail address.

Make sure that all authors are already registered in the ScholarOne system. Manuscript Central™ will help the corresponding author to check whether an author already exists in the journal's database, just by entering the author's e-mail address and clicking "Search". Make sure you have the correct e-mail address of the authors. When an author is already registered, their information will appear. All authors must have their ORCID linked to the ScholarOne system account at the time of manuscript submission.

The institutional affiliations must present their hierarchical levels in descending order (example: University, Faculty/ College, Department) and their location (city, state/province, country). The names of affiliations should be presented in full and in the

original language – or in English when not in Latin writing style. Acronyms and abbreviations of the institutions and their full addresses should not be used.

Author contributions

The Revista Brasileira de Zootecnia is committed to clarity and transparency in acknowledging the contributions of authors. To this end, we include an Author Contributions section in every manuscript published. We follow the Project CRediT taxonomy of contributor roles, details of which can be found at https://credit.niso.org.

During the manuscript submission process via the ScholarOne system, the corresponding author is required to specify the contributions of each coauthor. It is important to select only the roles that each of them has genuinely fulfilled in the development of the study.

#	Role	Definition
1	Conceptualization	Ideas; formulation or evolution of overarching research goals and aims.
2	Data curation	Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later re-use.
3	Formal analysis	Application of statistical, mathematical, computational, or other formal techniques to analyse or synthesize study data.
4	Funding acquisition	Acquisition of the financial support for the project leading to this publication.
5	Investigation	Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.
6	Methodology	Development or design of methodology; creation of models.
7	Project administration	Management and coordination responsibility for the research activity planning and execution.
8	Resources	Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools.
9	Software	Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code components.
10	Supervision	Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team.
11	Validation	Verification, whether as a part of the activity or separate, of the overall replication/reproducibility of results/experiments and other research outputs.
12	Visualization	Preparation, creation and/or presentation of the published work, specifically visualization/data presentation.
13	Writing – original draft	Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation).
14	Writing – review & editing	Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre- or postpublication stages.

3.3.4. Abstract

The abstract should be written in English as a single, justified paragraph. It must contain no more than 1,800 characters, including spaces. The abstract should concisely summarize the objective of the study, materials and methods, main results, and conclusions. It must provide statistical evidence (P-values) to support the results presented.

Abbreviations used in the abstract must be defined at their first occurrence there and again in the main body of the manuscript. The text of the abstract should be typed at 1.5 line spacing and positioned at the beginning of the manuscript, with the word “ABSTRACT” in all caps.

Extensive abstracts or those with subheadings are not acceptable and will be returned for adequacy to these guidelines. The abstract should not include any introductory text or references.

3.3.5. Keywords

At the end of the abstract, list a minimum of three and no more than six keywords (which must not be in the tittle), set off by commas and presented in alphabetical order. They should be elaborated so that the article is quickly found in bibliographical research.

3.3.6. Introduction

The introduction should be concise, not exceeding 3,000 characters including spaces. It should provide a brief overview of the context of the research topic, clearly state the hypothesis and objectives of the study, and justify the research. The rationale for the experiments should be well-integrated with current literature to ensure relevance and to demonstrate awareness of recent developments in the field. In the final paragraph of the introduction, explicitly articulate the hypothesis and the specific objectives of the research. This clarity will help in setting a clear direction for the subsequent sections of the manuscript.
Avoid discussing or inferring the results and refrain from extensive discussions based on literature that supports specific concepts unrelated to the main objectives.

For non-traditional papers such as reviews, a compelling rationale must be provided, and the structure of the introduction may be adjusted accordingly to better fit these types of submissions. 3.3.7. Material and Methods

Ethical standards

Whenever applicable, it is essential to state at the beginning of this section that the work was conducted in accordance with ethical standards and approved by the relevant Ethics and Biosafety Committee. The approval number must be included as follows: “Research on animals was conducted according to the ethics committee on animal use of the (institution name) (case/protocol number).”

Animal description and experimental units

Include a detailed description of the animals used in the study, specifying sex, breed, age, and species. Provide evidence of assay validation, or suitable published references, as well as inter/intra-assay coefficient of variation (CV), as needed. Appropriate statistical methods should be used with the experimental unit defined. State the number of biological and experimental replicates. Also, state the threshold for significance (e.g., $P<0.05$) and definition of tendency, if used. The experimental unit is the smallest unit that receives the application of treatments uniformly. It can be an individual animal (if there are guarantees that the treatment is applied uniformly and correctly to each animal in the study), a pen, a pasture, or a cage (when the treatment is applied to a group of animals under specific conditions). Please note that the application of nutritional treatments to group-fed animals (within a pen, pasture, box, or cage) often does not guarantee that each individual receives the proposed amount/dose of treatment, which implies that the group should then be considered as the

experimental unit. For considerations on the design and analysis of pen studies in animal sciences, please consult St-Pierre (2007).

Statistical and quantitative reporting

All quantitative values presented in the text, graphs, and tables must be reported with three significant digits (e.g., 752, 89.4, 3.59, 0.408, 0.0444, 0.00239). P-values must be presented with two or three significant digits (e.g., P = 0.72, P = 0.034, P<0.001) and should not be rounded off. For instance, if statistical software shows P = 0.1294 and you are presenting it with two digits, it should be reported as P = 0.12.

Description of procedures

Each biological, analytical, and statistical procedure must be clearly described. Modifications to these procedures should be explained in detail.

The statistical model must be presented as a separate sentence and is mandatory for designed experiments, observational studies, or survey studies. Describe all terms, assumptions, and fitting procedures to enable correct identification of the experimental unit and how the model was fitted:

$$y_{ij} = \mu + \alpha_i + \beta_j + e_{ij}, \quad (1)$$

in which y_{ij} is the response variable measured in the j-th block that received the i-th treatment, μ is the general constant, α_i is the fixed effect of the i-th treatment, β_j is the random effect of the j-th block, and e_{ij} is the random error term.

We recommend the use of Greek lowercase letters for fixed effects and Latin lowercase letters for variables and random effects for notation standardization. Mathematical formulas and equations must be inserted into the text as an object using Microsoft Equation or a similar tool and must be numbered.

Commercial products

When a commercial product is used as part of an experiment, authors should clearly specify the manufacturer's name and location (city, state or administrative region, and country) parenthetically at first mention in the text, tables, and figures. However, the use of names of commercial products should be minimized. The generic name should be used subsequently.

Suggestions for enhancing scientific rigor, reproducibility, and transparency

To assist with maintaining high standards, authors are encouraged to refer to various resources for enhancing scientific rigor, reproducibility, and transparency, aligning with broader scientific standards. These include guidelines for forage and grazing terminology, Western blotting, cell line authentication, functional genomics data, biological resource identification, image manipulation, immunoassays, biological and biomedical investigations, proteomics data, genetic nomenclature, and nucleotide and protein sequence data.

- Forage and grazing terminology: Guidelines by Allen et al. (2011).
- Western blotting: Standards for reporting by Fosang and Colbran (2015).
- Cell line authentication: Standards provided by the Endocrine Society and the study by Almeida et al. (2016).

- Functional genomics data: Authors are encouraged to deposit the data in databases such as GEO, Array Express, or SRA.
- Biological resource identification: Use the Research Resource Identification Portal (RRID Portal) for referencing specific research resources.
- Image manipulation: Guidelines from Cell. Any alterations must be minimal and disclosed in the manuscript.
- Immunoassays: Reporting guidelines for assay validation of the Journal of the Endocrine Society.
- Biological and biomedical investigations: FAIRsharing Team's collection of reporting guidelines.
- Proteomics data: Guidelines developed by the Molecular and Cellular Proteomics.
- Genetic nomenclature: Make sure sequence variant nomenclature complies with current HGVS guidelines.
- Nucleotide and protein sequence data: Submit data to DDBJ, EMBL, or GenBank for nucleotide sequences and PIR or SWISS-PROT for protein sequences.

3.3.8. Results

Authors are required to divide the manuscript into distinct sections for Results and Discussion, unless the study is sequential in nature, such as in model development or equation formulation, in which a combined section may be necessary for coherence and flow.

In the Results section, it is essential to present comprehensive data, including means and a measure of uncertainty (e.g., standard error, confidence interval). Absolute P-values must be included to denote statistical significance. This detailed presentation enables readers to independently interpret the outcomes of the experiment and form their own conclusions.

Please consult the additional RBZ guidelines regarding style and units to ensure the data is accurately represented in tables and figures. This will aid in the clear and effective communication of research findings.

3.3.9. Discussion

In the Discussion section, authors must clearly and succinctly interpret the results, emphasizing the biological mechanisms involved and their significance. It is crucial to integrate these findings with existing literature to provide readers with a comprehensive framework to either support or challenge the hypothesis presented.

Discussions should focus tightly on the relationship between the results and the primary questions of the study. Irrelevant references and tangential discussions that do not directly support the central hypothesis should be omitted. While speculative ideas and propositions regarding the hypothesis under consideration are generally discouraged, a reasoned interpretation consistent with the data may be presented if it enhances understanding of the results.

Furthermore, authors should end the Discussion section with a paragraph detailing the practical implications of their findings on production systems to highlight how the research can be applied in real-world settings, thereby adding value to the field and informing future practices.

3.3.10. Conclusions

In the Conclusions section, it is crucial to underscore the novel aspects of the research and emphasize the strongest and most significant inferences derived from your findings. This

section should articulate the broader implications of your results, ensuring they are presented in the present tense and align directly with the objectives of the study. While generally, results should not be detailed in the Conclusions, exceptions can be made when they are essential for supporting generalizations made from the study. This approach ensures that conclusions are not only based on the data collected but also provide a clear understanding of their relevance and impact.

3.3.11. Data availability

All manuscripts resulting from original research must include the "Data availability" section, in which authors will state one of the following situations in which the manuscript fits:

- Inform if data sharing does not apply to the manuscript, once all data is already in the manuscript.
- Inform whether there are data available in a repository and, if so, inform the location of these data.
- For data unavailable in public repositories, state that they will be made available upon request or explain why these data are not publicly available (as in cases of legal and ethical issues). Examples:

Non-available data	The dataset supporting the results of this study is not publicly available.
Available data	The entire dataset supporting the results of this study was published in the article itself.
	The entire dataset supporting the results of this study was published in the article and in the "Supplementary Material" section.
	The entire dataset supporting the results of this study was made available on [repository name] and can be accessed at [URL or DOI].
	The entire dataset supporting the results of this study was made available on [repository name] with the identifiers [list of identifiers].
	The entire anonymized dataset supporting the results of this study was made available on [repository name] and can be accessed at [URL or DOI].
Data available upon request	The entire dataset supporting the results of this study is available upon request to the corresponding author [name of corresponding author]. The dataset is not publicly available due to [provide a detailed reason for the restriction, such as containing information that compromises the privacy of research participants].
	The entire dataset supporting the results of this study is available upon request to [name of the organization]. The dataset is not publicly available due to [provide a detailed reason for the restriction, such as containing information that compromises the privacy of research participants].

3.314. Acknowledgments

In this section, authors can thank any support (other than financial) they had for the development of the research. This section is optional and must be included in the body of the manuscript.

3.3.15. Financial support

When applicable, provide sources of financial support for the study, including names of sponsors, contract/project number (if any), along with explanations of the role of these sources.

3.3.16. Declaration of generative AI in scientific writing

The Revista Brasileira de Zootecnia does not endorse the use of generative artificial intelligence (AI) tools for content creation within scientific manuscripts. However, the journal recognizes the utility of AI-assisted technologies for enhancing language, improving textual fluency, and organizing content, provided they are used as supplementary tools under strict human

supervision. It is critical to confirm that such interventions do not introduce inaccuracies, incomplete thoughts, or biases, which AI outputs can sometimes inadvertently produce.

It is categorically stated that AI and AI-assisted technologies are not to be recognized as authors, co-authors, or contributors in any capacity. Authorship and contributions are responsibilities that solely belong to human participants, as they entail accountability that cannot be attributed to AI tools. The journal will actively monitor for compliance with this policy in the authorship listings.

Disclosure of any AI assistance in language editing or content organization must be explicitly made in the cover letter to the editors and must also be included in the "Declaration of generative AI in scientific writing" section of the manuscript, following the "Financial support" section, which will be noted in the published article. Authors must provide a clear statement in their manuscript if any AI tools were utilized in the writing process. The ultimate responsibility for the content of the manuscript is the authors'.

3.3.17. Citations and references

RBZ adopts the APA references system, with adaptations. References and citations should follow the Name and Year System (author-date).

3.3.17.1. Citations in the text

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 last name of the first 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 the same 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. It will include the author's last name and first and middle name initials, followed by the phrase "personal communication", the date of notification, and name, state, and country of the institution to which the author is bound.

3.3.17.2. References section

References should be written in alphabetical order of last name of author(s), and then chronologically.

All authors' names must appear in the References section.

Each author is indicated by their last name followed by initials. Initials should be followed by period (.) and a space; the authors should be separated by semicolons, except for the last author that is preceded by the word 'and'. e.g.: Casaccia, J. L.; Pires, C. C. and Restle, J.

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

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 year.

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. Articles should be cited along with their DOI.
In order to standardize this type of reference, it is not necessary to quote the website, only volume, page range, year, and DOI. Do not use a comma (,) to separate journal title from its volume; separate periodical volume from page numbers with 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. https://doi.org/10.1590/S1516-35982013000300009

Article with document number in place of pagination:
Marçal, D. A.; Kiefer, C.; Nascimento, K M. R. S.; Bonin, M. N.; Corassa, A.; Alencar, S. A. S.; Santos, A. P. and Rodrigues, G. P. R. 2018. Dietary net energy plans for barrows from 25 to 100 kg body weight. Revista Brasileira de Zootecnia 47:e20180038. https://doi.org/10.1590/rbz4720180038

Articles accepted for publication should 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, https://doi.org/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)".

AOAC - Association of Official Analytical Chemists. 1990. Official methods of analysis. 15th ed. AOAC International, Arlington, VA.

Newmann, A. L. and Snapp, R. R. 1997. Beef cattle. 7th ed. John Wiley, New York.

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. Acribia, 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.

Bulletins and reports

The essential elements are: Author(s), year of publication, title, and 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, and its version and/or release year. Example: “... statistical procedures were performed using the MIXED procedure of SAS (Statistical Analysis System, version 9.2.)”

An exception is for software R packages, example:
R Core Team. 2013. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria.

Preprint documents

The essential elements are: Author(s), year, title, and name of Preprint server followed by the manuscript number (if any) and DOI.

Ahmed, B. A.; Laurence, P.; Pierre, G. and Olivier, M. 2019. Lactation curve model with explicit representation of perturbations as a phenotyping tool for dairy livestock precision farming. bioRxiv 661249. https://doi.org/10.1101/661249

Research data

References to data should include: Author(s), year, dataset title [dataset], version (if any) and date, repository name, identifier number (if any), and DOI.

Andrade, M. 2018. Estudo de genes em ratos albinos na América Latina [dataset]. 23 jan. 2018. Open Science Framework. NR_109833.1. https://doi.org/10.1590/0123-45620187214

3.3.18. Digital assets - Tables and figures

Tables

1. Submission: Submit tables in a separate, editable file, named "Tables". They must not be included in the manuscript body.
2. Construction: Tables must be created using the "Insert Table" function in Microsoft Word®, ensuring they are in distinct cells. Tables created by pressing the ENTER key or pasted as figures will not be accepted.
3. Formatting: Each table should be placed on a separate page within the same file and fit within an A4 size format, either in landscape or portrait orientation.
4. Numbering: Tables must be numbered sequentially in Arabic numerals.
5. Title: Titles should be short and informative. Detailed descriptions of variables within the table body should be avoided.
6. Column headings: Make sure every column has a heading. All values, symbols, and words in a column should be centered under the heading.
7. Units: Units (e.g., kg) should be informed within parentheses.
8. Footnotes: Each footnote should begin on a new line immediately below the table. Use numerals to reference footnotes. Lowercase letters indicate significant differences in the values.

Figures

1. Submission: Submit figures as separate files, named as "Figures" followed by the respective number. Example: "Figure 1", "Figure 2", etc. They must not be included in the manuscript body.
2. File format: Whenever possible, submit graphics in editable format. Figures such as photographs, pictures, and maps should be uploaded as PNG or TIF files.
3. Resolution: Figures should have a minimum resolution of 300 dpi.
4. Title and legend: Each figure must have a title and a legend. The legend should be informative, providing a comprehensive description of the results, graphical schemes, diagrams, or flowcharts depicted in the figure to enable readers to fully interpret the presented information without the need to refer back to the main text.
5. Axes and units: Designations of variables on the X and Y axes should start with capital letters, and units should be informed in parentheses.
6. Font and size: Standardize the font (Cambria) and units to no smaller than 8 points after figure reduction.

7. Creation: Preferentially, figures (graphics) should be created in Microsoft Excel® to allow corrections during copyediting.
8. Markers: Use contrasting markers (e.g., circles, crosses, squares, triangles, diamonds, filled or unfilled) to represent points on curves clearly.
9. Clarity: Avoid excessive information that could compromise the understanding of the graphs.
10. Non-original figures: For figures published elsewhere, obtain express written consent from the copyright owner for publication in RBZ. Include the source citation immediately after the figure title.

3.4. Additional guidelines for style, abbreviations, and units

The use of defined abbreviations and acronyms by the authors, especially for treatments, should be avoided. Example: "The dry matter intake in T3 was higher than in T4". This type of writing is appropriate for the author, but of complex understanding for the readers and characterizes a verbose and imprecise writing.

When necessary, the abbreviation should be defined the first time it is used in the abstract and again in the body of the manuscript.

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

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

Abbreviations in the titles of tables and figures should be avoided.
Example: "Average contents of dry matter (DM), crude protein (CP), acid detergent fiber (ADF), neutral detergent fiber (NDF), ether extract (EE), mineral matter (MM), organic matter (OM), total carbohydrates (TC), non-fiber 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 influences the final quality of the silage."
Suggestion: Total carbohydrate composition influences the final quality of the silage.

The use of abbreviations and acronyms in the abstract and in the manuscript should be limited. Too many abbreviations in the text makes it aesthetically cluttered and impairs the comprehension.

All abbreviations are written as singular, without "s", although they can be plural in the context (VFA instead of VFAs for volatile fatty acid").

Standard three-letter abbreviations for aminoacids (e.g., Ala) and internationally recognized symbols for chemical elements (e.g., P for phosphorus, S for sulfur) are acceptable. Symbols are reserved for their elemental meanings (e.g., C is for carbon, not control). Be cautious when using the symbol N, which can mean "nitrogen" or "Newton".

List of frequently used abbreviations.

The Editorial Board recommends authors to follow the International System of Units – SI.

3.5. Structure of short communication and technical note articles

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.

The publication fees of these two types of articles are the same as those of full-length papers.

4. Supplementary documents

Along with the manuscript files, authors must submit:

The cover letter

The corresponding author must compose a cover letter that outlines compelling reasons for the editor to consider publishing the submitted manuscript. The letter should address the following elements:

- Title and corresponding author's name: Clearly state the title of the manuscript and the name of the corresponding author.
- Relevance: Briefly describe the relevance of the topic studied.
- Novelty and originality: Highlight any novel aspects of the work and the originality of the research.
- Main findings: Summarize the main findings of the study.
- Additional findings: Mention any additional results of lesser relevance.
- Implications: Discuss the implications of the findings of the study.
- Patents: Inform about any patents related to the study, if applicable.
- Conflict of interest declaration: Include a declaration if there is any conflict of interest (financial, personal, commercial, political, institutional, or academic) that could influence the manuscript publication.
- Prior publication: If any part of the study has been previously published, describe these instances as preliminary results or partial publications, including the location, event, and date. If not, affirm that the study is original and has not been published in part or in full.
- Use of AI tools: Explicitly state if any AI tools were used in the preparation of the manuscript, particularly in the writing process.

The letter must be signed by the corresponding author, scanned, and uploaded to ScholarOne submission system in Step 6.

The Assurance of Contents form

Upon submitting a manuscript, authors must guarantee that their work is original and that neither the whole nor any part of their manuscript, regardless of language, is currently under consideration or has been published in any other scientific journal. Manuscripts that have been previously published or are under review elsewhere will not be accepted. The Revista

Brasileira de Zootecnia also does not accept the duplication or translation of articles that have already been published in other journals or as book chapters.
Studies that are fractioned or subdivided should be submitted concurrently (as companion papers) as they will be evaluated by the same reviewers.

Authors are also required to certify that any use of other works or words has been properly cited or quoted to avoid plagiarism, which is considered unethical publishing behavior. They bear sole responsibility for the content of articles published by the Revista Brasileira de Zootecnia.

After submission through the Manuscript Central™ (ScholarOne™ Manuscripts) online system, the corresponding author must send the Assurance of Contents form. This step confirms the participation and agreement of all listed coauthors concerning the submission and integrity of the manuscript.

The original text of this form must NOT be altered. It is the responsibility of the corresponding author to ensure the form is accurately filled out, signed all its pages (by hand or with digital traceable signature), and emailed it to RBZ's office at secretariarbz@sbz.org.br.

Open Science Compliance form

The corresponding author is required to fill out the Open Science Compliance form and submit it as a "supplemental file for review" alongside the manuscript on the ScholarOne system. This essential document allows the corresponding author to confirm their commitment to Open Science by detailing specific aspects of the manuscript. Authors must inform if the manuscript has been shared on a preprint server and, if so, include the location of such a server; inform if data, software codes, and other cited materials are correctly acknowledged and referenced; and indicate acceptance of opening options in the peer review process.

This form must be uploaded to ScholarOne submission system in Step 2.

5. Manuscript submission

5.1. The Manuscript Central™ (ScholarOne™ Manuscripts) online system

The editorial office of Revista Brasileira de Zootecnia uses an online system, the ScholarOne Manuscripts™, to manage the submission and peer review the manuscripts.

Manuscripts are submitted online by accessing the journal page (https://www.rbz.org.br), the portal of the Scientific Electronic Library, SciELO (https://www.scielo.br/j/rbz), or directly on ScholarOne Manuscripts™ (https://mc04. manuscriptcentral.com/rbz-scielo).

On the ScholarOne system, the corresponding author will find instructions in each step of the submission process.