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UNIVERSITY OF NEW ZEALAND

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**FEEDING STRATEGIES TO ALLEVIATE THE EFFECT OF HEAT STRESS ON GROWTH PERFORMANCE  
IN BROILERS**

A thesis presented in partial fulfilment of the requirements for the degree of

Master of Science

in

Animal Science

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Heidi Anna Jack

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## **Abstract**

Broiler production is seen as critical to socio-economic development within the tropics. With the higher and rising temperatures of the tropics, heat stress is a major challenge of the industry. Of the many approaches used to alleviate heat stress, nutritional strategies have been seen as more economically viable in comparison to non- nutritional strategies used to alleviate heat stress.

The current study was done to assess both the combined and specific impact of diet density (high fat versus low fat diets) and diet form (mash versus pelleted diets), on alleviating heat stress in broilers. Biological responses were monitored through growth performance and digestibility data.

The experimental design used in the study was a 2 x 2 x 2 factorial arrangement of treatments from day 10 to day 34 of the trial period. Birds were subject to one of eight treatments which included a combination of one of two different temperatures (normal or elevated), one of two different diet types (high fat or low fat) and one of two different diet forms (mash or pellet). These treatments included Low Fat Mash under Normal Temperature conditions (LMN), Low Fat Mash under Elevated Temperature conditions (LME), Low Fat Pellet under Normal Temperature conditions (LPN), Low Fat Pellet under Elevated Temperature conditions (LPE), High Fat Mash under Normal Temperature conditions (HMN), High Fat Mash under Elevated Temperature conditions (HME), High Fat Pellet under Normal Temperature conditions (HPN) and High Fat Pellet under Elevated Temperature conditions (HPE).

Pellet fed birds had a higher growth performance under elevated temperature and in phase 2 (day 21 to 34), had the highest ( $P = 0.016$ ) feed intake (166.9 g/b/d) compared to other treatments which were all statistically equivalent. With respect to ileal nutrient intakes, the intake of fat for the overall period and the intake of AME for phase 2 was highest ( $P = 0.045$  and  $P = 0.018$  for fat and AME respectively) on pellet fed birds housed under elevated temperature. Also, these birds had the highest ( $P = 0.048$ ) growth efficiency (16.8 MJ/kg per kilogram gain) compared to mash fed birds (18.8 MJ/kg per kilogram gain).



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## LIST OF ABBREVIATIONS

<b>AME</b>	Apparent Metabolisable Energy
<b>ADF</b>	Acid Detergent Fibre
<b>ADG</b>	Average Daily Gain
<b>AMEdg</b>	AME require for a daily gain of one kilogram
<b>CIAD</b>	Coefficient of Ileal Apparent Digestibility
<b>DM</b>	Dry Matter
<b>FCR</b>	Feed Conversion Ratio
<b>FI</b>	Feed Intake
<b>GE</b>	Gross Energy
<b>KJ</b>	Kilo Joules
<b>ME</b>	Metabolisable Energy
<b>MJ</b>	Mega Joules
<b>NDF</b>	Neutral Detergent Fibre
<b>NE</b>	Net Energy
<b>PDI</b>	Pellet Durability Index
<b>RO</b>	Reverse Osmosis
<b>cpNE</b>	Net Energy obtained from protein
<b>sNE</b>	Net Energy obtained from starch
<b>fNE</b>	Net Energy obtained from fat
<b>pNE</b>	Potential Net Energy

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