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Evaluating Youtube™ videos on ruminal acidosis: integrating human and AI assessment for quality and reliability.

Evaluación de videos de Youtube™ sobre acidosis ruminal: integración de evaluaciones humanas e Inteligencıa Artificial para calidad y confiabilidad.

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ABSTRACT

Ruminal acidosis is a common metabolic disorder in ruminants that carries significant health and economic consequences. As online platforms such as YouTube™ are increasingly used for veterinary guidance, assessing the quality and reliability of digital content has become essential. In this cross-sectional study, 71 publicly available English-language videos on ruminal acidosis were analyzed using a combined human–AI evaluation approach. Video content was assessed with three validated tools: the Video Content Quality Index, the Global Quality Scale, and a modified DISCERN instrument, measuring scientific accuracy, educational value, and reliability. Viewer engagement, including likes, comments, and viewing rates, was also recorded. The average Video Content Quality Index, the Global Quality Scale , and DISCERN scores were 9.80, 3.12, and 2.87, respectively, reflecting moderate overall quality and reliability. Videos uploaded by professional associations scored highest, whereas content from commercial sources had the lowest Video Content Quality Index values. Inter rater comparison revealed systematic differences between human reviewers and AI, with AI assigned higher Video Content Quality Index, the Global Quality Scale, and DISCERN scores compared to the human reviewer highlighting its potential to standardize evaluations across large datasets. Importantly, viewer engagement metrics did not consistently correlate with video quality, emphasizing that popularity does not equate to scientific rigor. These findings underscore the necessity for veterinary professionals and educators to actively contribute accurate, evidence-based content online. Integrating AI-assisted evaluation provides a scalable, consistent approach to identifying high-quality educational resources, offering a promising tool for enhancing digital veterinary education and supporting informed decision-making among students, practitioners, and livestock producers.

Key words: Ruminal acidosis; YouTube; Veterinary education; artificial intelligence; video content quality

RESUMEN

La acidosis ruminal es un trastorno metabólico frecuente en rumiantes que conlleva importantes consecuencias para la salud y la economía. Dado que plataformas en línea como YouTube™ se utilizan cada vez más como fuente de orientación veterinaria, evaluar la calidad y la fiabilidad del contenido digital se ha vuelto esencial. En este estudio transversal se analizaron 71 videos en inglés disponibles públicamente sobre la acidosis ruminal mediante un enfoque combinado de evaluación humano–IA. El contenido de los videos se evaluó utilizando tres herramientas: el Índice de Calidad del Contenido de Video , la Escala de Calidad Global y un instrumento DISCERN modificado, para medir la exactitud científica, el valor educativo y la fiabilidad. También se registraron métricas de interacción de los espectadores, incluidos los “likes”, comentarios y tasas de visualización. Los valores promedio del Índice de Calidad del Contenido de Video, la Escala de Calidad Global y DISCERN fueron 9.80, 3.12 y 2.87, respectivamente, lo que refleja una calidad y fiabilidad generales moderadas. Los videos publicados por asociaciones profesionales obtuvieron las puntuaciones más altas, mientras que los procedentes de fuentes comerciales presentaron los valores más bajos del Índice de Calidad del Contenido de Video. La comparación entre evaluadores reveló diferencias sistemáticas entre la evaluación humana y la realizada por la IA, ya que la IA asignó puntuaciones más altas del Índice de Calidad del Contenido de Video, la Escala de Calidad Global y DISCERN en comparación con el revisor humano, lo que pone de manifiesto su potencial para estandarizar evaluaciones en grandes conjuntos de datos. De manera importante, las métricas de interacción de los espectadores no se correlacionaron de forma consistente con la calidad del contenido, lo que subraya que la popularidad no equivale necesariamente al rigor científico. Estos hallazgos destacan la necesidad de que los profesionales y educadores veterinarios contribuyan activamente con contenido preciso y basado en la evidencia en entornos digitales. La integración de evaluaciones asistidas por inteligencia artificial proporciona un enfoque escalable y coherente para identificar recursos educativos de alta calidad, y representa una herramienta prometedora para fortalecer la educación veterinaria digital y apoyar la toma de decisiones informada entre estudiantes, profesionales y productores ganaderos.

Palabras clave: Acidosis ruminal, YouTube, educación Veterinaria, Inteligencia Artificial, calidad del contenido de video

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INTRODUCTION

Ruminal acidosis is a widespread metabolic disorder in ruminants, primarily caused by excessive consumption of rapidly fermentable carbohydrates. Under normal conditions, rumen pH is maintained between 6.0 and 7.0 through microbial buffering and salivary bicarbonates. However, when pH falls below 5.8, *Streptococcus bovis* and *lactobacilli* proliferate excessively, producing lactic acid that exceeds the rumen's buffering capacity [1 , 2].

In subacute ruminal acidosis (SARA), rumen pH typically fluctuates between 5,5 and 5,8 for several hours (h) per day (d), which can trigger subclinical inflammation, disrupt microbial balance, and allow lipopolysaccharides (LPS) to enter systemic circulation [3]. Diagnosis usually relies on rumen fluid pH measurement, feeding history, and production monitoring. Management strategies often include adjusting dietary fiber, gradually introducing high-concentrate feeds, and using rumen modifiers or buffers [4 , 5]. Prevention through proper ration formulation and continuous monitoring remains the cornerstone of effective control [6 , 7].

Beyond its direct veterinary importance, ruminal acidosis underscores the ongoing need for accurate and accessible scientific information. In this context, YouTube™ has become an increasingly utilized platform for veterinary students seeking educational resources and clinical guidance [8]. However, the quality and reliability of content vary widely, depending on the expertise and intent of content creators. Some videos are produced by specialists or professional organizations, whereas others may contain incomplete or misleading information [8 , 9]. Recent advances in artificial intelligence (AI) offer a promising approach for systematically evaluating online educational content [10].

In this study, both a human reviewer and an AI assistant independently assessed YouTube™ videos on ruminal acidosis using validated scoring tools to measure reliability, educational value, and clinical relevance. AI enables rapid and consistent analysis of large datasets, complementing human expertise and highlighting high-quality resources. As AI technologies continue to evolve, AI-assisted evaluation is likely to play an increasingly important role in guiding veterinary students toward trustworthy information [10].

Accordingly, this study seeks to critically evaluate YouTube™ content for scientific accuracy, clinical relevance, and educational value. By combining human review with AI based analysis, we aim to determine whether online videos can provide reliable and informative resources for veterinary and agricultural audiences.

MATERIALS AND METHODS

Study design

This cross-sectional observational study was conducted over a four-week period, from July 21 to August 18, 2025, to assess the quality, reliability, and educational value of YouTube™ videos related to ruminal acidosis. As all videos analyzed were publicly accessible, formal ethical approval was deemed unnecessary. The study design adhered to YouTube™'s terms of service and ensured compliance with privacy and content regulations.

Keyword Identification

To identify the most relevant search term, the "Google Trends" tool was utilized with settings adjusted to "worldwide" and "past 5 years." Keywords including "rumen acidosis," "ruminal acidosis," and "acidosis in cattle" were compared. The term "ruminal acidosis" demonstrated the highest relative search frequency and relevance to the study topic (FIG. 1).

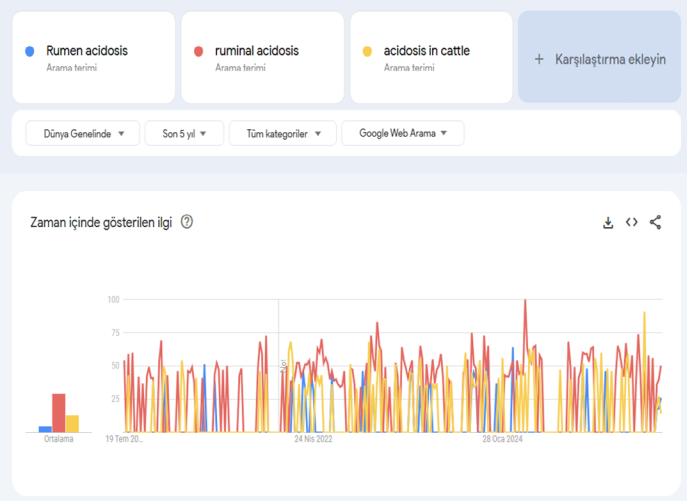

FIGURE 1. The most frequently used keyword results were determined by entering three key words into Google Trends.

Video selection

Following keyword determination, searches were conducted in Google Chrome's incognito mode using a newly created YouTube™ account to avoid algorithmic bias from prior search history. On July 21, 2025, the first 251 videos retrieved using the search term "ruminal acidosis" were screened. No filters were applied other than YouTube™'s default "relevance" sorting.

Exclusion criteria were as follows:

Non-English content,

Duplicate videos,

Absence of audio or title,

Content unrelated to ruminal acidosis,

Video duration < 30 seconds or > 40 minutes,

Content-deficient videos.

After applying these criteria, 180 videos were excluded and 71 videos were retained for final analysis (FIG. 2).

Data extraction

For each included video, the following demographic and descriptive characteristics were recorded:

Upload date,

Duration (minutes),

Number of views, likes, dislikes, and comments,

Country of origin,

Uploader type (professional, organization, commercial entity, or individual).

To minimize potential bias, the number of likes, dislikes, and comments was concealed from evaluators until the video content had been fully reviewed.

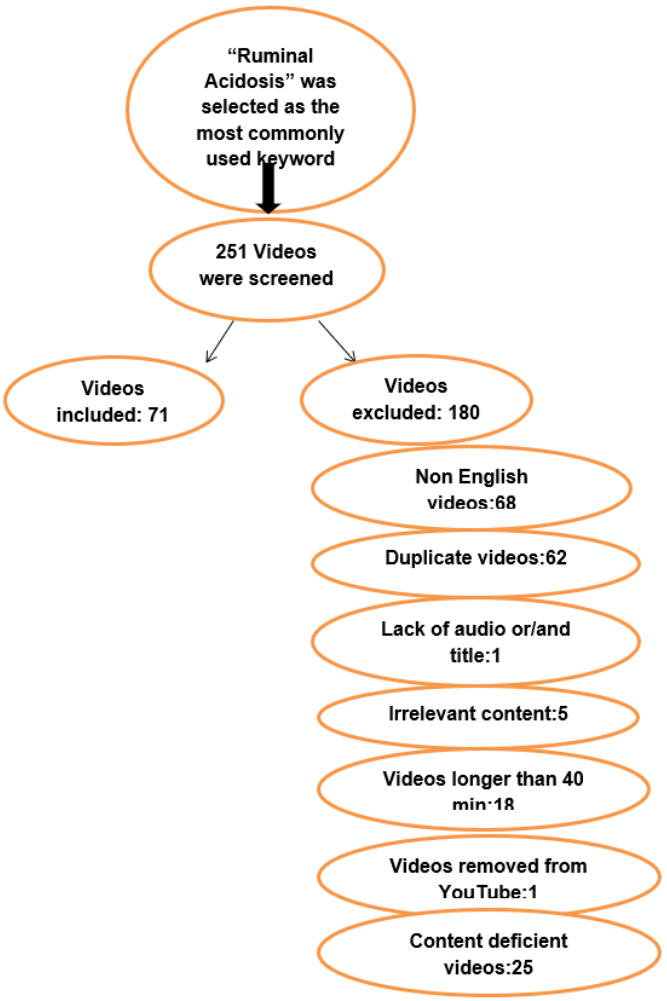

FIGURE 2. Flowchart of video selection. Of the 251 videos screened, 180 were excluded based on predefined criteria, and 71 videos were included in the final analysis.

Video classification

Videos were classified based on four source type: academic/professional, organizations/associations, commercial, or individual users.

Quality and reliability assessment

Three validated instruments were used to assess video content:

Video Content Quality (VCQ) Index: The Video Content Quality (VCQ) score was a study-specific composite metric developed by the authors to evaluate the scientific accuracy, completeness, and clarity of video content related to ruminal acidosis. The VCQ scoring framework was constructed based on key informational domains derived from established literature and clinical guidelines on ruminal acidosis. It consisted of a 10 item checklist assessing core content components, with each item scored on a scale from 0 to 2, yielding a maximum possible score of 20 points. The VCQ assessment was independently applied by one human reviewer and an artificial intelligence model. Total scores were categorized as follows: 0–6 = poor quality, 7–13 = moderate quality, and 14–20 = good quality. As the VCQ score represents an original assessment tool developed specifically for the purposes of this study, no previously published reference exists.

Global Quality Scale

The Global Quality Score (GQS) is a validated 5-point Likert-type scale originally developed to assess the overall quality, flow, and usefulness of online health-related information for patients and healthcare professionals. Each video is rated from 1 (poor quality, very limited usefulness) to 5 (excellent quality, highly useful). The GQS has been widely used in previous studies evaluating the quality of medical and veterinary content on YouTube™ and other online platforms [11].

DISCERN Instrument

A modified version of the DISCERN instrument focusing on core reliability items was used and scored on a 5-point scale. DISCERN has been extensively used in studies evaluating online medical information, including YouTube™ videos [12].

Engagement metrics

Two quantitative indicators of audience engagement were calculated:

Interaction Index: (Likes – Dislikes) / Views × 100

Viewing Rate: Views / Days since upload × 100

Evaluation procedure

Two independent reviewers assessed all included videos: a Veterinary Medicine specialist and an artificial intelligence based assistant (ChatGPT). The Veterinary Reviewer watched each video in full, paying attention to visual presentation, narration quality, and the accuracy of any demonstrations. The AI assistant, on the other hand, evaluated transcripts of the same videos, concentrating on the organization, clarity, and

factual correctness of the information presented. To reduce bias, Veterinary Reviewer completed his evaluations before being shown any engagement statistics. This dual-review process made it possible to compare human and machine evaluations in a consistent manner and to observe where their judgments tended to converge or differ.

Statistical analysis

In this study, the conformity of continuous variables to the assumption of normal distribution was assessed using the Kolmogorov–Smirnov test, and homogeneity of variances was examined using Levene's test. Differences between parameters in independent groups were analyzed using the nonparametric Kruskal–Wallis test [13], while comparisons within dependent (paired) groups were performed using the Wilcoxon signed-rank test. A 95 % confidence interval was applied in all statistical analyses. Inter-rater agreement for VCQ categorical classification (poor, moderate, good) between the human reviewer and the AI assistant was evaluated using Kendall's rank correlation coefficient (τ), with concordance interpreted as low (< 0.30), moderate (0.30–0.60), or high (> 0.60).

Associations between reviewer and AI scores were assessed using Spearman's rank correlation coefficient. Descriptive statistics and analyses were conducted using the R statistical software package, version 3.2.3 (2015-12-10), Copyright © 2015 The R Foundation for Statistical Computing [14]. Results were considered statistically significant at $P < 0.05$.

RESULTS AND DISCUSSION

A total of 71 YouTube™ videos met the inclusion criteria and were included in the analysis. The median video duration was 5.00 minutes (min), with values ranging from 0.34 to 32.38 min. The median number of views per video was 346 (range: 7–143,935). Videos had been available online for a median of 1432 d (range: 93–5921), indicating that most content had been published several years prior to analysis.

The median viewing rate was 30.70 views per d, with a wide range from 0.94 to 22,548, reflecting a highly skewed distribution. Median engagement metrics included 3 likes and 0 comments per video, resulting in a median interaction rate of 1.205 (range: 0–8.955). Regarding quality assessment scores, the median VCQ score was 10.0 (range: 1–20), while the median DISCERN and GQS scores were 3.00 (ranges: 1.50–4.50 and 1.00–5.00, respectively). Descriptive characteristics of the analyzed videos are summarized in TABLE I.

TABLE I
General Characteristics of 71 Included YouTube™ Videos on Ruminal Acidosis

Parameters	Median	Min.	Max.
Duration (min)	5.00	0.34	32.38
Total number of days since upload	1432.00	93	5921
Viewing rate	30.70	0.94	22548
Number of views	346.00	7	143.935
Number of likes	3.00	0	1800
Number of comments	0.00	0	143
Interaction rate	1.205	0	8.955
VCQ	10.0	1	20.00
DİSCERN	3.00	1.500	4.500
GQS	3.00	1.000	5.000

VCQ: Video Content Quality. GQS: Global Quality Scale

Regarding source distribution, 25 videos (35 %) were uploaded by professionals, 22 (31 %) by commercial entities, and 12 (17 %) each by associations and individual users. This distribution shows that professional and commercial producers dominate content on this topic on YouTube™, whereas associations and individual creators contribute smaller but meaningful portions.

The mean VCQ score across all videos was 9.80, suggesting limited scientific rigor and presentation quality. The mean GQS score was 3.12, indicating moderate educational usefulness, while the mean Quality Criteria for Consumer Health Information (DISCERN) score was 2.87, reflecting fair reliability.

When categorized by source, association uploaded videos demonstrated the highest mean VCQ (11.83) and GQS (3.54), whereas commercial videos yielded the lowest VCQ (8.36). Although associations and individuals had slightly higher DISCERN scores (2.96) than professionals (2.88) and commercial sources (2.77), none of these differences were statistically significant ($P > 0.05$). These findings are presented in TABLE II.

Overall, these results indicate that while some institutional efforts provide more reliable information, the general scientific rigor of ruminal acidosis related content on YouTube™ remains limited.

TABLE II
Comparison of Video Quality Scores According to Uploader Type

Parameters	Source	n	Median	Min.	Max.	P
VCQ	Professionals	25	10.000	1.00	20.00	0.290
	Associations	12	11.500	5.00	20.00	
	Commercials	22	8.500	1.00	16.00	
	Individuals	12	10.500	2.00	20.00	
GQS	Professionals	25	3.000	1.00	5.00	0.240
	Associations	12	3.500	2.50	4.50	
	Commercials	22	3.000	2.00	4.50	
	Individuals	12	3.000	2.00	4.50	
DISCERN	Professionals	25	2.500	1.50	4.50	0.768
	Associations	12	3.000	2.00	4.00	
	Commercials	22	2.750	1.50	4.50	
	Individuals	12	3.000	1.50	4.00	

VCQ: Video Content Quality. GQS: Global Quality Scale. (P > 0,05)

Inter-rater comparisons between the human reviewer and the AI assistant demonstrated statistically significant differences across all three scoring systems. The AI assistant assigned higher median VCQ scores than the human reviewer (median = 13.00 vs. 10.00; P < 0.01). Similarly, median GQS scores were higher for the AI assistant compared with the human reviewer (median = 4.00 vs. 3.00; P < 0.001), as were median DISCERN scores (median = 3.00 vs. 3.00; P < 0.01), reflecting differences in score distributions despite identical median values. Kendall's rank correlation coefficient (τ) analysis based on VCQ categories (poor, moderate, good) demonstrated a low but statistically significant level of agreement between the human reviewer and the AI assistant (τ = 0·235, p = 0·030), indicating measurable discordance between evaluators (TABLE III).

TABLE III
Comparison of Video Content Quality, Global Quality Scale, and DISCERN scores between the human reviewer and the AI assistant. Paired comparisons were performed using the Wilcoxon signed-rank test. Inter-rater agreement for Video Content Quality categorical classification (poor, moderate, good) was assessed using Kendall's rank correlation coefficient (τ).

Parameter	n	Reviewer Median	AI Median	Test	Satistic	P
VCQ score	71	10.00	13.00	Wilcoxon signed-rank	–	0.006*
GQS score	71	3.00	4.00	Wilcoxon signed-rank	–	<0.001*
DISCERN score	71	3.00	3.00	Wilcoxon signed-rank	–	0.007*
VCQ category agreement (poor–moderate–good)	71	–	–	Kendall's τ	0.235	0.030*

VCQ: Video Content Quality; GQS: Global Quality Scale; AI: Artificial Intelligence. Statistical significance was set at P < 0.05

These findings are summarized in TABLE III. In addition to these score differences, inter-rater agreement and association analyses provided further insight into the relationship between human and AI evaluations. Kendall's rank correlation coefficient **(τ)** analysis based on VCQ categorical classification demonstrated a low but statistically significant level of agreement, indicating that although both evaluators used the same scoring framework, their qualitative judgments differed.

Consistently, Spearman correlation analysis revealed only a weak association for VCQ scores and no significant correlations for GQS or DISCERN. Together, these findings suggest that AI-based assessments capture structural and textual completeness more readily than contextual and audiovisual quality, underscoring the complementary rather than interchangeable role of AI in evaluating educational video content.

These discrepancies can be explained by methodological differences: the AI evaluated text-based content extracted from transcripts, emphasizing linguistic organization and clarity, while the human reviewer considered visual presentation, delivery, and contextual accuracy. Consequently, the AI tended to overestimate structural coherence, whereas the human evaluator placed greater weight on didactic quality and audiovisual comprehensiveness.

The frequency distribution of VCQ categories (TABLE IV) visually reinforces this discrepancy, showing that the AI assistant classified nearly half of the videos as good quality, whereas the human reviewer more frequently assigned poor and moderate ratings.

The distribution of VCQ categories according to evaluator is presented in TABLE IV.

TABLE IV
Distribution of VCQ categories by evaluator

VCQ category	Reviewer n (%)	AI assistant n (%)
Poor (0–6)	22 (31.0%)	12 (16.9%)
Moderate (7–13)	33 (46.5%)	26 (36.6%)
Good (14–20)	16 (22.5%)	33 (46.5%)
Total	71 (100)	71 (100)

VCQ: Video Content Quality; AI: Artificial Intelligence.

Viewer engagement metrics showed no consistent correlation with video quality. Some videos with low VCQ or DISCERN scores received disproportionately high numbers of views and likes, indicating that popularity does not necessarily reflect educational or scientific accuracy. Conversely, several high quality videos produced by professional or academic sources had limited engagement. This imbalance highlights the need for strategies that promote both visibility and reliability in online veterinary educational media.

Spearman rank correlation analysis revealed a weak but statistically significant positive correlation between reviewer and AI VCQ scores (P = 0.303, P = 0.010). In contrast, no significant correlations were observed for GQS (P = 0.159, P = 0.184) or DISCERN scores (P = 0.054, P = 0.654).

From a Veterinary education standpoint, these findings reveal both challenges and opportunities. The overall scarcity of high-quality instructional materials on ruminal acidosis represents an untapped potential for academic institutions and professional associations. By increasing their digital presence and producing scientifically robust yet accessible content, these organizations can enhance public understanding and counter misinformation. Previous studies have emphasized that veterinary students appreciate online video materials for their accessibility and learning value, particularly before practical examinations [15 , 16 , 17 , 18 , 19 , 20].

Incorporating assessments from both human experts and AI-based systems may enable a more comprehensive evaluation of educational videos. As suggested by skill acquisition theory, repeated exposure to structured, high-quality video materials facilitates the transformation of declarative knowledge into procedural competence, thereby improving performance and safety awareness [21].

The observed divergence between human and AI scores underscores their complementary strengths. While human experts excel at evaluating contextual accuracy and audiovisual delivery, AI-based tools provide scalability and consistency. Hybrid evaluation frameworks that integrate both approaches could therefore offer a more balanced and objective assessment of online educational content.

Several limitations should be acknowledged. First, the analysis included only English-language videos, which may restrict generalizability to non-English contexts. Second, YouTube™'s dynamic recommendation algorithms may influence video rankings over time, affecting reproducibility. Third, despite the use of validated scoring instruments, evaluator dependent variability remains, as reflected in the reviewer AI discrepancies. Finally, the study did not assess the actual learning outcomes or behavioral impacts of the videos, which would require experimental or longitudinal research designs.

Future studies should include multilingual analyses and cross-platform comparisons to improve generalizability. Investigations incorporating both human and AI hybrid scoring models may yield deeper insights into evaluation reliability. Furthermore, collaborations between veterinary experts and digital media specialists could help produce scientifically accurate and engaging educational materials, maximizing the potential of platforms such as YouTube™ in veterinary and agricultural sciences.

CONCLUSION

In conclusion, YouTube™ videos on ruminal acidosis exhibit substantial variability in quality and reliability. While content produced by academic and professional sources is generally accurate and educational, the majority of available videos remain incomplete, inconsistent, or potentially misleading. These findings highlight the critical importance for Veterinary students, practitioners, and livestock producers to critically evaluate online materials, ideally incorporating feedback from both human experts and AI assisted assessments.

Furthermore, the results underscore the need for proactive engagement by veterinary professionals and academic institutions in producing accessible, scientifically sound digital content. Expanding expert led educational resources on widely used platforms such as YouTube™ may serve as an effective strategy to enhance farmer and student knowledge, counteract misinformation, and support improved herd health management.

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