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Effects of dietary supplementation with vitamin E and *Moringa oleifera* ground leaves on broiler performance, gut health and meat quality in broiler chickens

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In view of the increasing consumer demand for safe and quality poultry products has fuelled the development of natural, plant-based alternatives for antibiotic growth promoters in poultry farming. The current study was conducted to evaluate the effects of dietary supplementation with vitamin E (as α -tocopherol acetate) and ground *Moringa oleifera* leaves (MOLM) on growth performance, gut health and meat quality in broiler chickens. A total of 600, day-old broiler chicks were randomly allocated to four dietary treatments formulated as follows: T₁ with a coccidiostat and antibiotic growth promoter+200 mg/kg vitamin E; T₂ with 50 kg MOLM/ton feed; T₃ with 25 kg MOLM/ton feed+100 mg/kg vitamin E and T₄ with 12.5 kg MOLM/ton feed with 200 mg/kg vitamin E. Although there were no significant difference in feed intake, bodyweight gain, feed conversion efficiency and carcass yield were highest in birds fed T₂ and T₃ diets respectively. Supplementation with MOLM improved the digestive physiology and gut health of broilers as with birds that were offered birds with coccidiostats and antibiotic growth promoter. Antibiotic and plant extract supplementation. The addition of α -tocopheryl acetate significantly prolonged the shelf life (pH value, color and drip loss) of meat during refrigerated storage (4°C) particularly in meats from birds that were supplemented with MOLM. Meat from birds Microbiological analyses showed that *E. coli* counts were significantly lowest in meat samples from birds that were fed T₂ and T₃ diets. The results of this study indicate that dietary supplementation with vitamin E and ground *Moringa oleifera* leaves significantly improved the broiler performance, gut health and meat quality.

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Cattle health services

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The use of automated measurement to monitor the behaviour of animals is now widespread. Key features that have been identified include restlessness (as an indication of oestrus), eating and rumination. The paper presents the development and evaluation of eating and rumination signatures derived by processing signals from a three-axis accelerometer, the foundation for a range of decision support services optimising farm operations through alerting of the early onset of illnesses e.g. the basis for a cloud based nutrition service. The methodology for determining eating and rumination signatures using features within accelerometer raw measurement data is detailed. Furthermore evidence is provided that the signatures are a highly accurate and robust determination of these cow states. Using a Hidden Markov state transition model that determines the likelihood of a transition between behavioural states e.g. when the animal transitions between eating and ruminating, an overall prediction accuracy of better than 90% is obtained validated through commercial trials. The engineering approach adopted is designed to be compatible with a low power processing platform while lends itself to extended lifetime operation (7 years) using two AA batteries. Case studies on commercial farms are presented where the Silent Herdsman platform has flagged significant changes in eating and rumination patterns, a clear indication of the onset a detrimental animal welfare condition before any clinical signs become visible.

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