

COMPARATIVE STUDIES OF SERUM FATTY ACIDS IN DERMATOPHILOSIS SUSCEPTIBLE AND RESISTANT CATTLE BREED IN VOM

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ABSTRACT

A study was conducted at National Veterinary Research Institute (NVRI) Animal Health Research laboratory to determine serum total fatty acids in dermatophilosis resistant and susceptible (healthy and infected) cattle breeds in Vom. A total of 30 Cattle, comprising 15 resistant (7 N'dama and 8 Muturu) and 15 susceptible (8 healthy (4 Sokoto Gudali and 4 White Fulani) and 7 infected (3 Sokoto Gudali and 4 White Fulani) animals. Blood samples were collected from the Jugular vein using 18 gauge hypodermic needle and decanted into sterile sample bottles. The bottles were properly labeled for proper identification and immediately submitted to the laboratory for serum fatty acids analysis. The results obtained from the laboratory, were subjected to statistical analysis using T- Test for unpaired observations. The results showed that serum total fatty acid were significantly higher ($p < 0.05$) in resistant cattle than the susceptible ones. Also, there was significantly higher ($p < 0.05$) total fatty acids in healthy susceptible cattle than infected ones. It was therefore concluded that serum fatty acids play important roles in the resistance of Dermatophilosis infection.

Key words: serum fatty acids, dermatophilosis, resistant cattle breed

INTRODUCTION

Dermatophilus congolensis is the filamentous bacterium involved in dermatophilosis, an exudative dermatitis affecting a wide range of animals (Stewart 1972). It is an important disease in West Africa, particularly Nigeria, where it accounts for a major part (about 50%) of all bovine skin disease (Oduge and Lloyd 1971). All indigenous zebu breed of cattle in Northern Nigeria (Banji, Rahaji, Wandara, White Fulani and Sokoto Gudali) and their crosses and all exotic breeds are susceptible to dermatophilosis. N'dama and Muturu cattle breeds are resistant, but their crosses are susceptible (Coleman 1967).

It had been observed by some authors, that significant changes in serum protein, electrolytes, lipids and vitamin values of animals during the course of an infection have significant effect on the pathology of that disease. This may be in their increase or decrease in association with certain disease (Cole 1974). Robert (1967) reported increased level of serum protein globulin during Streptothricosis infection in cattle and was shown to be responsible for the circulating antibodies in the serum. Decreased levels of fatty acids have earlier been implicated in the various skin problems (Williamson 1941). Hauson et al (1952) also demonstrated the bactericidal activities of skins of animals, to be entirely dependent upon the long chain fatty acids and their derivatives (soaps).

Since skin pathology have been precipitated in one way or the other when there is an alteration in serum lipid factors, it is therefore the objective of this study to evaluate

- 1) The serum fatty acids profile in dermatophilosis infection.
- 2) To compare the values of serum fatty acids in healthy and dermatophilus infected cattle.
- 3) To compare the values of serum total fatty acids in dermatophilus resistant and susceptible cattle.

MATERIALS AND METHODS

This experiment was conducted at the Biochemistry Laboratory of Federal College of Animal Health and Production Technology, National Veterinary Research Institute, Vom. Blood samples from 30 different cattle, comprising 15 resistant (7 N'dama and 8 Muturu) and 15 susceptible (8 healthy (4 Sokoto Gudali and 4 White Fulani) and 7 infected (3 Sokoto Gudali and 4 White Fulani) animals, were collected from the jugular vein using 18 Gauge hypodermic needle and decanted into a sterile sample bottle, and immediately submitted for laboratory analysis.

The total fatty acids were determined using Palmitic acid working standard (0.333 Mmol/L) according to Rodwell(1980), and the data obtained were further subjected to statistical analysis using T-Test of unpaired observations of Wahna(1989) and the mean differences separated, using the DMRT.

RESULTS AND DISCUSSION

The results of the serum fatty acids levels of resistant and susceptible (healthy and infected) cattle (table 1) indicated significant difference ($p < 0.05$) between the groups. The resistant cattle breeds had significantly higher ($p < 0.05$) serum fatty acids (0.460Mmol/L) than healthy susceptible cattle (0.0313Mmol/L) and also, was significantly higher ($p < 0.05$) than infected susceptible cattle breeds (0.241Mmol/L). There was no significant difference ($p > 0.05$) observed in the serum fatty acid levels of the susceptible healthy (Sokoto Gudali and White Fulani) Cattle breed. Table 2 shows that the N'dama and Muturu (Resistant) breeds did not indicate any significant difference($p > 0.05$) between the group.

The increased serum fatty acid levels of healthy(resistant and susceptible) cattle breeds than the infected cattle observed in this study suggest that fatty acid status of animals, determine the resistivity or vulnerability of cattle breed to important skin infections like dermatophylosis. This agrees with earlier work of; Sinclair(1952). Rodwell (1980), reported various degrees of skin lesions in fatty acid deficiencies. Sinclair (1952) reported that in deficient animals, the skin of the entire body are affected, the malphibian and granular layers of the epidermis are increased in size with pronounced hyperkeratosis. The keratins is collected into globules with parakeratosis being evidenced. This clinical picture is almost the same with dermatophilosis disease, indicating that decreased level may be one of the factors that predisposed the dermatophilus infected animals which is a renowned skin disease of cattle. Cole (1974) had earlier reported, however, that changes in serum protein, electrolytes, lipids and vitamins values of animals go a long way to determine it's vulnerability to that infection. Hanson et al (1952) also asserted that the bactericidal activities of the skin of animal are entirely dependent upon the long chain fatty acids and their soap. Turpine (1938) agrees with the observation that when fat is deficient, the skin over the rest of the body becomes dry and scurfy and the hair thin, especially over the face and around the eyes.

More so, the increased levels of serum fatty acids observed in the resistant cattle breeds could suggest the reason why N'dama and Muturu are resistant to dermatophylosis than the susceptible (White Fulani and Sokoto Gudali) cattle breeds observed in this study. Increased levels of fatty acids in the resistant breed may probably mean increased levels of Essential Unsaturated fatty acids which Hume (1938) reported that dryness and scruffiness of the fore and hind paws is the earliest manifestation of deficiency.

Table 1: Serum fatty acid levels of resistant and susceptible (healthy and infected) cattle breeds

No of Cattle	Health/Genetic Status	AGE	FATTY ACID (mmol/L)
8	Healthy	4.52 ± 0.82	0.313 ± 0.01 ^c
7	Susceptible	4.12 ± 0.34	0.241 ± 0.02 ^b
15	Resistant	4.64 ± 1.88	0.460 ± 0.05 ^a

Mean ± S.D in the same volumes with different superscript differs significantly (p< 0.05)

Table 2: Total Fatty Acids of Infected (susceptible) Cattle Breeds

NO OF CATTLE	BREEDS	AGE	FATTY ACIDS (mmol / L)
3	Sokoto Guali	4.14	0.221 ± 0.00
4	White Fulani	4.10	0.261 ± 0.04

Mean ± S.D in the same column with different super script differs significantly (p<0.05).

Table 3: Serum Fatty Acids Levels of Resistant Cattle Breeds.

NO OF CATTLE	BREEDS	AGE	FATTY ACIDS ((mmol/ L)
7	NDAMA	4.48	0.44 ± 0.024
8	MUTURU	4.80	0.48 ± 0.037

Mean ± S.D in the same column with different superscript differs significantly (p<0.05)

CONCLUSION AND RECOMMENDATIONS

The result of this study is a clear indication that Fatty acids play important roles in the resistance and prognosis of Dermatophilosis infection. It is however, suggested that, other important structural components like phospholipids and glycolipids should also be investigated, to determine their roles in Dermatophilus and other skin infections.

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