

Seroprevalence of Viral Diseases in Cattle Meat Producer under Humid Tropical Conditions

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Abstract: The infectious diseases of viral origin, commonly known as bovine viral complex represent true reproductive problems in units of bovine meat production in the humid tropics, including infectious bovine rhinotracheitis (IBR), Bovine Viral Diarrhea (BVD) virus and Bovine respiratory syncytial (BRSV), causing huge economic losses for farmers, whose effects on reproduction and production of cattle, are expressed in the following disorders: abortions, infertility, placental retention, mummified fetuses, embryo resorption, low milk production, reduced conception rate, clinical mastitis and calf immunotolerant births among others. The aim of this work was to determine the immunological profile of viral diseases in cattle meat producer under humid tropical conditions in Mexico. We used sera from 100 animals, of which 31 had been vaccinated against bovine viral complex, 3 replicates were analyzed every 30 days, 69 were not vaccinated, to which were analyzed once; breeds considered in this study were: Limoussin, Charolais, Belgian Blue, Beef Master, and Brown Swiss crosses with Zebu from the humid tropical region of Mexico. Sera were analyzed for the serodiagnosis of three viral agents IBR, BVD and BRSV by ELISA. The results indicate that of the 31 vaccinated animals responded favorably 52.68% seroprevalence of antibodies in the first sample in the second, 100% of the animals responded positively and in the third sample, the response fell to 64.5% response seroprevalence. The 69 analyzed sera of unvaccinated animals, showed high rates of seropositivity in the following manner: IBR (89.85%), DVB (86.95%) and BRSV (85.50%). In conclusion, the results indicate the presence of these viral diseases in the humid tropics of Mexico, so there is an urgent need to establish measures for epidemiological control and prevention to prevent, control and eradicate the problem.

Key words: Seroprevalence, bovine viral diseases, humid Mexican tropic.

INTRODUCTION

Stressful events, are the primary factor contributing to this so-called bovine respiratory complex, which include IBR, BVD and BRSV (Loneragan *et al.*, 2001). Among these events are the environmental conditions such as sudden changes of temperature, proper animal density per area, relative humidity, the nutritional factors that are presented as adequate water, abrupt changes in diet (pasture of poor quality, inadequate minerals) and management: weaning, dehorning and mobilization of the animals that compromise the immune system, making the animal susceptible to diseases caused by viruses and bacteria. Appropriate management practices and better

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sanitary conditions, no doubt reduce the stress but not eliminated, but the best strategy to reduce outbreaks is through routine immunization programs.

Moreover IBR, BVD and BRSV with brucellosis, vibriosis, Trichomoniasis and Leptospirosis, are some of the major diseases affecting the reproductive tract of animals, causing economic losses to livestock by the presence of this complex causes abortion , infertility, mummified fetuses, embryo resorption, malformations, birth of calves persistently infected immunotolerant throughout his life (Calderon *et al.*, 1997).

The aim of this study was to determine the seroprevalence of viral diseases in cattle meat producer under humid tropical conditions in Mexico.

MATERIAL AND METHODS

This work, carried out under conditions of humid tropics of Mexico, in the southeast region. We analyzed 100 sera from cattle of meat-producing breeds, 31 animals vaccinated against bovine viral compound, which was performed 3 repetitions each 30 days, 69 sera from unvaccinated animals, were sampled once. The samples were individually obtained by puncture in the tail vein using a vacutainer tube 7 ml of sterile needles and 18mm gauge. Were transported to the lab and proceeded to obtain the serum by centrifuging samples at 3000 rpm for 5 minutes, then sera were analyzed by ELISA for the detection of antibodies against IBR, BVD and BRSV (Graham *et al.*, 2001). The results were analyzed using nonparametric statistics.

RESULTS AND DISCUSSION

In Table 1, the results of the percentages of positivity of sera from unvaccinated animals.

Table 2 shows the results of positivity of sera from vaccinated animals.

In Tables 3 to 5, the results obtained with HIV sera from unvaccinated animals for each of the diseases. Table 6 shows the overall results of the HIV status of the three samples from animals immunized against each disease.

Table 1: Percentages of seropositivity IBR, BVD and BRSV

PATHOLOGIES ANALYZED	POSITIVE ANIMALS (+)	NEGATIVE ANIMALS (-)	TOTAL
IBR	89.85%	10.14%	99.99%
DVB	86.95%	13.04%	99.99%
BRSV	85.50%	14.49%	99.99%

Table 2: Percentage of vaccinated animals seropositive for IBR, BVD and BRSV with three replications

POSITIVE ANIMALS (+) SAMPLING	PERCENTAGE (%)		PERCENTAGE (%)		PERCENTAGE (%)	
	FIRST		SECOND		THIRD	
	(+)	(-)	(+)	(-)	(+)	(-)
IBR	58.06	41.93	100	0	80.64	19.35
DVB	48.38	51.61	100	0	58.06	41.93
BRSV	51.61	48.38	100	0	54.83	45.16

Table 3: Percentage values of unvaccinated animals seropositive for IBR

POSITIVE ANIMALS (+)	62	NEGATIVE ANIMALS (-)	7
62 X 100 / 69		7 X 100 / 69	
PERCENTAGE (%)	89.85 %	PERCENTAGE (%)	10.14 %
TOTAL	89.85 + 10.14	99.99%	

Table 4: Percentage values of unvaccinated animals seropositive for DVB

POSITIVE ANIMALS (+)	60	NEGATIVE ANIMALS (-)	9
60 X 100 / 69		9 X 100 / 69	
PERCENTAGE (%)	86.95 %	PERCENTAGE (%)	13.04 %
TOTAL	86.95 + 13.04	99.99 %	
TOTAL DE ANIMALES MUESTREADOS	69		

Tabla 5: Valores porcentuales de animales no vacunados seropositivos a BRSV

ANIMALES POSITIVOS (+)	59	ANIMALES NEGATIVOS (-)	10
59 X 100 / 69		10 X 100 / 69	
PORCENTAJE (%)	85.50 %	PORCENTAJE (%)	14.49 %
TOTAL	85.50 + 14.49	99.99 %	

Table 6: Average percentage of positivity in animals vaccinated against the three diseases

DISEASES	POSITIVE NUMBER OF ANIMALS	OVERALL PERCENTAGE
IBR	74	79.56
DVB	64	68.81
BRSV	54	68.81

Discussion:

Unvaccinated animals in the humid tropics of Mexico, have IBR seropositivity of 89.85% (62/69), DVB 86.95% (69/69) and BRSV 85.50% (59/69) (Table 1), this indicates wide distribution of such diseases, which are similar to those found in studies, such as U.S. and Uruguay, 95% in England, 100%, in Canada and Ireland, 94% have been reported in Sweden according to the seropositivity geographical distribution in the north, 51% to 89% in the south (Costa *et al.*, 2000). The prevalence of DVB in Canada is 90%, according to the density of livestock in New Zealand, 63%. In other studies, we found that the prevalence is between 70 and 100% in countries like USA with 65%, with 62.5% United Kingdom, Chile and Cuba with 50% to 71.9% (Sosa *et al.*, 2000).

The IBR is a prevalent elsewhere in India and 51.6% (Gajendragad *et al.*, 1997, Sosa *et al.*, 2000). In our study, 31 animals vaccinated against IBR, BVD and BRSV, showed a positivity in the first sample of 58.06%, 48.38% and 51.61% respectively. In the second sampling, 100% to the three diseases in the third sample was 80.64%, 58.06% and 54.83% for IBR, BVD and BRSV, respectively (table), in Tables 3 to 5, are presented HIV results in animals not vaccinated against each of the diseases and in Table 6 shows the overall results of the HIV status of the three samples from animals immunized against each disease.

Houe (1999), indicated that the presence of bovine viral tends to increase in locations with severe climate changes, in herds with a high density of population per area, changes in diet, poor pasture, mineral salts and inadequate handling stressful events such as transport, dehorning and weaning among others, compromise the immune system, making the animal susceptible to diseases caused by viruses and bacteria. The most relevant factors that may contribute to the spread of bovine virus complex are livestock fairs, competitions and exhibitions in different regions of the world, as these events agglomerated animal production units of different ages, species and health conditions, providing a very important means of transmission to susceptible animals (Calderon *et al.*, 1997), indicated that the purchase of infected animals in the production unit, by contact of animals with active infection by sharing pasture with other herds and between the same sharing herd, feeding, watering, salting, use of semen, embryos contaminated by the bite of flies, fomites and by the complex vehiculaci3n through clothes, shoes, needles and instruments used in other farms or production units. However, the best strategy to reduce outbreaks is through routine immunization programs.

According to the results obtained in this work, programs were established newspapers serodiagnosis of evidence covering at least once a year, for IBR, BVD and BRSV also provided epidemiological data that include prevention and control measures such as vaccination programs according to serotypes in the region and a rigid quarantine for all animals in new revenue to the various units of production and acquisition of breeding animals to walk must be certified free of bovine viral complex.

In conclusion, the results indicate the presence of these viral diseases in the humid Mexican tropic so there is an urgent need to establish measures for epidemiological control and prevention to prevent, control and eradicate the problem.

REFERENCES

Calder3n, V.G., I.A. Alvarado, M.C. Vilchis, S.A. Aguilar, C.D. Batalla, 1997. Detecci3n de seropositividad al virus de Rinotraqueitis infecciosa bovina (IBR), en ganado del municipio de tizimin, Yucat3n, M3xico. *Tec. Pec. M3x.* 35(3): 161-164

Costa, M., L. Garc3a, A.S. Yunus, D.D. Rockemann, S.K. Samal, J. Cristina, 2000. Bovine respiratory syncytial virus: first serological evidence in Uruguay. *Vet. Res.*, 31: 241-246.

Gajendragad, M.R., S. Nagalakshmi, V. Vijayashree, K. Prabhudas and C. Natarajan, 1997. Development of an enzyme linked immunosorbent assay (ELISA) for the detection of antibodies to infectious bovine rhinotracheitis virus in cattle. *Indian Vet. J.* 74: 830- 833.

Graham, D.A., A. German, I.E. McLaren, D.A. Fitzpatrick, 2001. Testing of bulk tank milk from northern ireland dairy herds for viral RNA and antibody to bovine viral diarrhoea virus. *Veterinary record*, 149: 261-265

Houe, H., 1999. Epidemiological features and economical importance of bovine virus diarrhoea virus (BVDV) infections. *Veterinary microbiology*, 64: 89-107.

Loneragan, G.H., D.H. Gould, G.L. Mason, F.B. Garry, G.S. Yost, D.G. Miles, B.W. Hoffman, L.J. Mills, 2001. Involvement of microbial respiratory pathogens in acute interstitial pneumonia in feedlot cattle. *Am. J. Vet. Res.*, 62(10): 1519-1524

Sosa, G.R., M. Barrera, L. Ganges, H. Díaz de Arce M.T. Frias, 2000. Estudio de prevalencia de anticuerpos contra el virus de la diarrea viral bovina (BVDV) en rebaños lecheros, a partir de muestras de leche individual y de tanque. *Revista de salud animal.*, 22(3): 198-199.