

Dietary sodium diformate improves growth performance and nutrient digestibility in broilers against negative and positive controls



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Introduction: Broiler growth rate and feed efficiency are key to economic performance through to market. Dietary formic acid and its salts act against pathogens, helping to decrease pressure on the immune system and improving nutrient digestibility. Previous studies on the antimicrobial impact of organic acids and their salts, including sodium diformate (Formi NDF, ADDCON), placed less emphasis on the impact in the GI-tract of birds. This formed the impetus for this study, which assessed the impact of the additive on pH-levels at different locations of the GI-tract and digestibility parameters.

Material and methods: In a trial conducted at a research farm in Iran, 0.1% NDF was tested in a typical corn-soy diet, against both a negative (NC) and positive control (PC) containing an antibiotic growth promoter (500 mg Trimethoprim-Sulfadiazine per kg). 216 day-old broiler chicks (male Ross 308) were randomly selected into 3 treatment groups with 6 replicates of 12 birds each. Feed, in mash form, and water were available *ad libitum* throughout the 42-day trial period. The effects of dietary NDF on performance (body weight gain BWG, FCR, broiler index EBI), pH in the gizzard and ileum, Protein Efficiency Ratio (PER) and apparent ileal digestibility (CIAD) of protein and minerals were examined at the end of the trial. Data were analysed using the t-test and a confidence level of 95% defined for these analyses.



Results and discussion: Performance was boosted in the birds fed 0.1% NDF (Table 1). Treated birds had a significantly increased BWG against NC and PC respectively (2126 g vs. 2007 and 2006 g; $P < 0.05$), while the FCR tended ($P < 0.1$) to be improved (1.78 vs. 1.87 and 1.86). EBI was enhanced by almost 11% against both NC and PC. Utilization of nutrients was also significantly improved in the NDF-fed broilers, especially for crude protein, crude ash, calcium and phosphorus (Table 2). Calculated as PER, the usage of NDF led to an increase of protein utilization against both controls by more than 5%, which is in full agreement with the lowered pH in the GI-tract.

Table 1: Performance parameters in broilers fed with or without sodium diformate (Formi NDF) till slaughter

	Negative control	Positive control	0.1% NDF
BWG [g]	2007 ^a	2006 ^a	2126 ^b
Avg. Daily Gain [g/d]	47.8 ^a	47.8 ^a	50.6 ^b
FCR	1.87	1.86	1.78
PER*	2.66	2.67	2.80
EBI**	256	257	284

*PER - Protein Efficiency Ratio = BWG [g] / Protein Intake [g]; **EBI - European Broiler Index = (ADG [g] x Survival rate [%]) / FCR x 10
Means in a row not sharing the same superscript are significantly different ($P < 0.05$)

Table 2: Intestinal pH and ileal apparent digestibility parameters in broilers fed with or without sodium diformate (Formi NDF) till slaughter

	Negative control	Positive control	0.1% NDF
pH Gizzard	2.89	2.97	2.54
pH Ileum	6.75 ^b	6.73 ^b	5.66 ^a
CIAD crude protein	0.69 ^a	0.80 ^b	0.79 ^b
CIAD crude ash	0.29 ^a	0.42 ^b	0.50 ^c
CIAD calcium	0.48 ^a	0.59 ^b	0.60 ^b
CIAD phosphorus	0.45 ^a	0.53 ^b	0.62 ^c

Means in a row not sharing the same superscript are significantly different ($P < 0.05$)

This study demonstrates that including NDF in broiler diets is a sustainable tool for improved performance and nutrient utilization, thereby saving nutrient resources, even compared to an antibiotic growth promoter.

