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Research Article

Effect of Synthetic Bovine Breeds on Sustainable Management in the Quality of Meat for Human Consumption

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Abstract

This research work was carried out in a municipal trail (TIF) in the North of Puebla, Mexico, with the aim of physically analyzing the quality of beef. A sample of 120 male cattle, which were divided into the following groups: F1 pure Brahman (n=30), F2 Beefmaster (n=30), F3 Brangus (n=30), F4 Charbray (n=30), F5 Bradford (n=30), male cattle was used at 24 months of age. They received the same management and a food ration based on harinolone, soybean paste, grain corn, grain sage and a mixture of vitamins-minerals, which was offered to 3.5.0% (NRC, 2000) fresh water and forage to free access, averaging the 350 kg completed in intensive corral for slaughter during the 60 days of the experiment. The variables analyzed were: flesh color, fat color, marbling and texture. The results were evaluated through the STADISTIC programme, showing generally that cuts of meat from young uncastrated males with two years of age presented category A, characterized by white fat, with a deep red color, soft texture and abundant marbling in a rating of 11 and 12. Noting that young animals showed the best physical qualities in beef.

Introduction

It is important to point out that the sustainable practice together with cattle ranching are issues that they are usually not directly related. The reality is that they are intertwined with each other. To gauge their close relationship, which is regularly due to various factors that must undertake actions and programs to ensure that livestock permeates towards Sustainable Development [1]. Livestock is denominated as the economic activity that consists of raising domestic animals for human consumption and obtaining their inputs as meat, milk, wool, skins. It is considered a very old activity that allowed the passage of hunting, fishing and harvesting, the production of food and clothing of individuals. As well it is customary to associate it with agriculture, which provides vegetables, plants and food for animals. Livestock is part of the economic activity of the primary sector that develops the breeding, treatment and reproduction of domestic animals, to obtain important products for the food and clothing and footwear industry [2]. Currently the world panorama of environmental deterioration, outlined as the ecological footprint, where the demographic explosion depresses sustainability, through the depletion of resources, requires setting new parameters and therefore new weights. One of the first actions globally to take letters in the matter was to change the context that was had on the development this before the environmental demands which have been manifested through the climate change. For this reason, it has become necessary to reconsider the aspects aimed at development, now the weights are different, not everything should already be expressed in financial capital: now the expressions must be broader, capital financial, people, environment, equity and sustainabil [3].

The livestock sector annually consumes 6,000 million tons of food between fodder, grains, animal feed and other materials, including a third of the world cereal production. 86 percent of animal intake is made up of materials that are not for human consumption. On the other hand, derivatives of soybean, whose production is sometimes a key factor in the change of uses of soils, represents 4 percent of animal intake on a global scale. The species Monogastrics account for 72 percent of the world's cereal consumption. livestock sector, while fodder and vegetation make up more than 57 percent of total intake of ruminant species [4]. Cull animals have unfavorable characteristics in terms of the quality of meat that can be obtained from their carcasses [5]. One of them is the age of these bovines, since they are discarded when they are very old, and their meat has a darker color, is tougher and not very juicy, compared to meat from a young animal of two or three year old. Ignorance of the characteristics of the carcasses and the lack of a classification system directly affect the consumer, who does not have information regarding the quality and price of the meat he consumes [6]. The lack of an adequate culture in the selection of meat means that the demand is limited compared to the wide variety of quality grades and cuts that may exist in the market [7]. This also affects the processor and, of course, the producer, who is unaware of consumer preferences and the economic possibilities of the market. The problem is aggravated by the existing marketing system, the rancher economy [8].

Bartel [7] highlights that it is important that despite the existence of divergence in terms of perspectives, three types of qualities are identified in beef: hygienic-sanitary, nutritional and organoleptic (sensory); the first ensures that the meat to be consumed does not present a risk to human health; that is, absence of contaminants; the second; refers to the content and nutritional value of meat such as proteins, vitamins, minerals, carbohydrates, among others. In addition to the chemical and physical constants that it presents as pH, water retention capacity, fat content, thermal conductivity and consistency, among others Realini et al. [9]. The third corresponds to the characteristics that are perceived through the senses at the time of purchase or consumption such as color, smell, tenderness, juiciness, flavor and aroma McKenna et al. [10]. The conjunction of these three aptitudes determines the quality of the meat; that is to say, the quality (live bovine, its carcass and meat) obeys the degree in which they present certain attributes or characteristics that make them adequate to satisfy certain needs of use. Therefore, meat quality can be defined as the set of qualities appreciated and demanded by consumers when buying the product, it is the set of characteristics whose inherent class gives the product a higher degree of acceptance and price compared to consumers. Aspect that represents competitive advantages in the market. Therefore, this research work aims to evaluate the effect of quality in beef based on the age of the slaughtered bovines López et al. [11].

Materials and Methods

This research work was carried out in a Federal Inspection Type slaughterhouse (TIF) in the North of Puebla, Mexico, with the objective of analyzing the quality of beef through an organoleptic study. A sample of 120 male bovines was used, which were divided into the following crosses, F1 pure Brahman (n=30), F2 Beefmaster (n=30), F3 Brangus (n=30), F4 Charbray (n=30), F5 Bradford (n=30) with 24 months of age. They received the same management and a feed ration with 18% crude protein, based on flour, soybean paste, grain corn, grain sorghum and a vitamin-mineral mixture. The one that was offered at 3.5.0% (NRC, 2000) water and fresh forage with free access, until reaching a weight of 350 kg finished in an intensive corral for slaughter. The variables analyzed were: category, meat color, fat color, marbling and texture. The animals were transported from the place of fattening to the TIF slaughterhouse, 24 hours before their sacrifice, in accordance with the NOM-051-ZOO-1995 standard for humane treatment in the movement of animals. The animals were sacrificed by stunning with a captive bolt gun and electrical stimulation. After the slaughter process, the carcasses were stored for 48 hours in the cold rooms of the slaughterhouse (1 ± 1°C); We proceeded to take samples of "loin" (longissimus dorsi) bagged in high vacuum, which were then visually analyzed.

Results and Discussion

Table 1 refers to meat color including only colors associated with changes in maturity Bosselmann et al. [12]. For the evaluation of a carcass, it is closely related to other factors such as the stress produced by the inadequate handling of the cattle before slaughter or the type of supplements and vitamins that they ingested Beef, [13]. Meat and fat color are also used as indirect estimators of muscle and fat maturity, respectively Realine et al. [9]. Regarding the desirable attributes or characteristics for human consumption, and whose relationship gives rise to the different degrees of classification, those that are subject to the NMX-FF-078-SCFI-2002 standard, in which it is detailed that carcasses of bovine cattle will be classified according to the following basic grades of quality: supreme, select, standard, commercial and unclassified Montgomery et al. [14]. The grade out of classification is applied when the maturity identified in the carcass places it at a level of total ossification [15]. With respect to the differences analyzed between the type of animal, these were the expected ones, observing that muscularity was a relevant characteristic in the purebred bulls of the Brahman F1 breed in this study, being beneficial both for carcass yield and for meat production. greater adiposity (amount of body fat) presented. The trade-off of fat for muscle between the racial purity of the Brahman and its racial crosses could partially and biologically explain the statistical insignificance of the differences observed for the study groups in terms of performance McKenna et al. [10].

Table 1: Relationship of the category based on the color of fat and meat.

Concept	Supreme	Select	Estándar	Commercial
Subcutaneous fat distribution	Uniform layer on loin leg and ribs	Uniform layer on loin leg and ribs	No uniform layer	No minimum requirement
Perirenal fat	50% Coverage onwards	25% Coverage onwards	25% Coverage onwards	No minimum requirement
Fat color	White	White to creamy	Creamy slightly yellow	Yellow
Meat color	Cherry red beef	Cherry red beef deep red	Intense red beef dark red	Dark red beef

The classification characteristics of the postmortem carcasses were very noticeable in the Brahman F1 cattle, observing that the color of the meat is one of the most important criteria considered by the consumer at the time of purchase. This will depend on various factors such as the concentration and chemical state of myoglobin (muscle pigment), the amount of fat infiltrated (marbling) and the structure of the muscle, the latter being closely linked to the pH (fat Boleman et al. [16] In relation to color, the Brahman bulls of 24 months presented a cherry red coloration, having the best quality, Sañudo (1991) also indicated that in general the differences between racial crosses are not important although it can be said that Brahman/Holstein crosses have darker meat as a result of their higher content of heme pigments, due to their higher milk production Vaca and Carreón [17]. Regarding the effect of breed on carcass yield,

it is possible that a non-significant but noticeable advantage, such as the one detected (almost 10%) in yield of Brahman cattle, is due to the higher fat content in the carcass channel, as reported by Huerta and Ríos [18]. In another study of the characteristics of the meat, using dual-purpose types of known genetic composition Rodríguez et al., [19], they observed that the carcasses of pure F1 Brahman steers had a superior conformation to the F2 Beefmaster crosses and F3 Brangus (n=30). In addition, the F1 ½ Brahman steers had a greater coloration in both meat and fat (51.0±0.7%), significantly outperforming the F1 Charbray, F1 Bradford, F1 Beefmaster, 3, 4.4%, 3.1%, and 4.1%. F1 Brahman and pure Brahman respectively.

The yield advantages observed for cross-type cattle (Brahman/Brown Swiss) support the preference of cattle wholesalers for predominantly Zebu cattle, and their willingness to pay more for them Whipple et al., [20]. The assertion of Huerta and Ríos [18] that "the lack of information and the existence of a series of beliefs (wholesalers and slaughterhouses), some unfounded, contribute to disqualifying the suitability of dual-purpose cattle as meat producers, should be understood only in the context of comparing its performance in cuts, and not in carcass, according to the unfavorable results presented here for the Dairy type, typical of dual-purpose cattle.

However, it is important to bear in mind that meat yields are gaining greater commercial importance today due to their object. Expressing livestock production based on protein production, one can compare different products from different species. East and Southeast Asia Asian, with a generation of 19 million tons of protein, are the regions with the highest production, mainly driven by species monogastric. Western Europe, North America, and Latin America and the Caribbean have levels of similar production, between 12 and 10 million tons of protein. No However, the profiles are different: while meat and milk from beef and chicken are key in Latin America and North America, Western Europe owes its production mainly to bovine milk. The production of meat and milk of buffaloes plays a prominent role in South Asia. Middle East and Africa from North. Sub-Saharan Africa, Eastern Europe, Oceania, and the Russian Federation they have smaller productions, between 4 and 1.6 million tons of protein (FAO, 2013). It is estimated that the model of Sustainable Livestock, allows to initiate a diagnosis of the elements basics of the company (soil, pasture, ruminant, labor, climate and administration), to subsequently prepare a multi-year work program, focused on reinforcing the most inefficient points of the productive unit, allowing In addition, the gradual capitalization of the producer and the obtaining of profits important, with the support of the development catalyst that is financing [21].

Conclusion

Due to the fact that Mexico lacks planning and integration in all the processes related to the meat industry supported by the existing regulations, for this reason, SENACICA formed the System of Individual Identification of Cattle (SINIIGA), delegating its operation to the National Livestock Confederation (CNOG), which brings together the country's livestock organizations [22-24]. The objectives of this system are to improve health programs, have control in the movement of cattle, technical support in herd management, genetic improvement and optimization of business processes so that the consumer has sufficient information regarding the product that is acquiring. Once production has been planned, integrated and homogenized, another important issue could be addressed, traceability, which would allow having product information from the production unit to the final consumer; this being the synthesis of the concept of quality.

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