

THE EFFECTS OF COMMERCIAL ORGANIC ACID, PROBIOTIC and ESSENTIAL OIL MIXTURE AT TWO LEVELS ON THE PERFORMANCE OF BROILERS

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INTRODUCTION

Feed additive antibiotics have been used more than fifty years in feed industry all over the world as growth promoters. The much lower doses used as growth promoters in feed can still allow many of the beneficial bugs to grow by inhibiting bacterial lactic acid production and preventing toxin production (Langhout, 2000). Since the proposed total ban on subtherapeutic feed antibiotics, probiotics and organic acids is currently receiving considerable attention in animal nutrition because of their association with non-residual and non-resistant properties, the use of herbs and spices, phytogetic products and essential oils is gaining momentum (Mellor, 2000).

The most commonly used and well known essential oil is distilled from oregano. The Oil of oregano contains about 50 different compounds (Hertrampf, 2000). The two most important components of oregano oil are monoterpenic phenols. Phenols increase cell permeability, resulting in water imbalance and cell death, and hence bacterial resistance to phenols cannot develop (Bassett, 2000).

MATERIALS AND METHODS

One day-old male and female (Cobb-500) broiler chicks were used in the experiment. Five replicates of 50 chicks each were fed each dietary treatment. One thousand and two hundred and fifty chicks were weight individually and randomly assigned in each of 25 pens. Chicks were placed in an open-sided naturally ventilated broiler house with a photo-regimen of 24 h light. Experimental diets and water was provided for *ad libitum* consumption. Birds were fed on standard commercial starter and finisher diets from 0 to 21 and 22 to 42 days of age, respectively. Addition level of commercial organic acid (FRANKLIN) and probiotic (PROTEXIN) for kg feed were 2.5 g and 1.0 g, respectively. Essential oil mixture (HERBROMIX) was added to kg of feed at two different levels 36 mg and 48 mg, respectively.

HERYUMIX contains totally six different essential oils: Oregano oil (*Origanum sp.*), Laurel leaf oil (*Laurus nobilis*), Sage leaf oil (*Salvia triloba*), Myrtle leaf oil (*Myrtus communis*), Fennel seeds oil (*Foeniculum vulgare*), Citrus peel oil (*Citrus sp.*) Control group as standard diet did not contain growth promoter feed additive. The experimental basal diet is shown in Table 1.

At 21 and 42 days of age all birds were weighed of each pen and feed intake was recorded for determination of feed conversion. Mortality was recorded daily. The experiment lasted for 42 days. The data were analyzed using the General Linear Models procedure of SAS (Sas Institute, 1986) significance was based on a 5 % probability.

RESULTS

The effect of dietary treatments on broiler performance is shown in Table 2. All dietary treatments increased body weight significantly at 21 days of age, but chicks fed with probiotic and essential oil mixtures supplemented diets gained more body weight than those of control and organic acid treatments at day 42. Also, all growth promoter feed additives had increasing effect on feed consumption at first 3 week period, but no significant differences were determined for all 6 weeks experimental period. Feed conversion rate and mortality of broilers was not effected by treatments. However feed conversion rate of probiotic and essential oil mixtures supplemented treatments were slightly better those of control and organic acid treatments.

Table 2. The effects of dietary treatments on broiler performance.

| Treatments | Body weight (g) | Feed consumption (g) | Feed conversion | Livability (%) | | | |
|-----------------------|---------------------|----------------------|-----------------------|----------------|------|------|-------|
| | 21 d | 42 d | 21 d | 42 d | 42 d | | |
| Control | 584.4 ^a | 1949.34 ^a | 1018.10 ^a | 3922.20 | 1.89 | 2.95 | 99.29 |
| Organic acid | 607.0 ^{ab} | 1978.51 ^a | 1043.80 ^{ab} | 3953.60 | 1.86 | 2.94 | 99.20 |
| Probiotic | 602.77 ^b | 2056.01 ^a | 1064.40 ^{ab} | 4036.60 | 1.89 | 2.00 | 99.80 |
| Essential oil (36 mg) | 616.4 ^{bc} | 2105.26 ^a | 1077.60 ^{ab} | 4076.00 | 1.90 | 1.98 | 98.50 |
| Essential oil (48 mg) | 635.7 ^{cd} | 2085.31 ^a | 1069.60 ^a | 4057.60 | 1.94 | 1.98 | 98.80 |
| Standard deviation | 4.81 | 14.95 | 17.78 | 45.72 | 0.02 | 0.03 | 1.20 |

^aP<0.05 ^{abcd} Means within a variable with no common superscript differ significantly

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Table 1. Composition of diet

| Ingredients (g/kg) | Starter diet (1 to 21 d) | Grower diet (22 to 42 d) |
|------------------------------------|--------------------------|--------------------------|
| Corn | 545.50 | 620.88 |
| Soybean cake | 284.73 | 263.72 |
| Sunflower cake | 56.87 | - |
| Meat and bone meal | - | 30.00 |
| Fish meal | 42.71 | 37.86 |
| Vegetable oil | 36.84 | 40.00 |
| Sodium chloride | 2.50 | 2.50 |
| Ground limestone | 15.73 | 5.66 |
| Dicalcium phosphate | 6.73 | 2.78 |
| Vitamin premix ^a | 2.50 | 2.50 |
| Trace mineral mixture ^a | 1.00 | 1.00 |
| DL-methionine | 1.00 | 1.00 |
| L-lysine | 1.00 | 1.00 |
| Coccidiostat | 1.00 | 1.00 |
| Analyzed composition (%) | | |
| Dry matter | 90.85 | 90.25 |
| Crude protein | 21.55 | 19.58 |
| Crude fat | 4.93 | 5.91 |
| Crude cellulose | 4.35 | 3.06 |
| Crude ash | 7.03 | 6.30 |
| Total calcium | 1.22 | 1.12 |
| Total phosphorus | 0.63 | 0.61 |
| ME (kcal/kg) | 3048 | 3167 |

CONCLUSION

The commercial probiotic and essential oil preparations supplemented diets in this trial improved broiler performance with promising economic results even when compared to those standard diet and organic acid supplemented diet.

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