



UNIVERSIDAD JUÁREZ  
AUTÓNOMA DE TABASCO

“ESTUDIO EN LA DUDA. ACCIÓN EN LA FE”

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# Artículos Científicos

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**División Académica de Ciencias  
Agropecuarias**



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**Kinetic Parameters of Changes in Sensory Characteristics of Minimally Processed Rambutan**

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**ABSTRACT**

The aim of this work was to develop kinetic models to describe the sensory changes of minimally processed rambutan. Quality was assessed by a trained panel. The attributes that most decreased were freshness, aroma, and appearance (17–38%), and the defects that were more increased were off-odors and off-flavors (28–67%). Although whole fruit is sensitive to chilling injury, minimally processed rambutan is preserved better at 4.6 °C. Color, sweetness, and off-odor changes were adjusted to first-order kinetic and the other characteristics to zero order. Sourness, aroma, and color have higher activation energies (235–297.4 KJ mol<sup>-1</sup>), and these characteristics would change faster if failure in the cold chain occurs.

Keywords: kinetics; Minimal processing; sensory changes; tropical fruits



Small Ruminant Research

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**Relationship between body fat depots and body mass index in Pelibuey ewes**

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**ABSTRACT**

The aim of this study was to evaluate the relationship between body mass index (BMI), body condition score (BCS), and body energy reserves in Pelibuey ewes. Twenty-four hours before slaughter, withers height (WH) and body length (BL) were measured on 28 ewes. Their BMIs were calculated as follows:  $BMI = (\text{body weight (kg)} / \text{withers height (m)} / \text{body length (m)}) / 10$ . The BMI and BCS showed a correlation coefficient of 0.80 ( $P < 0.05$ ). The regression equation for BMI and BCS had a determination coefficient of 0.64 (RSD: 0.75). The correlation between BMI and the muscle (MUS), internal fat (IF), carcass fat and total body fat (TBF) weights ranged from 0.73 to 0.81 ( $P < 0.05$ ), while the regression equations had an R<sup>2</sup> that ranged from 0.54 for IF (RSD: 1.98 kg) to 0.60 for carcass fat (CF, RSD: 1.81 kg). BMI and body energy reserves showed a positive relationship with each other; therefore, BMI could be used as a predictor of body energy reserves in non-pregnant and non-lactating Pelibuey ewes.

**Keywords:** Body energy status; Body measurements; Body fat; Body condition



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**Species of Stalk Borers (*Lepidoptera: Crambidae*)  
and Damage to Maize in Southeastern Mexico**

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**ABSTRACT**

Stalk borers (*Diatraea* spp.) are important pests of maize, *Zea mays* L., in the Neotropical region. The objective of this research was to identify the *Diatraea* species and assess the injury they cause and their effect on yield of maize at Tabasco, Mexico. In total, 199 larvae and 54 pupae were found infesting 319 (62.4%) of 511 plants sampled. Species analyses showed 97.6% were *Diatraea lineolata* (Dyar) and 2.4% *D. saccharalis* (F). Despite the great amount of injury, no significant difference between yield and the number of nodes injured per plant was observed ( $R^2 = 0.014$ ,  $P > 0.05$ ). This is the first report of corn borers injuring maize in this area, and the findings suggest economic damage does not occur when stalk injury is <63% and maize matures before the borers complete development.



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**Energy requirements of hair sheep in the tropical regions of Latin America. Reviewg**

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**ABSTRACT**

Breeds of hair sheep play an important role in animal production in tropical regions; however, their nutrient requirements have not been determined to the same extent as those of wool breeds. Due to the environmental conditions of the tropical regions (climate, quality and availability of feedstuffs), it is reasonable to hypothesize that energy requirements and efficiency of utilization of metabolizable energy (ME) may be different between hair and wool breeds of sheep. Information available on hair sheep shows a large discrepancy regarding energy requirements. Based on available literature data for female sheep, ME requirement for maintenance (ME<sub>m</sub>) was 419±129 kJ/kgBW<sup>0.75</sup> (mean ± standard deviation) and for the male 388±123 kJ/kg BW<sup>0.75</sup>. The requirement of net energy for gain (NE<sub>g</sub>) ranged from 8.75 to 14.06 kJ/g (11.63±1.86 kJ/g). The efficiency of ME utilization for maintenance (k<sub>m</sub>) and gain (k<sub>g</sub>) were 0.66±0.02 and 0.42±0.04, respectively. This review indicated also that information is scarce for adult ewes at different physiological stages (maintenance, lactation, or pregnancy). More work is required regarding estimates of nutrient requirements of hair sheep in order to develop adjustments to existing nutrition models to predict animal's response under the conditions prevailing in the tropics (animal type, environment and feedstuffs available)

**Keywords:** Hair sheep, Energy requirements, Tropics, Maintenance, Gain, Efficiency



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**Preparation and characterization of curcumin nanoemulsions obtained by thin-film hydration emulsification and ultrasonication methods.**

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**ABSTRACT**

Curcumin is a natural, oil-soluble polyphenolic compound with potent anticancer, antiinflammatory, and antioxidant activities. However, its bioavailability is low as it is poorly absorbed in the gastrointestinal tract. Nanoemulsions offer the potential to improve the solubility and bioavailability of bioactive compounds; and compared with the traditional mechanical methods, ultrasound is a superior tool to obtain nanoemulsions with smaller and homogeneous globule size and physical stability. The goal of this study was to develop a curcumin nanoemulsion by ultrasonication, containing a high curcumin load, small droplet size and good physical stability. The composition and preparation method effects on entrapment efficiency, droplet size, polydispersity index, and zeta potential of the nanoemulsions were evaluated. Curcumin nanoemulsions were successfully prepared by combined thin-film hydration emulsification and ultrasonication methods, employing 50 % of glycerol in the aqueous phase, and 10 % of soybean lecithin as emulsifier; at 20 % amplitude for 12 min in the sonicator. Nanoemulsions with 2.5 mg curcumin per g, 100 % entrapment efficiency, mean droplet size of 108 nm, stables for 120 days at 4°C were obtained.

**Keywords:** Curcumin, Nanoemulsions, Lecithin



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**Biofortification of cowpea beans with iron: iron's influence on mineral content and yield.**

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**ABSTRACT**

Iron (Fe) deficiency is the most prevalent nutrient deficiency worldwide. Agronomic biofortification is an agricultural strategy for improving the micronutrient concentrations in staple food plants. At present, fertilization is a major vehicle for changing plant mineral contents and food quality. A greenhouse study was conducted to assess the effects of iron chelate and ferrous sulfate applications on the biofortification of Fe and its impacts on the mineral content and yield of cowpea beans. Four application rates of both forms were tested (0, 25, 50, and 100  $\mu\text{M L}^{-1}$ ) for 40 d. The amount and type of Fe application affected the mineral seed content, yield and yield components. Applying of Fe in the form of ferrous sulfate at 25  $\mu\text{M L}^{-1}$  was found to be the optimal rate for biofortifying the cowpea bean plant, because it favored the seed yield and increased the bioavailable Fe content in the seeds over that of the control. The best iron chelate rate was 100  $\mu\text{M}\cdot\text{L}^{-1}$ . Thus, it was considered feasible to implement an Fe fertilization program to improve the nutritional quality of cowpea bean crops by increasing the Fe concentrates in the seeds.

Keywords: *Vigna unguiculata*, iron chelate, minerals, ferrous sulfate



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**Energy utilization, nitrogen balance and microbial protein supply in cattle fed *Pennisetum purpureum* and condensed tannins.**

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**ABSTRACT**

The aim of the experiment was to assess the effect of condensed tannins (CT) on feed intake, dry matter digestibility, nitrogen balance, supply of microbial protein to the small intestine and energy utilization in cattle fed a basal ration of *Pennisetum purpureum* grass. Five heifers (*Bos taurus* x *Bos indicus*) with an average live weight of 295 ± 19 kg were allotted to five treatments consisting of increasing levels of CT (0, 1, 2, 3 and 4% CT/kg DM) in a 5 × 5 Latin square design. Dry matter intake (DMI) was similar ( $p > 0.05$ ) between treatments containing 0, 1, 2 and 3% of CT/kg DM and it was reduced ( $p < 0.05$ ) to 4% CT (5.71 kg DM/day) with respect to that observed with 0% CT (6.65 kg DM/day). Nitrogen balance, purine derivatives excretion in urine, microbial protein synthesis and efficiency of synthesis of microbial nitrogen in the rumen were not affected ( $p \geq 0.05$ ) by the increase in the levels of condensed tannins in the ration. Energy loss as CH<sub>4</sub> was on average 2.7% of the gross energy consumed daily. Metabolizable energy intake was 49.06 MJ/day in cattle fed low-quality tropical grass with a DMI of 6.27 kg/day. It is concluded that concentrations of CT between 2 and 3% of DM of ration reduced energy loss as CH<sub>4</sub> by 31.3% and 47.6%, respectively, without affecting intakes of dry and organic matter; however, digestibilities of dry and organic matter are negatively affected.

Keywords: feed intake, methane, condensed tannins





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**Requerimientos energéticos de ovinos de pelo en las regiones tropicales de Latinoamérica. Revisión**

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**ABSTRACT**

Los ovinos de pelo juegan un papel importante en la producción animal en las regiones tropicales; sin embargo, sus requerimientos nutricionales no se han determinado en la misma medida que los de las razas de lana. Debido a las condiciones ambientales de las regiones tropicales (clima, calidad y disponibilidad de alimentos), es razonable la hipótesis de que los requerimientos de energía metabolizable (EM) y la eficiencia de utilización de la EM pueden ser diferentes entre los ovinos de razas de pelo y de lana. La información disponible en ovinos de pelo muestra una gran discrepancia en cuanto a las necesidades de energía. Con base en datos de la literatura disponible para hembras ovinas, el requerimiento de EM para mantenimiento (EMm) fue de  $419 \pm 129$  kJ/kg PC<sup>0.75</sup> (media  $\pm$  desviación estándar) y para machos fue  $388 \pm 123$  kJ/kg BW<sup>0.75</sup>. El requerimiento de energía neta para la ganancia de peso (ENg) varió de 8.75 a 14.06 kJ/g ( $11.63 \pm 1.86$  kJ/g). Las eficiencias de utilización de la EM para el mantenimiento (km) y la ganancia de peso (kg) fueron de  $0.66 \pm 0.023$  y  $0.42 \pm 0.044$ , respectivamente. Esta revisión también indicó que la información es escasa para ovejas adultas en diferentes etapas fisiológicas (mantenimiento, lactancia y gestación). Se requiere más trabajo de investigación con relación a la estimación de las necesidades de energía de los ovinos de pelo, con el fin de hacer ajustes a los modelos existentes de alimentación, con el objetivo de predecir la respuesta de los animales con la condición que prevalece en los trópicos (tipo de animal, medio ambiente y alimentos disponibles).

Keywords: Ovinos de pelo, Requerimientos de energía, Trópicos



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**Relationship of ultrasound measurements and carcass traits in pelibuey ewes**

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**ABSTRACT**

Twenty Pelibuey ewes were used to assess the relationship between ultrasound measurements (USM) and carcass traits. Animals were slaughtered, and the left half of each carcass was divided into five cuts, and then each cut was dissected into muscle, fat and bone. The subcutaneous fat thickness and the *Longissimus dorsi* muscle area were determined 24 h *pre-mortem* using a ultrasound equipment, the USM were taken between the 12<sup>a</sup> and 13<sup>a</sup> thoracic vertebra (TF and TLD) and between 3<sup>a</sup> and 4<sup>a</sup> lumbar vertebra (LF and LLD). The relationships among USM and carcass traits were estimated by regression. The regression equations using only the USM have a R<sup>2</sup> that ranged from 0.22 to 0.45. When including the BW in the equations, the R<sup>2</sup> was from 0.52 to 0.55 for muscle, 0.51 to 0.53 for fat and 0.47 for bone. The best equations were: CM (kg) = 0.18(±0.03)×BW +0.38(±0.17)×TLDA; CF (kg)= -1.66(±0.79\*)+ 0.09(±0.03\*\*)×BW +0.38(±0.19\*)×TFT - 0.11(±0.09ns)×TLDA and CB (kg)= 2.44(±0.49)\*\*\*+ 0.06(±0.01\*\*\*)×BW+ -0.23(±0.11\*)×TFT. In conclusion, it is possible to predict the amount of muscle, fat and bone in the carcasses of adult Pelibuey ewes using USM and BW, nonetheless, other alternatives, should be considered to improve the accuracy of predictions.

Keywords: Pelibuey ewes, carcass composition; ultrasound measurements



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