

THESIS TITLE      EFFECTS OF PROTEIN LEVELS, LINOLEIC ACID LEVELS AND  
MIXED FATS IN DIETS ON PERFORMANCE OF BROILERS

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#### ABSTRACT

The purpose of the study was to determine the effects of protein levels, linoleic acid levels and mixed fats in diets on performance of broilers. This study involved 3 experiments. The first experiment was to study the effects of protein and linoleic acid levels in diets on performance of 84 Arbor Acres broilers at the ages of 4 and 6 weeks in individual cages. The experiment was designed as 3x4 Factorial in Completely Randomized Design with 7 replications. The broilers were fed diets containing one of the following protein levels: 18, 20, 22 %. In each protein level, there were 4 levels of linoleic acid: 0.75, 1.00, 1.25 and 1.50 %, respectively. The results showed that when protein levels in the diets was increased, feed/gain of 1 to 4-week-old broilers became improved significantly ( $P < 0.01$ ) while protein efficiency ratio (PER) decreased significantly ( $P < 0.01$ ). It also caused a significant ( $P < 0.05$ ) decrease of abdominal fat in 6-week-old

broilers. A higher level of linoleic acid in diets positively affected the feed/gain and PER, on the other hand, abdominal fat was decreased. However, there were no significant differences ( $P > 0.05$ ). It also found that there was no interaction ( $P > 0.05$ ) of protein and linoleic acid levels in diets on performance of broilers.

In the second experiment, 96 Arbor Acres broilers at the ages of 10-45 days in individual cage were studied. The 3x4 Factorial in Completely Randomized Design with 8 replications was employed. These broilers were fed the same amount of protein as the first experiment. Then the amount of protein was reduced by 2 % when the broilers were between the ages of 24-45 days (16, 18, 20 %, respectively). In each protein level, there were 4 different linoleic acid levels: 0.75, 1.00, 1.25 and 1.50 %, respectively. The results showed that an increase of protein levels in diets for 10 to 24-day-old broilers caused a significant ( $P < 0.01$ ) improvement of feed/gain. In addition, PER of all ages of broilers was reduced significantly ( $P < 0.01$ ). However, the increase of protein levels in diets did not produce significantly ( $P > 0.05$ ) different amounts of meat and shear value but it caused a significant ( $P < 0.01$ ) decrement of abdominal fat. Increasing linoleic acid levels in diets had no significantly ( $P > 0.05$ ) affects on body weight gain and feed intake of broilers. However, this significantly ( $P < 0.05$ ) affected the feed/gain. It was found that the broilers fed with 1.50 % linoleic acid were most efficient in feed/gain. However, there was no significant difference with 1.25 and 1.00 % of linoleic acid levels. Broilers which were fed with 1.25 % of linoleic acid had the lowest abdominal fat but not a significantly

( $P > 0.05$ ) differed from other groups. The experiment concluded that the influence of protein and linoleic acid levels on performance of broilers had no interaction ( $P > 0.05$ ).

The third experiment was conducted to study the performance of broilers which were fed with a 20 % protein level at the ages of 0-3 weeks, then reduced to 18 % when they were 3-6 weeks of ages. There were 6 different kinds of mixed fats in the diets as follows: tallow and soybean oil, tallow and rice bran oil, tallow and palm oil, soybean oil and coconut oil, tallow and lard, tallow and poultry fat. All of the above mentioned diets had a 1.25 % linoleic acid level. The results showed that there were no significant changes ( $P > 0.05$ ) of body weight gain, feed intake, feed/gain, PER, meat, abdominal fat and shear value.

The findings indicated that even though the protein level of 22-20 % was best for feed/gain and caused the lowest amount of abdominal fat, it also caused the poorest PER. Thus, the protein level of 20-18 % would be the most appropriate level. The higher the level of linoleic acid in diets positively affected feed/gain. However, there was no statistical difference between the levels of 1.25 and 1.50 %. Broilers fed with 1.25 % of linoleic acid seemed to have lower abdominal fat although a significant difference was not found. Therefore, the most appropriate level of linoleic acid in diet should be at 1.25 %. It should be also pointed out that feeding broilers with the same level of linoleic acid with different mixed fats would not have effects on their performance.