

Animal Research Programme – Animal Nutrition and Product Quality

RMIS No: 5755

Title: Development of a dietary supplement based on omega-3 polyunsaturated fatty acids to increase cow fertility

Abstract

Poor dairy cow reproductive performance costs the Irish cattle industry approximately €500 million annually. Nutrition plays a fundamental role in the reproduction; specifically there is emerging evidence that supplemental polyunsaturated dietary fatty acids (PUFA) increase cow fertility. For example, in-vitro studies show that the omega-3 PUFA eicosapentaenoic and docosahexaenoic acids have pivotal roles in the suppression of uterine prostaglandin F₂, a critical regulator of embryo survival, though the cellular mechanisms are as yet unclear. Such information is essential to formulate diets to increase cow fertility by increasing embryo survival. However, the optimum fatty acid(s), combinations, dietary levels or the mechanism(s) by which they act on the reproductive process have to be clarified. This project proposes a targeted approach examining the effects of specific dietary ω -3 PUFA on cow uterine function including control of prostaglandin synthesis and transport, oocyte development and competence, embryo development and gene expression. Finally, based on the outcome of several studies a specific ω -3 PUFA enriched diet will be formulated and its effect on dairy cow fertility will be measured in a large scale field trial.

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