

PRI

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FOR THE FUTURE

BIOCHAR FEEDING TRIALS

More Sustainable Dairy Production

Cheshire is home to over 450 dairy farms and nearly 10% of the UK's dairy herd. The dairy and beef sectors are important components of UK agriculture but there are challenges.

Ruminating cows produce a lot of methane and represent a significant source of total UK GHG emissions. Cows also produce a lot of slurry and manure. Both are important nutrient sources for pasture and arable land but can also cause diffuse pollution in watercourses and emissions of ammonia to the atmosphere.



Our Approach

Feeding biochar in the daily ration can reduce methane emissions from a cow by between 6% and 15%. Work at other universities has involved placing cows in biochambers and measuring everything that goes in (inputs) and everything that comes out (outputs). The science behind this is still being studied but it is believed that the cow's rumen (stomach) is more efficient when biochar is added to the ration.

Some of the dairy cows at Reaseheath, the high yielders, and some of our weaned calves are having biochar added to their feed. We know that methane production is suppressed. We are looking at the other impacts that may arise if cattle are fed biochar as part of their feed ration.

What is biochar?

Biochar is produced by heating biomass, usually wood but other sources such as bracken, grass, and some food wastes, up to 1,000°C in the absence of oxygen. Volatile materials are driven off and what is left is almost pure carbon, with some trace minerals and elements. Most of us know biochar as charcoal.

Biochar is "black gold" and has many useful properties. A lump of biochar is full of micropores. This microporosity gives biochar a massive internal surface area: 25g of biochar may have an internal surface area of 3,500m², almost half the size of Wembley football pitch. Micropores are ideal environments in which bacterial communities can thrive.



Research at Reaseheath

The robotic milking system allows us to measure accurately the volume of milk, butter fat and protein content, and other metrics such as bactoscan and somatic cell count. The robots also allow us to measure the feed intake and therefore the biochar intake.

A dairy cow consumes up to 25kg/day of carefully prepared ration mixed to ensure the cow receives the inputs she needs. Our initial trials add between 100g and 300g/day of biochar.

A more efficient rumen may mean:

more milk is produced for a given amount of feed, or the same amount of milk for less feed
milk quality is enhanced, for example butter fat and protein content

Cow health is improved resulting in lower veterinary and medicine costs

Concern over the use of antibiotics and microbial resistance requires the farming industry and food producers to reduce inputs of medicines. This will benefit farm margins, society and the environment.

Cows are happier

There is anecdotal evidence that cows fed biochar are happier. Herdsmen, who know their cows, can intuitively sense, and have reported, that their cows are "happier". We are working with University of Chester to see if we can establish some happiness metrics.

Calves fed biochar after weaning may perform better throughout their life

200 calves are born throughout the year at Reaseheath. Once weaned, we will add biochar to the rations of a small cohort and follow their progress during their time in the Reaseheath dairy herd. We are looking for impacts around live weight gain, health, first conception and pregnancy, milk yield etc (and happiness).

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