Determination of Muscularity and Correlation with Body Weight in Buffalo in the Northeast of Argentina

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ABSTRACT
Muscularity index corresponds to an equation used to determine in living animal and instantaneous real increased musculature and therefore higher yield performance, comparing the ribeye area by live weight of the animal. This is a very important tool to evaluate carcass characteristics necessary to identify the animal extensively raised for slaughter and at the age in which meat tenderness have conditions demanded by consumers. In the last years the number of buffalos in the northeast region of Argentina has been increased, especially in Corrientes province. The aim of this study was to perform the calculation of the index of muscularity and determine its relationship with the body weight. We worked with buffaloes of 250-710 kg in farms in the provinces of Corrientes and Formosa, identifying them individually recording each animal, plus: live weight, approximate age by teeth, high to the scapula, high at the rump, chest circumference and long body, then proceeded to collect information by ultrasound ribeye area (REA), rib eye thickness (AL), backfat thickness (EGD) and rump fat thickness (EGC or GC). Collected data was performed to calculate the index of muscularity dividing the ribeye area per body weight of each individual to give an index average of 0.11, then, use statistical software to perform a calculation InfoStat correlation between this index and the weight of individuals determined that there is a negative correlation between them. Rate of muscularity in buffalos (0.11) is lower than in cattle (0.15) and that it varies with the weight of animals.

Keywords: Muscularity, Index, Buffalo, Carcass, Meat, Quality

INTRODUCTION
In the Argentina Republic beef cattle have been the traditional source of red meat (Irurueta et. al 2008). National trade in meat systems are made: pay per kilogram of live animals, pay for performance or yield (kilogram of meat and bone obtained after the slaughter). A current concept is the industrial performance pay, is per kilogram of cuttings obtained from the slaughtering to be boned carcasses, making the commercial cuts (retail cuts). In the trial of live animals is not always possible to predict the performance of the covers will sacrifice no performance or industrial (commercial cuts). For that industry is looking up animals with better conformation (muscle building) and finishing (degree of fatness), the industry does not always get the best yields of sacrifice and boned. The sale of buffalo meat is currently side-lined by differentiated be sold as beef, the industry paid a lower price than beef steer for the misconception of the lower yield in slaughterhouse (caused by the high weight of leather, head, feet and gastrointestinal tract) (Rebak et al. 2004).

Regardless of the species, breed and sex, it should be noted that the composition of the muscles vary with advancing age of the animal, there being a general raising of most parameters, other than water, although the increase in speed so some are identical in all muscles. Even adults components reach values at different times (Lawrie, 1998).
Ultrasound has been used to calculate the measurements of fat and muscle in cattle for more than 30 years. However, the great advances in terms of portability and image resolution of the new generation of ultrasound, in addition to the use of computerized image analysis finally made possible the practical application of ultrasound. The study of the composition and quality in animal production is one of the trends that is used as a tool in marketing systems with high added value, and consists in measuring the ultrasound or ultrasound fat thickness or subcutaneous loin, loin eye area or steak (REA), rump fat or P8 Australian and intramuscular fat or "marbling". In selecting programs bulls and their progeny, evaluated a number of production parameters (conformation, fertility, maternal ability, gain kg/d, etc.), but are capital importance, those other parameters that are directly related to meat production, fattening and quality of carcasses and their products (Wilson, 1992).

Good correlations were observed between the ultrasound measurements of loin eye area of fat cover, with actual measurements post-mortem. Muscularity index corresponding to an equation used to determine in live animal instantly which has the largest muscles and therefore greater performance postmortem. The result is obtained after dividing the ribeye area by the weight of the animal. The index of muscularity is an important tool of choice to evaluate carcass characteristics. Usually in cattle with ribeye areas of 6.87 cm² achieve a live weight of approximately 45.3 kg. In animals heavier than 453 kg, index of muscularity is less. The ribeye area is the measure of eye muscle area (Longuisimus dorsi) in cm. It is a true indicator of the quality of the beef and carcass and has negative correlation with fatness: with increasing muscle decreases fatness and vice versa, which requires a good balance. At the same time, the greater muscular development increased yield. The rib eye area is a measure of heritability half and has a high positive correlation with the genetic percentage of retail (Ferrario and Fernandez, 2007).

The aim of this study was to perform the calculation of the index of muscularity in buffaloes from the northeast of Argentina and determine its relationship with the body weight of the animals.

MATERIALS AND METHODS
The work was conducted in the provinces of Formosa and Corrientes, Argentina, located between parallels 22 and 30 degrees south latitude in the subtropical region. For the study analyzed 30 buffaloes from each provinces with 250-710 kg live weight, identifying them individually recording each animal, plus: live weight with electronic scale, approximate age by teeth, high to the scapula, high at the rump, chest circumference and long body with extensible tape measure, then proceeded to collect information by ultrasound using Aquila Vet AS equipment sound THE 3.5-MHz 30C 180 mm coupled with stand-off guide of ribeye area (REA) taken between the 12th and 13th rib, with the placement of the transducer perpendicular to the animal's position. In the laboratory of Food Technology, Faculty of Veterinary Science, National University of the Northeast collected data was performed to calculate the index of muscularity dividing the ribeye area per body weight of each animal. Then we use InfoStat program for proceeded to perform the calculation of correlation between this index and the live weight of animals.

RESULTS AND DISCUSSION
The results obtained by relating parameters ribeye area and weight of buffaloes studied determined that the rate of average muscularity of buffaloes tested is 0.11 and has a negative correlation with the weight of 0.35. Figure I show the dispersion achieved by relating index of muscularity and body weight. This negative correlation is because as increase the weight of the animals increases the percentage of skin, bones and viscera in turn decreasing the muscle mass in relation to the total weight.

Rate of muscularity in buffalos is lower than in cattle (0.15) and that it varies with the weight of animals (Ferrario and Fernandez, 2007). Garriz and Vranic (2008) found muscularity index (0.18 ±0.01) in crossbreeding carcasses from Hereford, Shorthorn and Aberdeen Angus x Criollo Argentino cattle.
This information is remarkable, knowing conformation traits have low to media heritability values (Tonhati et al. 2008).

The routine use of this technology, which we call business, specifically applied to the determination of the degree of fatness of animals for slaughter. This is to optimize feed resources so as not to feed more animals that already have the degree of completion just for marketing.

REFERENCES


**Figure 1.** Shows dispersion of the index of muscularity and body weight of the buffaloes tested.