Advances in Animal Biosciences (2013), **4:s1**, p 1 © The Animal Consortium 2013
doi:10.1017/S2040470013000023X

advances in animal biosciences

Introduction

Many challenges are faced by world dairy production systems as we strive to meet the demands of feeding nine billion people in the coming years. Minimising the carbon foot print of our industry is a challenge for everyone, from producer to retailer and it is one that will to define how we produce milk in the years ahead. In 2011, the Irish Government launched a major initiative 'Food Harvest 2020', with an emphasis on clean, green and more efficient (smart) production systems of farming. Food Harvest 2020 sets ambitious targets, including a 50% increase in dairy production, which will create major opportunities and challenges. One of the largest challenges will be to achieve substantial increases in production with concomitant reductions in environmental burden. In order to achieve the best of both these worlds, dairy agriculture needs to fully understand its current impact on the environment, both negative and positive, especially as the latter is often overlooked. This understanding needs to take into account the different processes and systems globally and yield appropriate, measurable outcomes in order to prepare for inevitable forthcoming regulations. One of the major environmental impacts is, of course, livestock agricultures contribution to green house gas emissions, most notably methane from enteric fermentation. Numerous mitigation strategies are being investigated in order to reduce methane production by ruminant livestock, including animal breeding, diet formulation, dietary additives and alteration of gut microflora. In assessing these strategies, one must take into account the 'local' situation and adopt those most relevant strategies. However, it is clear that improving efficiency of production per unit of output (e.g. litre of milk) is key to attaining increased production with limited negative environmental impact.

The rumen is of critical importance for efficient and sustainable production systems and there are several ways in which dairy cows can be fed to further optimise production. Opportunities to improve transfer of nutrients to milk and minimise the potential negative environmental impact of dairy production are the objective, while at the same time ensuring optimum animal health and welfare; failure to attain the latter results in significant production losses and increased costs of production.

It is crucial to objectively review and disseminate current research enabling all bodies involved in the dairy industry to apply it at producer level. To this end, Alltech and University College Dublin have come together to address one of the biggest challenges facing our industry as we move towards the abolition of EU milk quota in 2015.

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https://doi.org/10.1017/S2040470013000023X Published online by Cambridge University Press