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The effect of synthetic and bovine conjugated linoleic acid on energy balance

A thesis presented in partial fulfilment of the requirements for the degree of Master of Science in Nutritional Science at Massey University, Palmerston North, New Zealand

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1999

ABSTRACT

Conjugated linoleic acid (CLA) is biologically active and has altered body composition in experimental animals. Dietary supplementation with synthetic CLA reduced body fat in mice and rats in a number of studies. The CLA used in previously published research contained mixed isomers, the majority of which were 9c11t-CLA and 10t12c-CLA. The biologically active isomer at the time of starting the trials described in this thesis was assumed to be 9c11t-CLA, due to the prevalence of this isomer in biological tissues.

The two trials in this thesis were designed to investigate the effect of dietary CLA on energy balance. In the first (refer Abstract, section 2.1), synthetic CLA reduced body fat in male BALB/c mice in a dose response manner, over the range 0.25 to 1.0 % w/w CLA in the diet. High levels (1.0 % and 2.0 %) caused a reduction in growth. In the second (refer Abstract, section 3.1) dietary treatments supplemented with synthetic CLA, or bovine CLA in milk fat, at levels similar to the 0.25 % w/w synthetic CLA treatment found to be effective in reducing body fat in mice, had no effect on energy balance in female Sprague-Dawley rats.

The CLA in milk fat contains approximately 86 % of the 9c11t-CLA isomer while synthetic CLA contains approximately 37 % 9c11t-CLA and 46 % 10t12c-CLA. Results from these two trials support recent evidence from research demonstrating 10t12c-CLA is the biologically active isomer, in relation to energy metabolism and body composition.

9c11t-CLA is the prevalent isomer of CLA found in the human diet. The CLA used in previously published research was chemically synthesised and contained a considerably higher proportion of 10t12c-CLA than found in human food sources.

PREVIOUS PUBLICATION: The study described in Chapter 2 has been previously published as an abstract and displayed as a poster presentation at the Pacific Partners in Nutrition Conference, held at Auckland, New Zealand, September, 1999 (Hayman, *et al.*, 1999).

ACKNOWLEDGEMENTS

I wish to thank my family for support, interest in my work, and for willingly providing me with time to complete this work. Particularly my husband Neil, and Tim and Craig. Thanks also to my parents, for company and meals, during some of the time at Massey University.

Sincere thanks are given to my supervisors Dr Hilary Green (Milk and Health Research Centre) and Dr Rodger Pack (Massey University) for their valued opinions, encouragement, commitment and sharing their many years of experience. Special thanks to Hilary for assistance with experimental protocol, guidance during bench work and comments during draft writing.

The Milk and Health Research Centre (MHRC), which is jointly funded by the New Zealand Dairy Board and New Zealand Dairy Research Institute, funded this work. My employers, the New Zealand Dairy Board, granted study leave. Massey University assisted financially with a Massey Masterate scholarship, as did M&HRC with a scholarship in Milk and Health. I would like to express my appreciation to the M&HRC, NZDB and Massey University for making the opportunity to complete a higher degree possible.

I wish to thank Marie Russel and Florence Chung in the Nutrition Laboratory of the Institute of Food, Nutrition and Human Health (IFN&HH), Massey University, for analytical services in determining fat, protein, ash and moisture.

The mice in the energy balance study described in Chapter 2 were also used in a separate study investigating the effects of CLA on immune function (Zhao, 1999). Thanks are due to Dr Kay Rutherford and Hui Zhao for sharing animals and facilities during the mouse CLA feeding trial.

Thanks are due to Bertram Fong and Dr Alastair MacGibbon for CLA analysis and method development carried out at New Zealand Dairy Research Institute.

I would also like to thank the following people;

Dr Linda Schollum, Chris Booth and Anne Broomfield of M&HRC for advise and assistance in working with animals.

The staff at the Small Animal Production Unit for use of facilities.

Margaret Scott and Justine Shoemark at the Food Evaluation Unit of NZ Institute Crop and Food Research Ltd for use of facilities.

Brett Guthrie and John Pedley in the Physiology Laboratory (IFN&HH) for use of facilities and assistance with calorimetry. The musical and humorous working atmosphere in the Laboratory was also much appreciated.

Dr Kay Rutherford, for assistance with Animal Ethics approval, and staff in the Immune Laboratory of the M&HRC for assistance in obtaining blood and body composition samples.

Nicky Frearson and Sally Robinson in the Nutrition Laboratory (M&HRC) for assistance with animal and laboratory work.

Dr Phil Pearce (IFN&HH) for the free fatty acid analytical service.

Don Thomas for use of sample preparation facilities at The Poultry Research Centre (IFN&HH).

Roger Kissling (NZDB) and Dr Barbara Kuhn-Sherlock (M&HRC) for statistical advise.

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