International Journal of Agriculture and Biosciences 2026 15(2): 594-600.
https://doi.org/10.47278/journal.ijab/2025.194

RESEARCH ARTICLE
eISSN: 2306-3599; pISSN: 2305-6622

Evaluation of *Elaeis guineensis´* Flour as a Non-conventional Source of Feed in the Fattening Stage of *Cavia porcellus* L.

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ABSTRACT

Guinea pigs (*Cavia porcellus* L.) are an essential source of animal protein for rural populations in the Andes, Africa, and Asia. However, the high cost of conventional feed ingredients poses a challenge to producers. The search for alternative, cost-effective feed options has led to the exploration of African Oil Palm Flour (APF) as a viable substitute, therefore, this study aimed to evaluate the impact of including different levels of APF in guinea pig diets during the fattening phase, particularly in the context of rising global food prices as consequence of commercial disruptions, armed conflicts, and climate-related issues. Conducted in Urcuquí canton, northern Ecuador, the experiment lasted 56 days and involved 120 male Creole guinea pigs, 21 days old, with an average weight of 346g. A randomized block design was used with four dietary treatments: L0 (0% APF), L1 (5% APF), L2 (10% APF), and L3 (15% APF). All animals also received *Medicago sativa* (alfalfa) and concentrate. The variables evaluated were the nutritional value of APF, feed intake (kg), feed waste (%), and weekly weight gain (g), which were subsequently used to calculate the feed conversion index (FCI). Finally, a regression analysis using an orthogonal test was performed. No significant differences were observed among the variables ($P>0.05$). However, L1 recorded the highest dry matter intake (5.37±0.27kg), the most favourable FCI (5.38±0.34), and the lowest feed waste percentage (18.00±0.76%), while L0 showed the greatest weekly weight gain (107.32±6.23g). The orthogonal polynomial analysis indicated that feed conversion exhibited a quadratic response to weight gain and feed intake ($P<0.05$). Feed intake and weight gain demonstrated a fourth-order polynomial trend ($P<0.05$). Overall, these findings indicate that APF can serve as an effective substitute for conventional feed ingredients without compromising the performance or health of guinea pigs (GP).

Keywords: African oil palm flour, Guinea pigs, Feed conversion, Dry matter intake, Mortality.

Article History
Article # 25-272
Received: 16-May-25
Revised: 06-Sep-25
Accepted: 10-Oct-25
Online First: 24-Nov-25

INTRODUCTION

Nutrition plays a crucial role in animal production because it directly affects their growth, reproduction, health, and overall well-being. This principle also applies to guinea pigs (*Cavia porcellus* L.), rodents native to the South American Andes, who's nutritional needs have received relatively limited scientific research. Therefore, further studies are needed to understand their dietary requirements better and improve production systems.

Although research is limited, guinea pigs have long been valued in human diets for their high-quality meat. Their consumption is especially important in rural areas of the Andean region, including Colombia, Ecuador, Peru, and Bolivia. In recent years, their role has expanded to other regions, such as parts of Africa, including Congo and Cameroon (Bindelle et al., 2009; Tobou et al., 2023) , as well as parts of Asia (Cawthorn & Hoffman, 2016).

Traditionally, guinea pigs have been bred on a small-scale manner, primarily fed with kitchen scraps, crop waste (Alagón et al., 2024), and very poor-quality forage (Fernand et al., 2020). This type of production has primarily served two purposes: a) self-consumption and b) an informal source of income for rural families across three continents. (Vinauskiene et al., 2019; Tapie et al., 2024).

Cite this Article as: Bonifaz-Aguinaga F-X, Vallejos SNC, Prado JK, Basantes-Vizcaino T-F, Villarreal JVA and Andrés VBB, 2026. Evaluation of *Elaeis guineensis´* flour as a non-conventional source of feed in the fattening stage of *Cavia porcellus* L., International Journal of Agriculture and Biosciences 15(2): 594-600. https://doi.org/10.47278/journal.ijab/2025.194

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Even though the breeding and consumption of guinea indigenous Andean people for approximately 3,000 years (Kyle, 1994; Bindelle et al., 2009). Its meat has recently gained popularity due to its high nutritional value (Cawthorn & Hoffman, 2016; Guevara et al., 2021) which accounts for 21% and 8% of protein and fat content respectively (Bislava et al., 2022). Consequently, the increasing demand for this type of protein calls for larger, more prolific and faster-growing animals (Tapie et al., 2024), which in turn requires enhanced feeding and care programs, a better understanding of their nutritional needs, and a thorough evaluation of the nutritional value of their feed (Fernand et al., 2020; Sarria et al., 2020).

A better understanding of guinea pigs´ nutritional needs is the cornerstone for a more technical breeding method that can open the doors to new trends towards the use of alternative raw materials for their feedstuff. In that sense, the industry of African Palm (*Elaeis guineensis*) has gained relevance in recent years, providing widely available and cheap byproducts (Fraser et al., 2022).

Abdeltawab & Khattab (2018) and Umar et al. (2021) mentioned that oil, cake and flour are some of the byproducts of *Elaeis guineensis* industry which in turn can be used as raw materials in animal nutrition, however, due to cost and availability, only the last two are the most popular ingredients in animal feed. In this scenario for instance, Palm Kernel Cake (PKC) showed to be both, a proteinaceous and energetic ingredient, although according to Umar et al. (2021) protein contents are low and even null, whereas APF is rather fibrous and energetic.

Elaeis guineensis has mainly been used as a cheap source of energy for various species such as cattle, poultry, and pigs (Umar et al., 2021), however, little has been tested on rodents like guinea pigs (Alagón et al., 2024; Vela-Roman et al., 2024). These small strictly herbivorous mammals possess a particular eating behaviour, that is caecotrophy, which allows them to have a passage of food through their gastrointestinal tract that can take up to 70 hours (Vela-Roman et al., 2024), making them efficient machines in the digestion of crude fiber, being even more efficient than ruminants.

The constant shortage and volatile prices of conventional raw materials such as maize and soybean due to war (Barboza et al., 2024), regional shocks and climate change (Chen & Villoria, 2022) motivate to investigate new sources of alternative ingredients. According to Santos et al. (2019) and Vela-Roman et al. (2024), byproducts of the African Palm industry have scarcely been used in animal feeding due to the lack of knowledge of its nutritional properties, therefore the present study aims to assess the effects of the inclusion of African Oil Palm Flour (APF) in *Cavia porcellus* L diet (Table 1).

MATERIALS & METHODS

Materials

The present study lasted 56 days and was conducted at 2229 meters above sea level in the Northern Province of Imbabura, Urcuquí canton, Ecuador. It required 232kg of concentrated feed and 1.42 tons of *Medicago sativa* L. for the entire experiment. Temperatures ranged between 10°C and 30°C, with an average relative humidity of 50%. Diets were formulated and prepared at the research site before being administered to the experimental animals (Table 1). The inclusion of *Elaeis guineensis* flour in the treatments varied at different percentages: 0%, 5%, 10%, and 15%. Twelve experimental units were arranged, each containing ten male weaned creole guinea pigs, totalling 120 animals with an average weight of 346 grams and 21 days of age. All animals received concentrate and *Medicago sativa* L. at 3% and 30% of their body weight, respectively. Water was provided ad libitum.

Table 1: Formulated diets for the guinea pig diet during the fattening stage

Raw materials	L0 (kg) 0%	L1 (kg) 5%	L2 (kg) 10%	L3 (kg) 15%
Maize	38	38	38	38
Soy	25	25	25	25
Rice dust	30	30	30	30
Palm oil	4	2.75	1.5	0.25
African palm flour	0	5	10	15
Molasses	3	3	3	3
*Total Mix A	100	103.75	107.5	111.25
High digestible protein	0.75	0.75	0.75	0.75
Micronutrients	1.46	1.46	1.46	1.46
Total Mix B	102.21	105.96	109.71	113.46

*For each total of Mix A, the same amount of highly digestible protein and Micronutrients were added, resulting in each total of Mix B. L0 to L4: concentrate + *Medicago sativa* L. and addition of APF at 0, 5, 10, and 15%, respectively.

Sanitary Management and Sampling

During the study, disinfection and insect control took place every 21 days. Such activities included removing animals and their manure from their experimental units and then dichlorvos (1.5mL in 1000mL of water) and quaternary ammonium (2.5mL in 1000mL of water) were applied. Guinea pigs received food 3 times a day (concentrate at 7AM and forage at 11:00 and 14:00 hours). Finally, feed consumption, manure production, and feed waste were recorded daily, whereas weight data were recorded every 7 days.

Data Analysis

Once the data were checked for normality and homogeneity assumptions, an analysis of variance (ANOVA) and an orthogonal test were performed (α=0.05). General linear model and linear regression modules of the InfoStat Software ver. 2020 was also used. The research method applied for this study was a completely randomized block design, with three blocks and four levels as follows: L0: concentrate + APF at 0% + *Medicago sativa* L., L1: concentrate + APF at 5% + *Medicago sativa* L., L2: concentrate + APF at 10% + *Medicago sativa* L. and L3: Concentrate + APF at 15% + *Medicago sativa* L.

RESULTS

Nutritional Value of African Palm Flour (APF)

The proximate analysis results of APF are presented in Table 2. The study found a high crude fiber (CF) content at 38.4%, metabolic energy (ME) at 4.1Mcal/kg, and fat at 11.7%, while the crude protein (CP) level was low at 2.6%.

Feed Intake (kg)

ANOVA revealed that APF inclusion levels had no significant effect on feed intake (P>0.05), although intake increased significantly over time (P<0.05). There were no differences among treatments (Table 3). Intake gradually increased, with weekly gains ranging from 0.40 to 1.27kg, reaching a peak in week 3 (1.27kg). Over the 8-week period, total intake rose by 226.33% compared to the first week.

Table 2: Proximate analysis of *Elaeis guineensis* flour.

Nutrients	Units	Quantity
Crude protein (CP)	%	2.6
Fat	%	11.7
Crude fiber (CF)	%	38.4
Calcium	%	0.08
Phosphorus	%	0.08
Metabolic energy (ME)	Mcal kg^{-1}	4.11

Feed Waste (%)

Feed waste ranged from 18.00±0.76% to 19.64±0.79% across different palm flour inclusion levels (0, 5, 10, and 15%). The highest waste was observed at a 15% inclusion rate (19.64±0.79%), which was significantly higher (P<0.05) than at a 5% inclusion rate (18.00±0.76%). The 0% and 10% inclusion rates (18.65±0.8% and 18.37±0.79%) were intermediate and statistically similar (P>0.05). ANOVA revealed that inclusion level did not significantly affect feed waste (P>0.05), whereas time did (P<0.05).

Gain Weight (g)

Weight gain was not influenced by inclusion levels of APF (P>0.05) (Table 3), but it varied significantly over time (P<0.05). Throughout the study, gains fluctuated without a clear pattern, ranging from 61.07±3.17g in week one to 137.08±7.94g in week five. The highest increases occurred in weeks 2 (135.00±8.3g) and 5 (137.08±7.94g), while lower gains were observed in weeks 3, 4, 6, and 8, with values ranging from 82.94±6.5g to 101.65±8.59g.

Feed Conversion Index

ANOVA revealed that APF inclusion levels did not significantly affect FCI (P>0.05), whereas time had a highly significant effect (P<0.05). Feed conversion ratio increased steadily as animals grew older, beginning at 2.8±0.13 in week 2 and reaching 8.82±0.78 by week 8. This trend demonstrates a consistent rise in feed amount needed per unit of weight gain over the course of the study.

Orthogonal Analysis

The relationship between weight gain and the feed conversion index (FCI) in guinea pigs showed a significant quadratic pattern (P<0.05), as illustrated by the corresponding equation (Fig. 1). Regression analysis between feed intake and FCI revealed a non-linear association (P<0.05), described by the equation in Fig. 2. The curves indicate that FCI decreased with increasing weight gain, while it increases as feed intake rises.

Weight gain exhibited a significant non-linear response (P<0.05) to feed intake, following a fourth-degree polynomial pattern (Fig. 3). The negative coefficient of the x^4 term shaped the curve concavely downward, causing weight gain to decline after a certain intake point. Specifically, feed intake between 2.5 and 3.75kg was associated with high feed efficiency. In comparison, intakes above 3.75kg reached a plateau, with a slight decrease at 5kg, indicating that additional feed did not proportionally promote growth. Small fluctuations occurred between 5 and 6.25kg, followed by a more notable decline approaching 7.5kg, suggesting reduced efficiency or overfeeding effects.

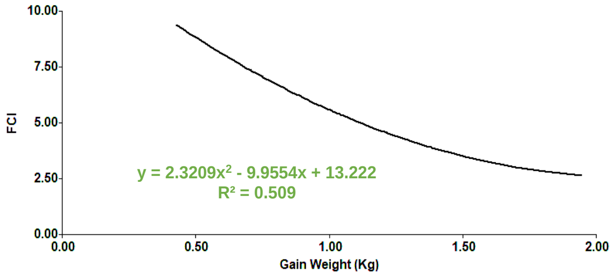

Fig. 1: Feed Conversion Index (FCI) as a Function of Gain Weight in Guinea Pigs.

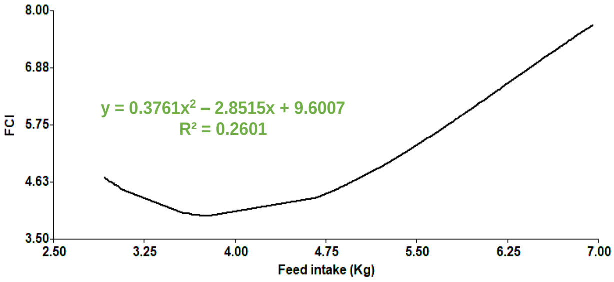

Fig. 2: Feed Conversion Index as a Function of Feed Intake in Guinea Pigs.

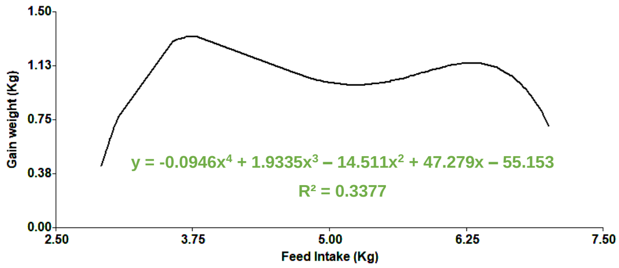

Fig. 3: Gain Weight as a Function of Feed Intake in Guinea Pigs.

Table 3: Performance of guinea pigs fed with different levels of inclusion of African Oil Palm Flour.

Components	Units	Levels of African Oil Palm Flour inclusion %			
		0	5	10	15
Total gain weight	g	778.64±18.41^{a}	759.09±18.00^{a}	742.96±17.34^{a}	737.89±16.76^{a}
Weekly gain weight	g	107.32±6.23^{a}	105.23±5.94^{a}	101.20±5.56^{a}	97.48±6.44^{a}
Weekly feed intake	kg	5.33±0.27^{a}	5.37±0.27^{a}	5.35±0.27^{a}	5.24±0.26^{a}
Feed waste	%	18.65±0.8^{ab}	18.00±0.76^{b}	18.37±0.79^{ab}	19.64±0.79^{a}
Feed conversion index	-	5.43±0.52^{a}	5.38±0.34^{a}	6.14±0.60^{a}	5.84±0.41^{a}

Mean+SE with a common letter in rows are not significantly (P>0.05) different.

DISCUSSION

Nutritional Value of African Palm Flour (APF)

The proximate composition of African Palm Flour (APF) shows clear differences from Palm Kernel Cake (PKC), a common byproduct of the palm oil industry. While PKC is known for its higher crude protein (16.86%) and lower crude fiber (15.12%) and metabolizable energy (2.79Mcal/kg) (Azizi et al., 2021; Ferreira et al., 2021; Tang et al., 2021), APF stands out by being more fibrous and energy-rich. This profile aligns well with the nutritional needs of guinea pigs, which require more dietary fiber (16%) compared to swine (9%) and poultry (3%) (Bernal & Vázquez, 2021; Sánchez et al., 2022). Although its protein level is lower, the higher fiber content of APF can support good gut health and digestion in guinea pigs, making it a valuable alternative feed ingredient when combined with other protein sources.

Feed Intake

The results of this study indicate that incorporating African palm flour (APF) into guinea pig diets did not significantly change feed intake, as no differences were detected among the treatment groups (P>0.05). However, feed consumption increased over the course of the experiment (P<0.05), suggesting that growth and developmental stage, rather than the diet itself, were the main factors influencing intake. Guinea pigs have a post-gastric digestive system that allows them to ferment large amounts of fiber and partially hydrolyze cellulose. This capacity enables them to utilize a wide variety of feedstuffs, from crop residues to formulated concentrates, making them especially adaptable for rural production systems where alternative feed sources, such as palm by-products, are commonly used (Castro & Chirinos, 2021).

Although data on guinea pigs' nutritional responses are limited, insights from other mammals and poultry offer valuable context. For example, rabbits fed increasing levels of palm kernel cake (PKC) showed higher daily intake, rising from 54.64g to 57.68g at 0 and 40% inclusion, respectively (Orunmuyi et al., 2006). Similar trends have been seen in buffaloes, where voluntary dry matter intake increased with PKC inclusion from 0 to 1% of the diet (Agyekum & Nyachoti, 2017; Amaral et al., 2023). Poultry tolerate relatively high levels of PKC, up to 40%, without reductions in feed intake, although some studies suggest that body weight may be negatively affected at around 15% inclusion (Sundu et al., 2005; Sundu et al., 2006; Azizi et al., 2021).

These observations emphasize that the impact of palm-based by-products on feed intake varies among species, depending on digestive efficiency and dietary adaptation. In guinea pigs, the consistent intake observed here reflects their ability to consume fiber-rich ingredients without decreasing voluntary intake. This flexibility highlights the potential of guinea pigs as a hardy and adaptable species capable of efficiently utilizing unconventional feeds, supporting sustainable livestock production in smallholder or rural settings (Azizi et al., 2021; Castro & Chirinos, 2021; Jiang et al., 2024).

Feed Waste (%)

Although the ANOVA showed no significant effect of inclusion level on feed waste (P>0.05), time had a significant effect (P<0.05), suggesting that feed wastage patterns may depend more on feeding duration or animal behaviour rather than solely on diet composition.

These findings support previous studies that highlight the influence of feed composition on feed waste and feed conversion in guinea pigs. For instance, some studies assessing the nutritional value of various concentrate feedstuffs in guinea pigs have shown that palatability and physical characteristics of feed can affect intake patterns and subsequent waste (Azizi et al., 2021). Similarly, initial assessments of feed intake and fecal output revealed that guinea pigs exhibit significant variability in feed utilization, depending on the diet type and feeding conditions (Elfers et al., 2021).

The observed increase in feed waste at the highest palm flour inclusion (15%) may stem from decreased palatability or altered texture, as reported in studies on alternative feed ingredients for guinea pigs. For example, including non-conventional protein sources like black soldier fly larvae meal can change feed intake patterns and feed conversion efficiency, emphasizing the importance of ingredient acceptability to reduce waste (Herrera et al., 2022). Additionally, models that predict digestible and metabolizable energy in guinea pigs suggest that feeds with suboptimal energy or fiber content may lead to higher feed rejection and wastage (Castro et al., 2022).

The lack of a statistically significant effect of inclusion level on feed waste aligns with other studies where feed formulation did not markedly alter wastage, provided that diets met basic nutritional requirements (Chirinos et al., 2024). However, the significant effect of time observed in this study suggests that management factors, such as feeding schedules, feed presentation, and animal behaviour, play a critical role in determining actual feed utilization. This emphasizes the need for careful consideration of both dietary composition and feeding practices to minimize waste in guinea pig production systems.

Finally, while palm flour inclusion up to 15% caused a slight increase in feed waste, the overall variation was moderate, and time-dependent factors seem to have a greater impact on feed wastage. These results underscore the importance of both diet formulation and management strategies in optimizing feed efficiency and minimizing losses in guinea pig production.

Gain Weight (g)

The present study on guinea pigs found that varying levels of African palm flour (APF) did not significantly influence overall weight gain (P>0.05), with weekly gains between 61.07±3.17g and 137.08±7.94g. Similar outcomes were seen in rats fed 15–25% palm kernel cake (PKC) (Loh et al. 2002), where moderate PKC levels did not hinder growth, although feed conversion efficiency could be affected. These findings suggest that moderate amounts of high-fiber palm by-products are generally well tolerated by small mammals without compromising overall growth.

In contrast, studies on grower rabbits showed that including PKC above 30% negatively affected growth performance, while up to 30% inclusion resulted in comparable daily weight gain, feed intake, and carcass traits to the control diet (Orunmuyi et al., 2006). Rabbits, similar to guinea pigs, seem able to tolerate moderate levels of palm by-products, but their performance declines when inclusion exceeds species-specific thresholds.

Grasscutters, however, exhibit a more pronounced nutrient-dependent response to PKC inclusion. Studies indicate that grasscutters fed a diet with 50% PKC replacement achieved the highest average daily weight gain (19.3g), while both higher and lower inclusion levels resulted in reduced growth. The optimal response was associated with diets containing 22% crude fiber and moderate energy levels, highlighting the importance of balancing fiber and energy for growth in this species (Wogar, 2012).

Together, these findings emphasize a common pattern: small herbivorous mammals such as guinea pigs and rabbits sustain relatively stable growth with moderate inclusion of PKC or APF. In contrast, higher inclusion levels or high-fiber content can diminish feed efficiency. This highlights the importance of considering species-specific digestive physiology and maintaining a proper fiber and energy balance when formulating diets with palm by-products.

Feed Conversion Index

Although guinea pigs are herbivorous with well-developed cecums, their growth performance is closely linked to the diet's nutritional composition, especially energy content rather than fiber levels. Higher fiber generally reduces weight gain and feed conversion efficiency (Garner, 2013; Sánchez et al., 2016; Castro & Chirinos, 2021; Castro et al., 2022; Nemeth et al., 2023). In this study, the feed conversion index (FCI) did not differ significantly among treatments ($P<0.05$); however, L1 showed the best efficiency with an FCI of 5.38±0.34. As dietary fiber increased, FCI also tended to increase, as seen in L2 (6.14±0.6), indicating a decline in feed utilization efficiency (Sarria et al., 2020).

This trend aligns with previous findings showing that higher fiber content (from 8.59 to 10.66%) leads to an increase in FCI from 5.34 to 6.16, indicating that diets with more fiber require greater feed intake to achieve similar weight gain (Sarria et al., 2020). Similarly, guinea pigs fed diets with 20% crude fiber exhibited an FCI of 9.38 (Gaibor et al., 2023), exceeding the FCI recorded in the current study at 15% fiber (5.84±0.41). Comparable patterns have been observed in other herbivorous rodents such as rabbits; for example, including 40% palm kernel cake, equivalent to 11.2% crude fiber, resulted in an FCI of 5.01 (Orunmuyi et al., 2006).

Overall, the variation in FCI values among guinea pigs, ranging from 2.8 to 5.0, underscores the impact of dietary fiber on feed efficiency (Saucedo et al., 2018; Cedano et al., 2021). The increased FCI in treatments with more fibrous feeds underscore the importance of balancing energy and fiber levels to enhance feed conversion in guinea pigs.

Orthogonal Analysis

Weight Gain and the Feed Conversion Index Relationship

Feed consumption and FCI in guinea pigs follow a quadratic relationship, where feed efficiency improves with consumption but plateaus or declines at higher intake levels (Castro et al., 2021). This finding aligns with the quadratic form of the equation derived in this study, indicating that increasing feed consumption does not always lead to a proportional improvement in weight gain or FCI.

An important aspect to consider is that FCI and weight gain depend not only on the type and amount of food but also on other factors such as genetics, environmental conditions, and the animals' metabolism; therefore, the quality of the feed significantly influences feed conversion efficiency. Diets with high levels of fiber and high-quality proteins can improve conversion, while unbalanced diets or those with low nutritional value may result in less efficient conversion (Guamán et al., 2024).

Regression Analysis between Feed Intake and the FCI

Feed consumption and feed conversion efficiency follow a quadratic relationship, where conversion improves with consumption but stabilizes or decreases at high intake levels (Castro et al., 2021). This pattern was also observed in this study, indicating that increasing feed consumption does not always lead to continuous improvements in feed efficiency.

Although the feed conversion index improves with feed consumption, this relationship begins to decline at high consumption levels (Cantaro et al., 2020). This may be due to metabolic saturation or the guinea pigs' limited ability to efficiently convert nutrients when intake exceeds a certain threshold.

The highest feed efficiency occurs during the early stages of growth, which aligns with the quadratic form of the proposed equation, indicating a decline in performance as guinea pigs mature. As they age, guinea pigs need larger amounts of feed to achieve the same weight gain (Escobar et al., 2023), which is also reflected in the trend of the derived equation.

Weight Gain and Feed Intake Relationship

Regarding the behaviour of the equation, the negative fourth-degree term indicates that the effect of feed intake on weight gain follows a pattern that peaks and then declines. This aligns with previous studies reporting a decrease in feed conversion efficiency once feed consumption exceeds a certain point. For example, feed conversion efficiency in guinea pigs improves with increasing feed intake, but this growth slows at higher levels. This could be due to metabolic saturation, age, or the limited ability of guinea pigs to convert nutrients efficiently when intake surpasses a threshold (Cantaro et al., 2020).

An important aspect to consider is that feed intake and weight gain depend not only on the type and amount of feed but also on other factors such as genetics, environmental conditions, and the animals' metabolism. The quality of the feed greatly influences feed conversion efficiency. Diets high in fiber and high-quality proteins can enhance conversion, while unbalanced or nutritionally poor diets may lead to less efficient conversion (Guamán et al., 2024).

Although the results obtained in this study show a moderate relationship between feed intake and weight gain, it is important to note that other factors, such as feed type, animal health status, and management conditions, also significantly influence conversion efficiency. Feed type, genetics of the guinea pigs, and management conditions are key factors affecting the growth performance of guinea pigs (Guerrero et al., 2020).

Conclusion

Dietary APF did not significantly impact feed intake or weight gain, implying that guinea pigs can consume high-fiber ingredients without reducing their voluntary intake. Nonetheless, diets with higher APF fiber content showed lower feed conversion efficiency (FCE), indicating the importance of balancing fiber and energy in diet formulation. Overall, guinea pig performance is affected more by physiological and environmental factors than by diet composition alone, emphasizing the importance of a well-balanced nutritional approach. Although the effects on feed intake and weight gain were limited, the study indicates that adding APF causes a slight increase in feed waste, particularly at higher levels. This rise may be due to behavioural factors rather than dietary ones. Therefore, it is crucial to address both the dietary ingredient and the system's management, such as feeding schedules, frequency, and feed presentation, to optimize feed efficiency and reduce losses in sustainable guinea pig production systems. The orthogonal analysis reveals a quadratic relationship between intake and the diet's feed conversion ratio, as efficiency increases with intake but seems to level off or even decline at very high intake levels. Although this model has not been fully explained in current literature, metabolic saturation may potentially limit efficiency once a certain threshold is surpassed. Besides quantity, diet quality and its relationship with environmental variables influence feed conversion in balanced diets. Likewise, based on the previous quadratic relationship, feed intake and its correlation with weight gain suggest a non-linear curve regarding conversion. In fact, higher intake does not directly translate to better conversion when it comes to weight gain. This might be due to age, metabolic conversion limits, and a maximum threshold for conversion. However, this research paves the way for future studies that combine genetics, diet, and environmental factors. Future research should focus on: (1) how different fiber sources affect feed conversion in guinea pigs, and (2) identifying optimal intake thresholds to maximize feed conversion efficiency under various management and feeding conditions.

DECLARATIONS

Funding: Universidad Técnica del Norte and Cuyera Andina funded the present study.

Acknowledgement: The authors would like to thank Cuyera Andina breeders, their manager, Mr. Enrique Chiriboga, and their DMV, Fernando Díaz; they were very important people for this process. Thanks for their advice and guidance.

Conflict of Interest: The authors declare no conflict of interest. The funding sponsors (Universidad Técnica del Norte and Cuyera Andina) had no role in the design of the study, in the collection, analysis, and interpretation of data. Neither had any contribution in the writing of the paper, nor in the decision to publish the results.

Data Availability: Data is available under formal request to the corresponding author.

Ethics Statement: Resolución Nro. 052-SE-HCD-FICAYA-2024.

Author's Contribution: FXBA and SNCV collected data, performed data tabulation and wrote paper; JKP performed statistical analyses of experimental data; TFBV, JVAV and VBBA supervised and coordinated the experiments. All authors critically revised the manuscript and approved the final version.

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