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Effect of the inclusion of banana peels *(Roatan or Tabasco bananas)* in feeding New Zealand fryers rabbits

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Abstract

This study was with the objective to assess the inclusion of banana fresh peels in the feeding of growing and finishing rabbits and its effect over weight gain and carcass performance. 27 New Zealand rabbits were used in this study, males and females rabbits were included, these with an age of 45 ± 1 days, with a live weight of 1,600 ± 300 grams. The rabbits were grouped in numbers of nine rabbits picked up at random, and were 3 groups, these were housed indibidually in three-comparments American style cages. An adjustment period of seven days feeding banana peels was allowed to the rabbits; later three trials were carried out, these with different level of inclusion of banana peels as replacement of comercial feed; trial #1 was 0%, trial #2 was 20% and trial #3 with 40% of banana peels. The study lasted four weeks, and the rabbits were weight-ed weekly to measure total weight gain, daily weight gain and carcass performance. 5 rabbits from each trial group were slaughtered to assess the performance variable in carcass. About the data, to identify possible differents about the initial weight among the trials; were used variance analysis ($p<0.05$) with the minitab 16 statistic package and with at random method as a whole (unidirectional anova). In the obtained results were not found significative differences among the analysed variables, so it can be concluded that inclusión of banana fresh peels in the feeding of rabbits is feasible and this could lower significantly the economic cost of rabbits production and, the environment impact that banana peels have as industrial and household waste.

Feed, Peels, Banana, Rabbits

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Introduction

Rabbit breeding has been widespread in recent years, excelling over other productive species by having different characteristics that distinguish such as: meat quality with high nutritional value, low cost of infrastructure that can be used in the same , demand little space, its short reproductive cycle, as well as its easy handling and high productivity. All these aspects make the production of rabbits a possibility of animal production system both family and industrial, as well as being able to take advantage of other by-products such as hair, skin and organic fertilizer (López and Montaño, 2015).

Rabbit meat is a white meat of good taste, lean, easily digestible, low in calories, with high levels in proteins and low in cholesterol, sodium and lipids, with a higher proportion of unsaturated fatty acids. It also possesses a characteristic other attractive to its consumers: it does not contain uric acid (Malavé et al., 2013). In this order of ideas, compared to other meats of other species, rabbit meat is richer in proteins, in certain vitamins, in minerals, being a white meat (Calvache, 2010, Malavé et al., 2013). López and Montaño, (2015), report the nutritional content of banana peel; including values of dietary fiber, potential fatty acids and potassium, proteins, essential amino acids, antioxidants and carotenoids among other substances.

Taking into account the consumption of meat from different species, more than 90% of the meat consumed in the world is pork, beef and poultry, of which only 0.5% corresponds to rabbit. While in Italy there is a preference and per capita consumption of 5.3 kilos per year, in Mexico it only reaches around 40 grams. Mexico occupies the fourteenth place in the world as a producer, with 4,200 tons, much lower than China (500 thousand) and Italy (225 thousand) (FAO, 2007).

However, the progress of this activity in our country has been very limited, mainly due to lack of planning and the lack of consideration of this activity in official support, lack of sanitary policies that avoid epizootics, little knowledge and interest in educational institutions and research, problems of consanguinity (and therefore absence of genetically improved animals), little diffusion of the nutritional characteristics and consumption of this meat and poor organization among producers (García et al., 1998).

However, this is not a general situation, since in some states subsidies have been channeled to promote production, organization and creation of marketing structures, which will be mitigated little by little (Olivares et al., 2009). Due to its digestive characteristics as a herbivore it gives a guideline to the possibility of feeding it with different strategies that allow that there is no competition with the human species.

On the other hand, plantain is the second most important fruit tree in Mexico, 95% goes to national consumption and the remaining 5% to export (Pérez, 2010). If we take into account that waste is one of the greatest environmental problems faced by human beings, a problem that increasingly takes on a special gravity and therefore special attention in the so-called developed world, these cumulative effects due to the intense and much the subsequent irrational exploitation of natural resources, directly impacting the contamination of soil, water and air, triggers the interest of using these by-products (Fernandez et al., 2013).

There are reports that it has been used in the form of silage for the feeding of birds and snails, as well as the use in the form of flour for the fattening of chickens (Mosquera et al, 2013). Also, for the elaboration of feed for cattle and as raw material for the elaboration of flour (Vásquez et al., 2008).

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With great possibilities of use we find the banana peel (Tabasco or Roatán), as already mentioned is a byproduct in abundance in our state and country, without use and that can therefore become waste and be part of environmental pollution since this by-product represents around 30 to 40% of the total weight of the fruit (Mosquera et al., 2013). The objective was to evaluate the effect of the inclusion of fresh peel of fresh banana in the diet of rabbits in fattening on weight gain and performance of the carcass.

Materials and methods

The research was carried out in the Academic Unit of Veterinary Medicine and Zootechnics of the Autonomous University of Nayarit, located at Compostela-Chapalilla km 3.5, in the municipality of Compostela, Nayarit, from April to May 2017. 27 rabbits of the New Zealand breed with an average life of 45 ± 1 days and weighing 1,600 ± 300 grams, they underwent a period of adaptation to the consumption of fresh banana peel for seven days in combination with pelleted food . A commercial feed was used with a guaranteed analysis of: 14% crude protein, 3.5% fat, 8% crude fiber, 8% ash, 12% humidity and 54.5% ELN.

The animals were housed in American type cages divided into three spaces each, three groups of nine rabbits were composed of five males and four females each, forming three treatments: for the three treatments, the basic food was the commercial formula, replacing the 0%, 20% and 40% of the total daily ration for banana peel for treatments 1, 2 and 3, respectively.

The rabbits were fed once a day, weighing daily the amount offered with a Tefal digital scale (model BC5113VO) with a maximum capacity of 5 kg. Five weighings of the rabbits were carried out weekly with a Tor-rey scale (model MFQ-40).

After the feeding or fattening period (28 days), five animals of each treatment were slaughtered, this was done by stripping and slaughtering, considering what the official Mexican standard NOM-033-SAG / ZOO-2014 indicates. Prior to slaughter, the animals were weighed and afterwards the channels were weighed individually (without skin, legs and guts) to measure the variables of the hot carcass weight and carcass yield..

The results obtained were analyzed by Analysis of variance ($P < 0.05$) with the Minitab Statistical Package 16, with a Completely Randomized Design (Unidirectional Anova) between the treatments with respect to the initial weight to the study and sacrifice weight to identify possible differences between these.

Results and Discussion

Table 1 shows the results obtained for variables under study. It can be observed that there were no statistical differences ($P < 0.05$) for the variables between the different treatments. It should be noted that treatment two (T2) shows slight numerical differences in their favor, but not statistics, while T1 offered the lowest values. It is important to mention that the total of the experimental animals were apparently healthy during the study time, at slaughter and post mortem. In a report by Valdivié et al., (2008) mention maximum values of inclusion of banana peel meal in the diet for rabbits in different stages from 25 to 30 percent. In another study, Palacios and Córdoba (2009) used with good results 15% of banana peel meal in broiler feed and found that this level can be used without detriment to the production characteristics.

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Table 1. Mean values and standard deviation for the variables under study.

	n	T1 = 0 %	D.E.	T2 = 20 %	D.E.	T3 = 40 %	D.E.
PI (gr)	9	1,642	110	1,702	207	1,644	103
PF (gr)	9	2,436	200	2,612	334	2,472	120
GTP (gr)	9	793 [a]	140	911 [a]	176	828 [a]	85
GDP (gr)	9	28.3 [a]	4.9	32.5 [a]	6.2	29.5 [a]	3.0
PS (gr)	5	2,387 [a]	206	2,550 [a]	342	2,450 [a]	148
PCC (gr)	5	1,333 [a]	141	1,430 [a]	236	1,375 [a]	115
RC (%)	5	55.84 [a]	1.62	56.08 [a]	6.90	56.12 [a]	2.03

[a] Equal literals between rows indicate statistical similarity (P> 0.05); D.E. = standard deviation; PI = initial weight; PF = final weight; GTP = total weight gain; GDP = daily weight gain; PS = weight at sacrifice; PCC = hot channel weight; RC = channel performance.

Conclusion

The analysis of variance did not show an effect of the main factor (treatment), not finding significant statistical difference between treatments (P> 0.05). Concluding that the use or inclusion of banana peel in the feeding of rabbits in fattening is a viable alternative for the use of an unconventional by-product, little used in animal feed, in addition to being able to considerably reduce production costs and the impact environmental.

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