Amyloidosis associated with feline leukemia virus in a white bengal tiger (Panthera tigris tigris)

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Abstract

Feline leukemia virus (FeLV) is the cause of neoplastic and degenerative disorders and immunosuppression in domestic cats. FeLV has never been reported in Bengal tiger (Panthera tigris tigris). Necropsy findings of a white Bengal tigress were a subcutaneous mass of 10 cm in diameter in the right rear limb which was classified as fibrosarcoma. In agreement with macroscopic and microscopic lesions, the morphologic diagnosis was consistent with a multisystemic disease characterized by fibrinonecrotic and suppurative broncopneumonia with multifocal severe bronchiectasis, severe icteric hepatomegaly and renal amyloidosis with membranoproliferative glomerulonephritis. Furthermore, a serum sample was positive to FeLV when diagnosed by ELISA. This report concluded that FeLV was associated with the pathological findings and death of the tigress.

Keywords: feline leukemia virus, amyloidosis, glomerulonephritis, Bengal tiger (Panthera tigris tigris)

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Prevalence of Cryptosporidium in small ruminants from Veracruz, Mexico

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Abstract

Background: Cryptosporidiosis is a zoonotic disease caused by the protozoan parasite Cryptosporidium spp. that can affect domestic animal and human populations. In newborn ruminants, cryptosporidiosis is characterized by outbreaks of diarrhea, which can result in high morbidity and economic impact. The aim of the present study was to determine the prevalence of Cryptosporidium spp. in small ruminants from the Perote municipality in Veracruz State, Mexico. One hundred and sixty small ruminants (80 sheep and 80 goats) from eight farms located in four towns of the Perote municipality were examined following a cross-sectional study design. Stool samples were analyzed by a modification of the Faust centrifugation method, and the presence of Cryptosporidium spp. oocysts was examined using a modification of the Ziehl-Neelsen staining procedure. Bivariate and multivariate analyses were used to assess the association of Cryptosporidium infection and the general characteristics of the animals studied.

Results: Overall, 112 (70 %, 95 % CI: 62.3–76.9) of the 160 small ruminants sampled were infected with Cryptosporidium spp. The prevalence of Cryptosporidium spp. infection in goats was 72.5 % (95 % CI: 61.4–81.9) and in sheep 67.5 % (95 % CI: 56.1–77.6). Small ruminants aged 1 month old had the highest (88.2 %; 95 % CI: 63.6–98.5) prevalence of infection. Prevalence varied from 60 % to 85 % among herds. Animal species, age, sex, breed, farm, town or cohabitation with cattle did not influence the prevalence of Cryptosporidium infection.

Conclusions: A high prevalence of infection with Cryptosporidium spp. was observed in small ruminants from the Perote municipality in Veracruz, Mexico. Infection was widely distributed among sheep and goats regardless of their age, breed or farm location. Further research is required to identify risk factors for, and to assess the veterinary public health significance of Cryptosporidium infection among sheep and goats in the Mexican state of Veracruz.

Keywords: Cryptosporidium, Infection, Zoonosis, Prevalence, Small ruminants, Sheep, Goats, Veracruz State, Mexico

Background

Cryptosporidium is a zoonotic protozoan parasite of the Apicomplexa phylum and the Cryptosporidiidae family [1]. Cryptosporidium is an important pathogen in cattle and humans [2], and infection with this parasite in cattle may lead to economic losses due to morbidity and mortality [3, 4]. Cryptosporidium spp. infecting sheep and goats have been found to be of public health significance [5, 6].

Cryptosporidiosis, the disease caused by Cryptosporidium, is characterized by diarrhea, dehydration, and weight loss [7–9]. Cryptosporidium affects epithelial cells of the small intestine and occasionally stomach, gall bladder, liver, trachea, and lungs in a number of mammals including humans [10, 11]. Cryptosporidium is a widely distributed parasite and can infect more than 170 species of vertebrates [1]. Transmission of Cryptosporidium occurs mainly by the fecal-oral route [7]. In sheep and goats, cryptosporidiosis is an important enteric disease resulting in diarrhea and inefficient weight gains [12], and is more severe in young than in adult animals [13, 14]. Animals infected with Cryptosporidium shed a large (108–109 /g) number of oocysts [15]. These oocysts are source of infection for animals and humans [16]. In humans, infection with Cryptosporidium causes diarrheal disease [17], and chronic and fatal disease in immunocompromised individuals [18].
Seroprevalence and risk factors associated with bovine herpesvirus 1 and bovine viral diarrhea virus in North-Eastern Mexico

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Abstract
Bovine herpesvirus 1 (BoHV-1) and bovine viral diarrhea virus (BVDV) are well known etiological agents of cattle that produce important economic losses due to reproductive failures and calf mortality, as well as enteric and respiratory disease. Tamaulipas is located northeast of Mexico, an important cattle production and the principal exporter of calf and heifer to the United States. The objectives of this study were to estimate the seroprevalence of BoHV-1 and of BVDV, and to determine the effects of risk factors on these infections. Blood samples of cattle from 57 farms from rural districts of Tamaulipas were collected. The samples were tested for antibodies against BoHV-1 and BVDV using commercial ELISA kits. Data on potential risk factors were obtained using a questionnaire administered to the farmer at the time the blood samples were taken. The seroprevalences for BoHV-1 and BVDV were 64.4% and 47.8%, respectively. In the logistic regression analysis, the significant risk factors were rural district, herd size and cattle introduced to the farm. This study confirms the high seroprevalence of BoHV-1 and BVDV in unvaccinated cattle in Tamaulipas, Mexico. The results of this study could be used for the development of BoHV-1 and BVDV prevention and control program in North-Eastern, Mexico.

Keywords: Bovine, Bovine herpesvirus 1, Bovine viral diarrhea virus, Risk factor, Seroprevalence.

Introduction
Bovine herpesvirus 1 (BoHV-1) and bovine viral diarrhea virus (BVDV) are viruses of cattle that can result in economic losses due to reproductive failures, calf mortality, enteric and respiratory disease. BoHV-1 is a virus of the family Herpesviridae, subfamily Alphaherpesvirinae, the causative agent of infectious bovine rhinotracheitis, a highly contagious, infectious disease (King et al., 2012; Newcomer and Givens, 2016). Typical clinical signs associated with BoHV-1 infection include respiratory disease, but the virus can also be associated with conjunctivitis, vulvovaginitis, abortions, encephalitis and balanoposthitis. The transition from primary manifestations of infection to a latent stage of persistency is often the source of spread after virus reactivation (Viu et al., 2014). BVDV is a Pestivirus from the family Flaviviridae, etiological agent of bovine viral diarrhea/mucosal disease (King et al., 2012). Clinical signs include pyrexia, diarrhea and reduced production; it is a highly morbid disease but cause low mortality of infected animals (Grooms, 2004; Nardelli et al., 2008). Both BVDV type 1 and 2 are present in Mexico. Infection of pregnant cows can result in transplacental fetal infection. Fetuses may be aborted, mummified, stillborn or born with severe anomalies. In many cases, immunotolerant (persistently infected) calves are born (Van Oirschot et al., 1999). Also, BVDV can have immunosuppressive effects, which predispose animals to infection by other microorganisms (Reggiardo and Kaeberle, 1981). The use of vaccines may reduce the economic losses caused by clinical disease, but does not seems to reduce the prevalence of either BVDV or BoHV-1 infections (Xue et al., 2011). It is difficult to accurately estimate the real economic impact due to infected animals that often have no clinical signs of these infections. BoHV-1 and BVDV are widespread in Mexico as indicated by previous studies (Solis-Calderon et al., 2003, 2005; Magaña-Urbina et al., 2005; Segura-Correa et al., 2010). However, state differences may exist within a country and between regions. Risk factors effects may also varied from region or farm to farm because microclimatic changes, management differences, stock densities, along with other factors (Almeida et al., 2013). BVDV is spread between herds mainly by cattle movement, live vaccines use, semen and embryos, visitors, including veterinaries and artificial insemination technicians (Lindberg and Alenius, 1999). Some European studies report several risk factors associated to infection with BoHV-1 such as animal age, vaccination status, herd size, production system (dairy or beef), season and introduction of animals to the farm (Boelaert et al., 2005; Gonzalez-Garcia et al., 2009). Several reports associated risk factor to BVDV infection such as density of cattle farms, altitude, more than six calves aged ≤ 12 months, animal purchasing
Evaluation of the protective effect of thiamine pyrophosphate based on the biochemical analysis of rabbit foetuses at 30 days of gestation

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ABSTRACT

This study evaluated the effects of thiamine pyrophosphate (PPT) on the biochemical profiles of full-term rabbit foetuses that were subjected to experimental ischemia followed by 24 h reperfusion. A total of 16 gestating rabbit dams were divided into two groups, one of which was treated by administering PPT and subjected to a process of ischemia. During this interval, fetal blood samples were drawn from each dam (in the ischemia group) at 0, 15 and 45 min. Ischemia for 15 and 45 min was not associated with changes in lactate levels of the Ischemia group foetuses. However, in the foetuses in the reperfusion groups without PPT lactate levels were significantly higher after 15 and 45 min of arterial occlusion compared to time zero. These results demonstrate that PPT alters some acute and some longer-term biochemical outcomes of uterine ischemia perhaps important in preserving energy metabolism under hypoxic conditions.

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1. Introduction

Disorders that damage the developing brain are a significant cause of death or permanent disability, such as cerebral palsy. Hypoxic-ischemia encephalopathy (HIE) occurs at a rate of about three per thousand live-born, full-term infants [1]. While mild forms of encephalopathy have good prognosis, in moderate and severe cases the risk of death [2] or neurodevelopmental sequel in the surviving offspring increases greatly [3]. Asphyxia events have been evaluated in several animal models, including pigs [4,5], guinea pigs [6], and rats [7]. In these animals, asphyxia triggers a cascade of cellular biochemical events that lead to temporary alterations in cellular function and/or cell death. Tissue hypoxia and ischemia, meanwhile, can result in the depolarization of neuronal membranes, alterations of cellular ion homeostasis, and changes in energy metabolism [8]. Various alternative therapies have been utilised to treat the secondary lesions that result from hypoxic events, including hypothermia and the administration of free radical scavengers or calcium channel blockers [9]. Some of these measures have been incorporated into clinical practice with relative success. However, considering that damage is progressive and largely-dependant on the energy supplies that reach the cell, an additional option could consist in administering molecules that act on the enzymatic pathways associated with energy production in order to reduce the extent of damage. Thiamine exerts its metabolic action primarily through thiamine pyrophosphate, or cocarboxylase (PPT), which acts through two different pathways; first, by donating phosphate groups to form ATP and other energy molecules, such as TATP (adenosine-thiamine-triphosphate); and, second, as an indispensable co-factor in the activation of enzymes involved in energy-generating processes through the Krebs Cycle or the pentose cycle [10]. Although Valenzuela [7] has demonstrated
White Spot Syndrome Virus (WSSV) and Necrotizing Hepatopancreatitis (NHP) detection in wild shrimp of the San Andrés Lagoon, Mexico

Detección del Virus de la Mancha Blanca (WSSV) y Hepatopancreatitis necrotizante (NHP) en el camarón silvestre de la laguna San Andrés, México

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Abstract. - The presence of diseases caused by virus and bacteria pose a threat to the capture and commercialization of shrimp, and may cause significant economic damage. Nocturnal monthly sampling were conducted to detect the presence of IHHNV, WSSV, and NHP in San Andres Lagoon in Tamaulipas, Mexico, an important coastal ecosystem due to its shrimp fishery and the existence of shrimp farms in the area. Polymerase chain reaction (PCR) analysis in the shrimp tissue did not detect the presence of IHHNV, however, WSSV was detected, as well as NHP during July and August, when low salinities and high temperatures were recorded.

Keywords. Shrimp, WSSV, NHP, IHHNV

INTRODUCTION

Shrimp fishery production ranks as the second place on production volume in Mexico, with the state of Tamaulipas as the first producer of wild shrimp in the Gulf of Mexico. Wild shrimp capture in this area (Tamaulipas and Veracruz coasts) consists mainly on the capture of Farfantepenaeus aztecus, with 95% of the total catch (INP 2006). Coastal lagoons in this area are rich in wild F. aztecus and F. duorarum populations; however, Litopenaeus setiferus can also be found in lagoons (Perez-Castaneda et al. 2010). These shrimp species show differential temporal abundance patterns in the lagoons (Wakida-Kusunoki et al. 2008).

Virus and bacteria are important pathogens that have been held responsible of disease in wild and cultured shrimp, especially when shrimp are under environmental stress. Pathogen prevalence in wild shrimp might represent a potential source of diseases for cultured organisms (Macías-Rodríguez et al. 2014), where prevalence and mortality can be very high due to the raised stress levels during culture, making disease outbreaks the main limiting factor for the development of the worldwide aquaculture industry (Dutta et al. 2015). Among the pathogens that have been identified as responsible of disease in shrimp aquaculture are the infectious hematopoietic necrosis virus (IHHNV), a widely distributed, highly prevalent and infective virus, considered one of the most serious problems affecting the shrimp farming industry (Vega-Heredia et al. 2012), and white spot syndrome virus (WSSV), deemed the most severe viral pathogen due to the high mortality it causes (Sanchez-Martinez et al. 2007). Hepatobacterium penaei is the causal agent of the necrotizing hepatopancreatitis (NHP) (Lightner et al. 2012), it is a small, Gram negative, intracellular, rickettsia-like bacteria, which was described for the first time in 1985 (Loy et al. 1996). This bacterium affects cultured shrimp in Latin America (Lightner & Redman 1994, Del Rio-Rodriguez et al. 2006) and Texas where it has caused losses of up to 90% of cultured shrimp (Lightner et al. 1992).

There are several coastal lagoons in Tamaulipas, of which the San Andres Lagoon forms a special ecosystem at the mouth of the Tigre River, an area with many Litopenaeus vannamei farms, an exotic species to the region. Transport of farmed shrimp to new culture areas may pose a risk to the local fisheries, since pathogens may spread to the wild through their byproducts or wastewater and shrimp escapes (del Rio-Rodriguez et al. 2006, Wakida-Kusunoki et al. 2011, Lightner et al. 2012). This makes the adequate diagnostics of disease in wild shrimp populations especially relevant, in order to implement strategies to avoid the introduction of the pathogens to the culture systems, as well as in the design of control methods. There are few studies on the viral and bacterial pathogens on wild shrimp populations in the Mexican gulf coast, therefore it is necessary to study their presence in wild shrimp, to help the local fishery; thus, the

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Does the relative value of submerged aquatic vegetation for penaeid shrimp vary with proximity to a tidal inlet? Preliminary evidence from a subtropical coastal lagoon

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Abstract. The value of submerged aquatic vegetation (SAV) as a nursery habitat for penaeid shrimp has been recognised previously; however, the importance of SAV in terms of its distance from a tidal inlet (a site through which shrimp postlarvae migrate into coastal lagoons) has not been evaluated. In the present study, the effect of proximity to a tidal inlet on the relative importance of SAV beds for Farfantepenaeus shrimp was evaluated in the Laguna Madre of Tamaulipas (Mexico). Sampling was performed monthly from February to December 2005, diurnally and nocturnally, in two SAV bed areas, one 25 km (distant) and the other 1 km (nearby) from the inlet. Densities of shrimp (F. aztecus, F. duorarum and F. brasiliensis) were consistently higher in the nearby SAV bed during both the day and night. Water temperature was the most important explanatory variable of shrimp abundance in both SAV beds. The temperature–abundance relationship was negative in all cases, except in the distant SAV bed at night, when shrimp abundance was positively related to dissolved oxygen and salinity. The nearby SAV bed had higher recruit abundance and supported a greater numbers of juveniles and subadults. In contrast, shrimp abundance in the distant SAV bed was apparently limited by recruitment.

Additional keywords: decapods, estuarine fauna, Farfantepenaeus, Laguna Madre, macroalgae, seagrass.

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Introduction
Submerged aquatic vegetation (SAV) can form extensive subtidal beds of vegetation covering the shallow benthos of estuaries and coastal lagoons, and can consist of a diverse group of seagrasses and macroalgae (Mattson 2000). The ecological importance of SAV beds for estuarine macrofauna has been widely documented, primarily for their roles as nursery areas and sources of shelter and food for several species of fish and decapod crustaceans (Haywood et al. 1995; Beck et al. 2001; Jackson et al. 2001).

Penaeid shrimp species, those belonging to the family Penaeidae, are an important component of the coastal macrofauna that uses SAV habitat during at least part of their life cycle (Dall et al. 1990; Rozas and Minello 1998; Hemminga and Duarte 2000). In penaeid shrimp with a Type 2 life cycle, adult individuals live and spawn in the ocean. After eggs hatch and larvae develop, postlarval shrimp migrate to coastal lagoons, estuaries or bays, exhibiting preference for SAV habitats. Penaeids do not leave SAV beds until the late juvenile or subadult stage (Murphrey and Fonseca 1995; Jackson et al. 2001; Pérez-Castañeda et al. 2010), when they migrate to offshore areas, where they grow to adult size and reach sexual maturity (Dall et al. 1990). This type of life cycle is characteristic of all the Farfantepenaeus species found in the Gulf of Mexico (i.e. F. aztecus, F. duorarum, F. brasiliensis and F. notialis), which support a commercial fishery being sequentially exploited by two fleets during different phases of the life cycle along the Mexican coast: an industrial fleet targets the adult phase at sea, whereas the artisanal fleet targets the juvenile shrimp phase in coastal lagoons and estuaries (Garcia and Le Reste 1981).

The species composition, coverage and structural complexity of SAV beds are important factors determining the distribution and abundance of crustaceans in estuaries and coastal lagoons (Haywood et al. 1995; Jackson et al. 2001; Hovel et al. 2002). Positive relationships between seagrass biomass and the growth and survival of penaeid shrimp have been documented previously in estuarine ecosystems (Loneragan et al. 2001; Pérez-Castañeda and Defeo 2005; Loneragan et al. 2006). The location of a SAV bed within a coastal ecosystem may also affect its value for associated fauna, such as recently settled fish and penaeids (Bell et al. 1988; Beck et al. 2001), thereby influencing faunal patterns of distribution and abundance. For example, the importance of intertidal seagrass habitat in determining the abundance of shrimp has been shown to depend on the proximity to other coastal habitat, such as mangrove forest (Skillet et al. 2005).
Research Article

The effects of *Yucca schidigera* and *Quillaja saponaria* on growth performance and enzymes activities of juvenile shrimp *Litopenaeus vannamei* cultured in low-salinity water

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**ABSTRACT.** The inclusion of *Yucca schidigera* and *Quillaja saponaria* extracts (NTF) in aquatic organisms display a positive response on production and organism’s physiology. Fifteen tanks (140 L) with low-salinity water (S = 5) were stocked with 10 juvenile shrimp (*Litopenaeus vannamei*, 2.6 g of mean weight) feeding with 0, 0.25, 0.5, 1.0 and 2.0 g kg⁻¹ of NTF of basal diet (triplicate treatment). The shrimp were cultured in a close recirculation system (control condition) and fed *ad libitum* daily for 40 days. General growth parameters (body weight, growth, body length, feed conversion rate, survival) and hepatopancreatic digestive enzyme activities (alkaline protease, alkaline phosphatase, α-amylase, leucine aminopeptidase, and lipase) were evaluated after 40 days of shrimp culture. The final mean body weight, individual mean body, weight gain, and feed conversion ratio from shrimp feeding with 1.0 and 2.0 g kg⁻¹ of NTF have a significant (*P < 0.05*) result compared to other treatments. The highest values of alkaline protease, lipase, and α-amylase were detected in shrimp feeding with 0.5 g kg⁻¹ of NTF, where a high level of leucine aminopeptidase and alkaline phosphatase were detected with 0.25 g kg⁻¹ of NTF treatment. However, any significant differences in enzyme activities were detected between the control group and treatments. The increase effect in shrimp growth and any decrease effect in enzyme activity detected in present study suggest that NTF shows potential as a feed additive for shrimp cultured at low-salinity.

Keywords: *Litopenaeus vannamei*, growth, enzyme activity, low-salinity, aquaculture.

Los efectos de *Yucca schidigera* y *Quillaja saponaria* sobre el crecimiento y actividad enzimática de camarones juveniles de *Litopenaeus vannamei* cultivados a baja salinidad

RESUMEN. El uso de extractos de *Yucca schidigera* y *Quillaja saponaria* (NTF) en organismos acuáticos ha mostrado una respuesta positiva en la producción y fisiología de los mismos. Quince estanques (140 L) con agua a baja salinidad (S = 5) fueron preparados con 10 camarones juveniles (*Litopenaeus vannamei*, 2.6 g de peso promedio), alimentados con 0; 0,25; 0,5; 1,0 y 2,0 g de NTF kg⁻¹ en la dieta base (tratamientos por triplicado). Los camarones fueron cultivados en un sistema cerrado de recirculación (condiciones controladas) y alimentados *ad libitum* diariamente por 40 días. En los organismos se evaluaron los parámetros generales de crecimiento (peso y longitud del cuerpo, crecimiento, conversión alimenticia, supervivencia, etc.) y la actividad de enzimas digestivas hepatopancreáticas (proteasa y fosfatasa alcalina, α-amilasa, leucina aminopeptidasa y lipasas). El peso promedio final e individual, ganancia de peso, y conversión alimenticia fue superior en los camarones alimentados con 1,0 y 2,0 g kg⁻¹ de NTF con valores significativamente positivos (*P < 0,05*), comparado con los otros tratamientos. El valor más alto de proteasa alcalina, lipasa y α-amilasa fue detectada en camarones alimentados con 0,5 g kg⁻¹ de NTF. Un valor alto de leucina aminopeptidasa y fosfatasa alcalina se detectó en el tratamiento con 0,25 g kg⁻¹ de NTF. Sin embargo, no se observó diferencia significativa entre tratamientos. El efecto positivo en el crecimiento y carencia de efectos negativos en la actividad enzimática.
Influence of high-oil algae biomass as a feed intake and growth-performance enhancer in feedlot cattle during period of high ambient temperature

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Sixty calf-fed Holstein steers (290 ± 2 kg) were used in a 90-d trial to evaluate the influence of fresh high-oil algae biomass as a feed intake in feedlot cattle. Steers were grouped into 5 weight blocks, and randomly assigned within blocks to 15 pens (4 steers per pen, 4 pens per treatment). All steers were fed the same steam-flaked corn-based basal growing-finishing diet. Three treatments were evaluated (1) basal diet, (2) basal diet plus 60 g/head water or (3) basal diet plus 60 g/head high-oil algae biomass. On an as-fed basis, the algae biomass contained: 78.4% moisture, 2.15% ash, 0.21% N, 0.07% starch, 0.50% neutral detergent fiber and 17.2% ether extract. Steers were fed once daily. Water and algae biomass treatments were top-dressed onto the basal diet at time of feeding. On a dry matter basis, algae biomass application accounted for 0.14% of average daily feed intake. Top-dressing the basal diet with water did not affect \( P > 0.20 \) cattle growth performance or dietary net energy (NE). In contrast, top-dressing feed with algae biomass increased average daily gain (7.8%, \( P = 0.02 \)), and tended to increase gain efficiency (5.7%, \( P = 0.08 \)) and estimated dietary NE (3.7%, \( P = 0.09 \)). We conclude that application of low levels of high-oil algae biomass may enhance daily weight gain of feedlot cattle during period of high ambient temperature. This effect is due in part to an apparent increase in efficiency utilization and in part to an increased dry matter intake.

Keywords: algae; cattle; performance; feedlot

1. Introduction

Summer heat load causes a reduction in feed and energy intakes (Young & Hall 1993; Hahn 1994); and subsequently in animal productivity (Blackshaw & Blackshaw 1994). In cattle, this can result in decreased growth rate and gain efficiency (Turner 1984; Hubbard et al. 1999). Algae contain chemical compounds that serve as attractants to augment feed consumption in aquatic species (Mustafa et al. 1997; Tierney and Atema 1998; Jaime-Ceballos et al. 2007). The objective of this study is to evaluate the influence of top-dressing a steam-flaked corn-based growing-finishing diet with a low level (0.14%) of high-oil algae biomass as an agent to enhance energy intake during a period of high ambient temperature.

2. Materials and methods

All procedures involving animal care and management were in accordance with and approved by the University of California, Davis, Animal Use and Care Committee.

2.1. Animals and diets

Sixty calf-fed Holstein steers (290 ± 2 kg) were used in a 90-d experiment to evaluate the influence of algae as a feed intake and growth-performance enhancer in feedlot cattle with respect to feedlot growth performance and dietary NE. This trial was conducted during months of May through July at the University of California Desert Research Center located in El Centro, CA. The average climatic conditions during this experiment were: air temperature 31.0°C (range 28.0–34.0°C), relative humidity 45%. Temperature-humidity index (THI) was calculated using the formula: THI = \[0.8 \times \text{ambient temperature} + \left[\frac{\% \text{of relative humidity}}{100}\right] \times (\text{ambient temperature} – 14.4)\] + 46.4 (Mader et al. 2006). Accordingly, the mean THI value during the course of this study was 78.8. In accordance with THI code (Normal THI < 74; Alert 75 < THI < 78; Danger 79 < THI < 83; and Emergency THI > 84), steers in the trial were exposed to ‘danger’ situation due hot environmental conditions. Eight days before initiation of the study, steers were individually weighed, implanted with Revalor-S (Intervet Inc., Millsboro, DE), grouped by weight into 5 blocks, and randomly assigned within weight blocks to 15 pens (4 steers per pen). Pens were 75 m² with 27 m² of overhead shade, automatic waterers, and 4.3 m fence-line feed bunks. All steers were fed the same basal diet (sudangrass hay: 6.00%, yellow grease: 2.50%, molasses cane: 5.00%, urea: 0.50%, limestone: 1.65%, magnesium
Influence of Wheat Straw Pelletizing and Inclusion Rate in Dry Rolled or Steam-flaked Corn-based Finishing Diets on Characteristics of Digestion for Feedlot Cattle

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ABSTRACT: Eight Holstein steers (216±48 kg body weight) fitted with ruminal and duodenal cannulas were used to evaluate effects of wheat straw processing (ground vs pelleted) at two straw inclusion rates (7% and 14%; dry matter basis) in dry rolled or steam-flaked corn-based finishing diets on characteristics of digestion. The experimental design was a split plot consisting of two simultaneous 4×4 Latin squares. Increasing straw level reduced ruminal (p<0.01) and total tract (p = 0.03) organic matter (OM) digestion. As expected, increasing wheat straw level from 7% to 14% decreased (p<0.05) ruminal and total tract digestion of OM. Digestion of neutral detergent fiber (NDF) and starch, per se, were not affected (p>0.10) by wheat straw level. Likewise, straw level did not influence ruminal acetate and propionate molar proportions or estimated methane production (p>0.10). Pelletling straw did not affect (p>0.48) ruminal digestion of OM, NDF, and starch, or microbial efficiency. Ruminal feed N digestion was greater (7.4%; p = 0.02) for ground than for pelletted wheat straw diets. Although ruminal starch digestion was not affected by straw processing, post-ruminal (p>0.01), and total tract starch (p = 0.05) digestion were greater for ground than for pelletted wheat straw diets, resulting in a tendency for increased post-ruminal (p = 0.06) and total tract (p = 0.07) OM digestion. Pelletting wheat straw decreased (p<0.01) ruminal pH, although ruminal volatile fatty acids (VFA) concentration and estimated methane were not affected (p>0.27). Ruminal digestion of OM and starch, and post-ruminal and total tract digestion of OM, starch and N were greater (p<0.01) for steam-flaked than for dry rolled corn-based diets. Ruminal NDF digestion was greater (p = 0.02) for dry rolled than for steam-flaked corn, although total tract NDF digestion was unaffected (p = 0.94). Ruminal microbial efficiency and ruminal degradation of feed N were not affected (p>0.14) by corn processing. However, microbial N flow to the small intestine and ruminal N efficiency (non-ammonia N flow to the small intestine/N intake) were greater (p<0.01) for steam-flaked than for dry rolled corn-based diets. Ruminal pH and total VFA concentration were not affected (p>0.16) by corn processing method. Compared with dry rolled corn, steam-flaked corn-based diets resulted in decreased acetate-propionate molar ratio (p = 0.02). It is concluded that at 7% or 14% straw inclusion rate, changes in physical characteristics of wheat straw brought about by pelletling negatively impact OM digestion of both steam-flaked and dry-rolled corn-based finishing diets. This effect is due to decreased post-ruminal starch digestion. Replacement of ground straw with pelletted straw also may decrease ruminal pH. (Key Words: Digestion, Cattle, Wheat Straw, Corn Grain, Processing)

INTRODUCTION

Wheat is the principal agronomic crop of the Mexicali Valley. After the grain is harvested, much of the straw is left in the field. The relatively low available energy value of wheat straw limits its nutritive value for feedlot cattle (Lesoing et al., 1980). However, its functional value as a roughage source is well documented (Ware and Zinn, 2005; Salinas-Chavira et al., 2013). Hence, the level of inclusion of wheat straw in high-concentrate finishing diets is largely a functional constraint, i.e. stimulate chewing and saliva output that buffer the acids produced during ruminal fermentation (Balch, 1958). Feedlot receiving diets typically include approximately 35% roughage to allow adaptation of ruminal bacteria to the more readily
Short Communication

Evaluación de la eficiencia productiva de tres líneas de tilapia con reversión sexual en un sistema de recirculación (RAS)

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RESUMEN. El presente estudio se evaluó el comportamiento productivo de las líneas de tilapia del Nilo (Oreochromis niloticus), híbrida de Spring (O. niloticus x O. mossambicus) y Pargo-UNAM de 25% híbrido Rocky Mountain (Oreochromis aureus x Oreochromis niloticus), 25% color rosa O. niloticus y 50% híbrido rojo Florida Red Tilapia (O. urolepis hornorum x O. mossambicus), cultivados en sistema de recirculación. El estudio duró 75 días y se realizó en estanques de polietileno con una capacidad individual de 3,146,6 L. Cada estanque fue dividido en tres compartimentos. Los alevines, previamente masculinizados con la hormona 17-α-metil-testosterona (MT), se contaron individualmente, pesaron y distribuyeron aleatoriamente en tres grupos iguales de 60 alevines cada uno. El primer grupo de tilapia del Nilo tuvo un peso promedio inicial de 1,43 g ± 0,38; el segundo, híbrido de Spring, de 1,20 ± 0,23 g y el tercero Pargo-UNAM de 1,28 ± 0,24 g. Las variables medidas fueron ganancia diaria de peso, conversión alimenticia y sobrevivencia para cada una de las líneas. Al final del ensayo, las líneas de tilapia del Nilo e híbrido de Spring, mostraron un mejor desempeño (crecimiento e índice de conversión), con diferencias significativas (P ≤ 0,05) en comparación con el pargo UNAM, que mostró un incremento promedio de peso y conversión alimenticia inferior. No se observaron diferencias significativas entre las líneas, en lo que a sobrevivencia se refiere (P ≥ 0,05).

Palabras clave: Oreochromis aureus, Oreochromis niloticus, tilapia, sistema de recirculación (SRA), alevines.

Evaluation of the productive efficiency of three strains of tilapia sex reversal in a recirculation system (RAS)

ABSTRACT. This study was conducted to evaluate the productive performance of three strains. Nile tilapia (Oreochromis niloticus), hybrid of Spring (O. niloticus x O. mossambicus) and Pargum-UNAM from 25% hybrid Rocky Mountain (Oreochromis aureus x Oreochromis niloticus), 25% pink O. niloticus and 50% of red hybrid Florida Red Tilapia (O. urolepis hornorum x O. mossambicus), reared in a recirculating aquaculture system (RAS). The study lasting 75 days was carried out in polyethylene tanks with an individual capacity of 3,146,6 L. Each tank was divided in three compartments. Fry were previously masculinized with 17-α-methyl-testosterone (MT) hormone, counted individually, weighed and randomly distributed into three equal groups of 60 each. The first group Nile tilapia, had an average initial weight of 1.43 g ± 0.38 the second, hybrid of Spring, recorded a weight of 1.20 ± 0.23 g and the third red Pargum-UNAM, weighed 1.28 ± 0.24 g. The variables measured were: daily weight gain, feed conversion and survival rate for each of the strains. At the end of the trial, the strains of Nile tilapia and hybridizes of Spring, showed a better performance (growth and conversion factor) with significant differences (P ≤ 0.05) compared with Pargum-UNAM, which showed a lower weight and conversion factor. There were not significant differences among the strains in survival (P ≥ 0.05).

Keywords: Oreochromis aureus, Oreochromis niloticus, tilapia, recirculating aquaculture system (RAS), fry.
Efecto de la sustitución de grasa de fritura por aceite vegetal y concentración energética en dietas para la producción de pollos de engorde

Effect of frying fat substitution by vegetable oil and energy concentration on diets for productive performance of broilers

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RESUMEN
En la dieta de pollos de engorde se adicionan lípidos para mejorar su eficiencia productiva, generalmente grasa de fritura (GF), reciclada de restaurantes, por tener menor costo que el aceite vegetal (AV). El objetivo de este trabajo fue evaluar el efecto de la sustitución de GF por AV en dietas estándar (DEE) y dietas altas en energía (DAE) sobre el comportamiento productivo de pollos de engorde. Se alimentó durante 42 d a 200 pollos mixtos ROSS, de un día de edad y peso promedio de 37.2 g ± 0.89 g. El estudio se realizó en dos fases de 21 d: inicio y acabado. Se usó un diseño experimental al azar con arreglo factorial 2 x 2 con la fuente de lípidos (GF y AV), la concentración de energía (DEE y DAE) y su interacción como efectos principales. La energía metabolizable en la fase de inicio fue 2 994 kcal/kg y 3 013 kcal/kg, y en la fase de acabado fue 3 081 kcal/kg y 3 111 kcal/kg en DEE y DAE, respectivamente. La fuente de lípidos no influyó (P > 0.05) sobre las variables de estudio. En la fase de inicio, los pollos alimentados con la DAE ganaron más peso y mostraron mejor conversión alimenticia (P < 0.05) que los pollos en la DEE, aunque el consumo de alimento fue similar (P > 0.05). En la fase de acabado, los pollos alimentados con la DAE ganaron...
Effects of *Prosopis laevigata* pods on growth performance, ruminal fermentation and blood metabolites in finishing lambs

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Abstract

Twenty-one non-castrated male Rambouillet lambs (21±1.44 kg body weight) were used to evaluate the effects of increasing dietary levels of *Prosopis laevigata* pods (PLP) in a 72 d growth performance trial. Three dietary treatments defined as PLP0 (control, 0 g PLP/kg DM), PLP250 (250 g PLP/kg DM), and PLP500 (500 g PLP/kg DM) were evaluated. Animals fed PLP250 and PLP500 had higher daily weight gain (P<0.05) and feed intake (P<0.01) than lambs fed PLP0. Feed conversion was improved by PLP addition in the diets. Feeding cost decreased linearly as the level of PLP in the diet increased. Blood urea-N concentration increased linearly as PLP increased in the diet. Lambs fed PLP500 had higher (P<0.05) blood uric acid concentrations than lambs fed PLP0 and PLP250. Ruminal total volatile fatty acid (VFA) increased linearly with increasing dietary PLP. Lambs fed PLP250 and PLP500 had higher ruminal ammonia N concentrations (P<0.05) than lambs fed PLP0. Dietary inclusion of PLP did not affect health status of lambs. *Prosopis laevigata* pods can be used safely in finishing lambs' diets at 500 g/kg.

Keywords: carcass, feed cost, performance

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Introduction

The Chihuahuan Desert extends over the central and northern portion of the Mexican plateau and projects into the southern part of the USA. This desert has a dry climate with a mean annual precipitation of 2335 mm, most of which occurs in the summer (June-October). Animals are taken out to graze and browse the poor range vegetation. Thus, farmers have adopted semi-intensive and intensive systems for growing and fattening lambs. The adopted systems are based on conventional feed ingredients such as soybean meal, barley, sorghum, wheat, and maize grain. Although these ingredients are known to be excellent sources of nutrients, their prices have increased significantly in recent years. In the Chihuahuan Desert, *Prosopis laevigata* trees are well adapted and one hectare of rangeland (without irrigation) can produce 3.7 t/ha of pods (as feed) annually, whereas maize grain yield is 0.57 t/ha (Ruiz, 2011).

Our previous study (Peña-Avelino et al., 2014) indicated that *Prosopis laevigata* pods (PLP) contained on average (dry matter basis) 7.8 % crude protein (CP), 2.1 % fat, 33% neutral detergent fiber (NDF) and 22% free sugars, making them highly palatable and digestible. To our knowledge, no growth performance trials have evaluated high inclusion of PLP (50%) in finishing lambs. *Prosopis laevigata* trees are well adapted and one hectare of rangeland (without irrigation) can produce 3.7 t/ha of pods (as feed) annually, whereas maize grain yield is 0.57 t/ha (Ruiz, 2011).

These inconclusive results may be due to the nutritional value of PLP, which is higher than forages but lower than grains (Peña-Avelino et al., 2014). Thus, when PLP replace conventional feedstuffs, diet reformulation would have to be considered. In cattle, detrimental effects on growth performance has been attributed to high
INDICES PARASITARIOS EN PECES DE LA PRESA CABALLEROS, EN CD. VICTORIA TAMAULIPAS, MÉXICO

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RESUMEN: Este trabajo se realizó de enero a abril de 2016. Se muestrearon ejemplares de peces vivos para estudiar índices de parasitismo. Las muestras se transportaron al Laboratorio de Parasitología acuática, Facultad de Medicina Veterinaria-Universidad Autónoma de Tamaulipas. Las especies estudiadas fueron aquellas con potencial de explotación comercial en la Presa Caballeros, Victoria, Tamaulipas, México. Se realizaron estudios parasitoscópicos en bagre de canal (Ictalurus punctatus), perca americana (Micropterus salmoides) y tilapia (Oreochromis niloticus). Se desarrollaron dos protocolos, ya que para la caracterización de cada especie de parásitos se requieren diferentes formas de identificación, a saber: 1) Protocolo de necropsia en peces y técnicas parasitológicas (Anexo I); 2) Técnicas de fijación y conservación de parásitos por grupo (Anexo II). Se consideraron como base los protocolos de necropsia de Noga (1996) y Jiménez (2007). En el bagre de canal se detectaron trematodos monogeneos en arcos branquiales, éstos pertenecen al género Ligictaluridus. En la lobina negra se identificaron larvas de nematodos del género Spiroxys. Mientras que en la tilapia se encontraron parásitos hirudineos. Los tres géneros de parásitos se detectaron en niveles de infección bajos, por lo que representan un riesgo moderado para el cultivo de bagre y tilapia en este embalse.

PALABRAS CLAVE: Ictalurus sp., parásitos, sanidad Acuícola.

ABSTRACT: This work was carried out from January to April 2016. Alive fish specimens were sampled to study rates of parasitism. Samples were transported to the Aquatic Parasitology Laboratory, Faculty of Veterinary Medicine-Universidad Autónoma de Tamaulipas. Fish species studied were those with potential for commercial exploitation at Presa Caballeros, Victoria, Tamaulipas, Mexico. Parasitoscopic studies were conducted on channel catfish (Ictalurus punctatus), largemouth bass (Micropterus salmoides) and tilapia (Oreochromis niloticus). Two protocols were developed, as for the characterization of each species of parasites different forms are required for identification, these being: 1) Protocol necropsy on fish and parasitological techniques (Annex I); 2) Fixation techniques and conservation of parasites per group (Annex II). Noga (1996) and Jiménez (2007) necropsy protocols were taken as base protocols. In the channel catfish monogeneans flukes were detected in gill arches, these parasites belong to the genus Ligicaluralius. In the largemouth bass larvae of nematodes of the genus Spiroxys were identified, while in the tilapia leeches parasites were found. The three genera of parasites were detected at low levels of infection, which pose a moderate risk for catfish and tilapia culture in this reservoir.

KEY WORDS: Ictalurus sp., parasites, aquaculture health.

1. INTRODUCCIÓN

Desde la antigüedad la pesca ha sido fuente de alimento, empleo y otros beneficios económicos para el hombre, formando parte de su cultura y desarrollo. A pesar del avance de las pesquerías y la acuicultura se ha constatado que existen limitantes para su óptimo aprovechamiento (FAO, 2011). A nivel mundial uno de los aspectos más importantes en el desarrollo de la industria acuícola, es la presencia de patógenos y la aparición de enfermedades. Ello ha causado cuantiosas pérdidas económicas generadas en los diversos sistemas de producción. Las enfermedades en los organismos de cultivo se generan por una amplia diversidad de etiologías, asociadas en algunos casos a malas prácticas de manejo y que ocasionan estrés. La sanidad acuícola tiene como objetivo mantener y mejorar la salud de los peces y así obtener el máximo rendimiento en su cultivo (Jiménez, 2007). En México, las principales especies acuícolas que se cultivan bajo sistemas controlados son la tilapia, camarón, trucha y bagre. Esta última
INTRODUCCIÓN
Las garrapatas pertenecen al Phylum artrópoda, clase arácnida y se agrupan en tres familias, Argasidae, Ixodidae y Nutallielidae. La familia Argasidae con 186 especies incluye a las garrapatas blandas, la familia Ixodidae con 692 especies incluye a las duras y la Nutraliöidae, con una especie, esta última no tiene importancia parasitaria (Sonenshine y Roe, 2013). En total se han descrito cerca de 893 especies (Guglielmone et al., 2010), aunque existen controversias en el número de especies de Argasidae y continuamente se realizan cambios o se agregan nuevas especies (Nava et al., 2014). En México se tienen registradas 99 especies, 33 Argasidae y 66 ixodidae, lo que representa 45% de las especies de América Latina. (Bautista, 2006)

El género Amblyomma incluye varias especies de garrapatas muy bien adaptadas al continente americano. Guglielmone y Nava (2006) mencionan que este género incluye 130 especies, de las cuales 50% se concentra en el Neotrópico. Las garrapatas de este género son ectoparásitos de gran importancia económica, capaces de producir daños físicos en los animales como debilidad, fiebre y mortalidad. Debido
Case Report

Congenital biliary atresia in a Beefmaster calf

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Abstract

Biliary atresia is a congenital cholangiopathy characterized by a progressive fibrosis of the bile ducts leading to impaired biliary flow, hepatic failure, icterus and early death. This paper describes the gross and microscopic findings in a 4-week-old Beefmaster calf that unexpectedly died with severe jaundice. On postmortem examination, the liver was firm in texture and exhibited an orange-yellow discoloration. Microscopically, there were cholestasis, hyperplasia, fibrosis and obliteration of the biliary ducts, and mural fibrosis of the gall-bladder. Masson’s trichrome and Gomori’s stain revealed excessive collagen deposition in the portal areas and biliary ducts, and occasionally around central veins. Immunohistochemistry confirmed biliary epithelial cells, not only lining the bile ducts but also forming tubular-like structures devoid of a lumen. Blood test was negative for babesiosis and anaplasmosis. Based on these findings, the final diagnosis was congenital biliary atresia.

Key words: biliary atresia, congenital, jaundice, portal fibrosis, Beefmaster calf.

Introduction

Biliary atresia is a congenital cholangiopathy characterized by progressive fibrosing obliteration and disconnection of the bile ducts leading to impaired biliary flow and jaundice (1, 3, 5). In human neonatology, biliary atresia is the leading cause of cholestasis with an estimated incidence of 1 in 8,000-18,000 live births (3). Clinically, this congenital condition leads to hepatic failure, jaundice, acholic stools, and dark urine that ultimately culminates in premature death during the first few months of life (1-3, 5). According to some pediatric reports, biliary atresia is the most frequent reason for liver transplantation in children and without intervention, death ensues within the first few months or years of life (1, 5).

In veterinary medicine, congenital biliary atresia is particularly rare with only a few cases reported worldwide, most of them in Australia and to a much lesser extent Europe and United States (7, 9, 19, 22, 24, 25). This condition is most frequently reported in lambs, foals, calves, puppies, kittens and primates (4, 7, 9, 10, 19, 22, 25). The pathogenesis is still under investigation, but genetic, infectious and toxic factors are suggested as probable causes (12-14). The viral pathogenesis gained momentum when a multi-national pediatric study reported a possible link between biliary atresia and group C rotavirus, but conclusive validation is awaiting (18). In veterinary medicine, a toxic etiology was strongly suggested as the underlying mechanism when an outbreak of biliary atresia affected over 300 lambs and 7 calves in a
El bienestar del cerdo recién nacido

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INTRODUCCIÓN
En la actualidad, el bienestar del cerdo en la etapa temprana sigue representando un gran problema para la industria porcina. En los principales países productores de cerdo en el mundo, la mortalidad de lechones durante la lactancia oscila entre el 10 y el 20%1-3. Más de la mitad de estas muertes ocurren durante la etapa temprana de estos animales (primera semana de vida), especialmente durante las primeras 72 horas de vida4. Asimismo, aproximadamente el 6% de los lechones nacen muertos y algunos lechones vivos tienen una menor viabilidad5,6. De hecho, del 2 al 9% de los lechones que nacen vivos mueren por problemas relacionados con asfixia perinatal7-9. En gran medida, esto se debe a problemas de hipoxia padecidos durante el parto, como lo muestra la estrecha relación entre el grado de viabilidad al nacer y la magnitud de la hipoxia sufrida por los lechones durante el parto10-12. El nivel de mortalidad y el grado de hipoxia padecido durante el parto se utilizan comúnmente como indicadores del bienestar de los lechones. Es posible que varios sucesos que tienen lugar en el período preparto jueguen un papel importante en los fenómenos del posparto inmediato11. En situaciones donde el parto, o el intervalo de tiempo transcurrido entre el nacimiento de los lechones, se prolonga, el bienestar del recién nacido puede disminuir y entonces el neonato puede nacer en condiciones de hipoxia, aunque aparentemente sano12-14. Parece evidente, pues, que el parto y el inicio de la respiración son sin duda los momentos más críticos en el recién nacido. La pronta identificación de señales que muestren debilidad y desajustes fisiológicos son muy importantes para proporcionar un tratamiento rápido a los recién nacidos con la finalidad de que puedan sobrevivir15. Como se ha comentado, el bienestar del lechón recién nacido depende del grado de asfixia, que puede tener diversos factores predisponentes, los relacionados con la madre y los del propio lechón16, y estos pueden tener consecuencias en el desarrollo del cerdo durante el destete y en su vida posterior durante el engorde. Hay diferentes factores relacionados con la madre que pueden contribuir a prolongar el parto e incrementar el riesgo de hipoxia intraparto: estrechez del canal pélvico, atonía uterina, fallos en la regulación hormonal, dinámica uterina, estrés materno (estrés térmico, imposibilidad de mostrar conducta de nido, dificultad de adaptación a jaulas individuales de parto)17-20. En el caso del lechón, los factores más importantes son su peso al nacer12,21 (los lechones más grandes tienen mayores probabilidades de morir), el orden en el nacimiento, la rotura del cordón umbilical, el grado de tinción de meconio en piel y su aspiración18,22-23; las hembras tienen menores probabilidades de morir que los machos24. Asimismo, el consumo de calostro durante las primeras horas de vida es determinante en la supervivencia del neonato; no solamente se trata del único alimento disponible para el lechón, sino que supone la vía de adquisición de inmunidad pasiva proveniente de la madre,
In the southwestern United States, calf-fed Holstein steers are commonly fed steam-flaked corn-based diets containing 12% to 13% CP, with urea as the primary or sole source of supplemental N (Zinn et al., 2005; Vasconcelos and Galyean, 2007). These diets satisfy average AA requirements for the overall feedlot phase (300 to 350 d; NRC, 2000) but do not meet requirements during the early stages of growth (first 112 to 140 d; Zinn and Shen, 1998; Zinn et al., 2007). Methionine and lysine are considered the first-limiting
Effect of diets with different energy concentrations on growth performance, carcass characteristics and meat chemical composition of broiler chickens in dry tropics

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Abstract

Background: Diets with increasing levels of energy were fed for 42 days to 200, 1-day old male broiler chickens to evaluate growth performance, carcass characteristics and chemical composition of meat. The study was performed in the subtropical area of northeastern Mexico. Treatments diets (T) for starter and finisher phases had apparent metabolizable energy (AME; kcal/kg) of: 2960 and 3040 (T1); 3000 and 3080 (T2); 3040 and 3120 (T3); 3080 and 3160 (T4), respectively. Within each of the growing phases the four treatment diets were formulated to contain similar levels of crude protein, amino acids, and other nutrients. In a completely randomized design, birds were allocated to the four treatments with five replicates (floor pens) of 10 birds each. The trial was divided in two phases (starter and finisher) of 21 days each (42 days total).

Results: Weight gain was not influenced by energy level; however, feed conversion efficiency was improved in the diets with 3040 and 3120 kcal/kg AME (T3; P < 0.05). There was no influence of treatment on total carcass weight or carcass cuts (P > 0.05). Meat from breast muscle had similar crude protein percentages among treatments; ether extract was higher in T1 than T4 (P < 0.05). The percentages of water, ether extract, ash and crude protein in thigh meat were not significantly different (P > 0.05) among treatments.

Conclusions: For this study carried out in a dry tropical area, the moderate increase in dietary energy concentration (diet with 3040 and 3120 kcal/kg AME, T3) enhanced feed conversion efficiency of broiler chickens.

Keywords: Energy level, Growth performance, Carcass, Meat composition, Broiler chicken