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SUPPLY OF RUMINAL CONTENT (UNDIGESTED FOOD) OF BEEF IN THE RATION AND WEIGHT INCREASE IN GUINEAINES (CAVIA PORCELLUS) IN THE HUAURA VALLEY, LIMA

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Abstract: **Objective:** Explain the influence of ruminal content (undigested feed) of beef with the addition of molasses in the ration on weight gain in guinea pigs (Cavia porcellus). **Method**: The rumen content of beef plus molasses was supplied as a food input to a sample of 40 growing-finished male guinea pigs from 30 to 90 days of age, as it is a valuable source of nutrients for animals due to its high contribution of protein and others. nutrients, and was supplemented with forage (chala) to cover the vitamin "C" that this species needs. The completely randomized statistical design (DCA) was used, with 10 guinea pigs for the control treatment and 30 guinea pigs for the experimental treatment distributed in three homogeneous groups as repetitions. (TE-R1; TE-R2; TE-R3). **Results**: The guinea pigs in the experimental group reached a final weight of 866.4 grams and the control group reached a final weight of 694 grams, achieving a total average weight increase of 172.4 grams. Greater than the guinea pigs in the control group in 60 days of experimentation. **Conclusions**: The reuse of bovine rumen content in guinea pig feeding generates greater weight gain and, consequently, guinea pig meat production increases.
Keywords: Guinea pig production, ruminal content, weight increase.

INTRODUCTION

The ruminal content of beef is found in its first stomach (rumen), which at the time of slaughter contains all the material that was not digested (Guerrero, 2004). A massive community of microorganisms lives in the rumen, mainly bacteria and protozoa, which ferment the food, delivering mainly volatile fatty acids (VFA) and carbon dioxide as products. VFA from the rumen reach circulation and are used by cattle as a primary source of energy and carbon (Domínguez, 2007).

Fermentation provides food and energy for the development of the microorganisms present in this gastric compartment, which, together with the undigested material, are subsequently removed more or less continuously from the rumen by passage to the other gastric compartments of the ruminant. The metabolic processes that occur there are similar to those carried out in monogastric animals and complete digestion in the abomasum and small intestine.

Rodríguez & Cook (2003) indicate that in the reticulum and rumen there are around 10 billion bacterial cells per gram of rumen content and around 200 species that are responsible for the greatest degradation of nutrients in the food content.

The ruminal microflora also has microscopic fungi that help in the digestion of food and belong to the Phylum Chytridiomycota of the Kingdom Fungi. Fungi were the last type of ruminal microorganisms to be discovered; Therefore, its mode of action to hydrolyze food particles is not well known. Ruminal fungi constitute about 8% of the microbial biomass and the zoospore population is estimated to have a density of 10,000 – 1,000,000 cells per milliliter of ruminal fluid.

Fungi are important in the digestion of fibrous foods during the first 5 hours after consumption; they produce an enzyme complex capable of degrading fiber as well as or better than the main cellulolytic bacteria, even being capable of dissolving part of the lignin.

Bacteria and protozoa act in the degradation of cellulose and its derivatives: hemicellulose, starch and proteins. Amylolytic activity is of great importance for these organisms. Protozoans digest starch and as the final product of metabolism produce volatile fatty acids, lactate, formate, H2 and C02.

We noted that in Colombia, two processes have been implemented for the use of rumen

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content in animal feed, one industrial Forage Flour (HF) and another semi-industrial called nutritional blocks, in our cases there is no literature cited other than an experience in direct feeding to sheep, this is partly because the proposed uses require the necessary infrastructure (Domínguez –Cota et al.,1994;Flores-Aguirre et al., 1994;Falla-Cabrera,1995)

Falla – Cabrera (1995) motivated by Domínguez (2007) Indicates that according to the bromatological analysis, the Ruminal Content contains: moisture 85%, protein – fat 9.60%, fiber 2.84%, ash 27.06%.

Rodríguez and Cook (2003) fattened guinea pigs using the content of bovine pre-stomachs, achieving a satisfactory weight increase.

The objective of this research work is to explain the influence of beef rumen content in the diet on weight gain in guinea pigs (cavia porcellus) from the territorial area of the Huacho District, Huaura Province, Lima-Peru.

MATERIALA ND METHODS

LOCATION

The research was carried out on the premises of the José Faustino Sánchez Carrión National University of Huacho, Province of Huaura.2017.

SAMPLE

We worked with a total of 40 male guinea pigs (Cavia porcellus) of 20 days of age on average, considering 10 guinea pigs for the control group (TC) and 30 guinea pigs for the experimental group (ET) distributed in 3 homogeneous groups, of 10 guinea pigs per group as repetitions, under the randomized experimental design (RCD).

INSTALLATIONS

The shed was built with materials from the area and in accordance with its ecology (Chauca, 1993). In the breeding shed, cages were installed in an area of 40 m2, which were also used in the research, as follows:

- 06 breeding/lactation cages, 1m per side by 0.70m high.
- 03 breeding cages for males, 1m per side by 0.70m high.
- 03 breeding cages for females, 1m per side and 0.70m high.
- 03 individual cages for guinea pigs under observation (with health problems) measuring 1m per side by 0.70m high.

METHODOLOGY

The method was descriptive-experimental analytical type.

The bovine ruminal content (undigested feed) was collected immediately after the slaughter of bovines in the slaughterhouse, extracted from the pre-stomach called the rumen. It was then subjected to dehydration in the environment, and to improve the palatability of the food, 20% molasses was added.

The food was supplied ad-libitum to the experimental guinea pigs, complemented with forage (chala) to provide the vitamin "C" that this species needs, based on its nutritional requirements during the fattening stage; since these food inputs have a high percentage of protein, ash and fiber.

Weight control of the guinea pigs was carried out at 30 days of age on average and then biweekly until 90 days of age; having considered 10 days of adaptation in the consumption of the food that was the subject of the experiment.

NUTRIENT	%
Total protein	18 – 20
NDT	56 –60
Fiber	9 – 18
Fat	1.0
Calcium	1.2
Potassium	1.4
Match	0.6

TABLE 01: NUTRITIONAL REQUIREMENTS OF THE GUINEA (Leonard, 1992)

RESULTS

The results of the research demonstrate that the provision of beef ruminal content (undigested food) in the diet of guinea pigs (Cavia porcellus) in experimentation it allowed them to achieve a greater weight (866.4 g) compared to the control group (694g) that received only a standardized conventional food ration (concentrate). An average increase of 172.4 g was achieved. in favor of the experimental group with three repetitions (TE-R1; TE-R2; TE-R3). Table: 06 and 07. Figure: 01 and 02.

One of the health problems of guinea pigs is gastrointestinal diseases, generally of bacterial etiology.

	WEIGHT CONTROL BY AGE (g)										
Animal Code	20 days (Start)	30 days	They gain weight	45 Days	They gain weight	60 days	They gain weight	75 Days	They gain weight	90 days	They gain weight
1	298	486	188	583	97	852	269	964	112	1164	200
2	296	487	191	588	101	853	265	972	119	1172	200
3	312	492	180	596	104	861	265	986	125	1201	215
4	315	494	179	597	103	862	265	984	122	1182	198
5	322	493	171	602	109	881	279	1011	130	1182	171
6	359	488	129	593	105	848	255	1008	160	1192	184
7	312	489	177	516	27	849	333	998	149	1201	203
8	352	512	160	611	99	878	267	1012	134	1198	186
9	328	508	180	603	95	879	276	1001	122	1172	171
10	311	498	187	594	96	876	182	1006	130	1176	170
TOTAL WEIGHT $\bar{X}$	**320.5**	**494.7**	**174.2**	**588.3**	**93.6**	**863.9**	**265.6**	**994.2**	**130.3**	**1184**	**189.8**

Table 02: Control Group (TC), biweekly weights

	WEIGHT CONTROL BY AGE (g)										
Animal Code	20 days (Start)	30 days	They gain weight	45 Days	They gain weight	60 days	They gain weight	75 Days	They gain weight	90 days	They gain weight
1	263	392	129	495	103	598	103	885	287	962	77
2	256	384	128	520	136	589	69	879	290	969	90
3	260	380	120	510	130	593	83	883	290	982	99
4	262	370	108	588	218	613	25	876	263	988	112
5	264	379	115	572	193	638	66	868	230	956	88
6	271	388	117	569	181	642	73	872	230	959	87
7	268	390	122	581	191	647	66	874	227	912	38
8	275	391	116	543	152	668	125	884	216	963	79
9	295	398	103	565	167	682	117	862	180	973	111

10	301	384	83	572	188	679	107	872	193	986	114
TOTAL WEIGHT $\bar{X}$	**271.5**	**385.6**	**114.1**	**551.5**	**165.9**	**634.9**	**83.4**	**875.5**	**240.6**	**965.5**	**89.5**

Table 03: Experimental group 1 (T1), biweekly weights

	WEIGHT CONTROL BY AGE (g)										
Animal Code	**20 days (Start)**	**30 days**	**They gain weight**	**45 Days**	**They gain weight**	**60 days**	**They gain weight**	**75 Days**	**They gain weight**	**90 days**	**They gain weight**
1	281	394	113	592	198	788	196	978	190	1031	53
2	278	401	123	589	188	787	198	978	191	1029	51
3	284	386	102	563	177	778	215	969	191	1108	139
4	274	396	122	527	131	806	279	942	136	1222	280
5	293	398	105	520	122	845	325	912	67	1245	333
6	298	396	98	499	103	902	403	978	76	1195	217
7	304	399	95	527	128	878	351	991	113	1206	245
8	300	402	102	512	110	865	353	932	67	1224	292
9	301	401	100	592	191	768	176	943	175	1190	247
10	302	402	100	594	192	792	198	959	167	1246	287
TOTAL WEIGHT $\bar{X}$	**291.5**	**397.5**	**106**	**551.5**	**154**	**820.9**	**269.4**	958.2	137.3	1169.6	214.4

Table 04: Experimental group 2 (T2), biweekly weights.

	WEIGHT CONTROL BY AGE (g)										
Animal Code	**20 days (Start)**	**30 days**	**They gain weight**	**45 Days**	**They gain weight**	**60 days**	**They gain weight**	**75 Days**	**They gain weight**	**90 days**	**They gain weight**
1	309	486	177	587	101	850	263	965	115	1163	198
2	296	484	188	589	105	849	260	974	125	1172	198
3	338	492	154	596	104	864	268	986	122	1179	193
4	342	492	150	594	102	866	272	982	116	1182	200
5	346	491	145	601	110	889	288	1009	120	1182	173
6	362	488	126	598	110	856	258	1004	148	1212	208
7	311	497	186	612	115	854	242	999	145	1202	203
8	348	512	164	608	96	878	270	1002	124	1198	196
9	330	506	176	606	100	879	273	1003	124	1186	183
10	296	498	202	592	94	876	284	1008	132	1178	170
TOTAL WEIGHT $\bar{X}$	**327.8**	**494.6**	**166.8**	**598.3**	**103.7**	**886.1**	**267.8**	**993.2**	**127.1**	**1185.4**	**192.2**

Table 05: Experimental group 3 (T3), biweekly weights.

CLUSTER		AVERAGE LIVE WEIGHT(g)				
		20 days (Start)	90 days (Final)	Weight gain	Increase	Total
Control	T.C.	271.5	965.5	694	694	172.4
Experi-mental	T1	291.5	1169.6	878.1	866.4	
	T2	320.5	1184.0	863.5		
	T3	327.8	1185.4	857.6		

Table 06: Final average live weight increase

CLUSTER		30 DAYS	60 DAYS	90 DAYS
CONTROL	T.C.	385.6	634.9	965.5
EXPERIMENTAL	T1	397.5	820.9	1169.6
	T2	494.7	863.9	1184.0
	T3	494.6	886.1	1185.4

Table 07: Average live weight

BY AGE (g.)					
CLUSTER		**30 DAYS**	**60 DAYS**	**90 DAYS**	**PARTIAL**
CONTROL	**T.C.**	114.1	249.3	330.1	231.2
Experimen-tal	**T1**	106.0	423.4	351.7	293.7
	T2	174.2	359.2	320.1	284.5
	T3	166.8	371.5	319.3	285.9

Table 08: Average Partial Live Weight Increase

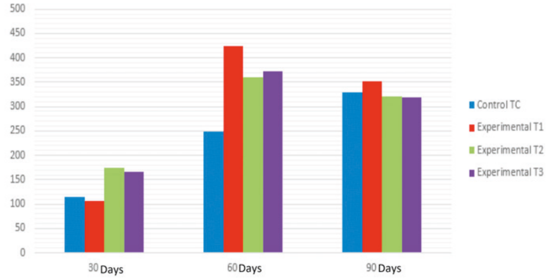

FIGURE NUMBER 01: AVERAGE MONTHLY WEIGHT INCREASE BY AGE (PER TREATMENT)

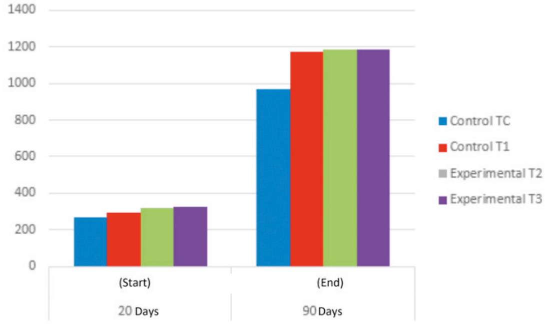

FIGURE NUMBER 02: FINAL AVERAGE LIVE WEIGHT INCREASE (PER TREATMENT)

DISCUSSION

The richness in protein – fat (9.60%), ash (27.06%) and fiber (2.84%) of the ruminal content (undigested food) of beef, which indicates Falla – Cabrera (1995), mentioned by Domínguez (2007) credits and guarantees its reuse in animal feed; This agrees with the benefits achieved in terms of improved growth, weight gain and resistance to diseases reflected in the research guinea pigs.

As seen in Table 6 of the research, the experimental treatment reached a final average live weight of 866 grams at 90 days of age, achieving a weight increase of 172.4 grams in favor of the experimental group in 60 days of experimentation compared to the control group, which achieved a final average live weight of 694 grams, a result that agrees with the research of Rodríguez and Cook (2003) who carried out a similar study. Consequently, the rumen content of beef can be used as food for guinea pigs, with the additional benefit that it does not cause them, digestive pathologies.

CONCLUSIONS

- The results show that it is feasible to use the ruminal content (undigested food) of beef in the feeding of guinea pigs, thus allowing an increase in meat production of this species.
- Resistance to gastrointestinal diseases was observed in cattle.

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