How CCm Technologies impacts CO_2 equivalent (CO_2e) emissions

The environmental benefits of CCm's technology:

1. Utilisation of waste streams – CCm's process technology promotes a circular economy by producing high-value, high-performance materials from low or negative value inputs, particularly from the water treatment, food manufacture and agricultural waste sectors. The waste input component of CCm's fertiliser can be up to 90%, including materials which could otherwise have ended up in landfill or discharged into water courses. The utilisation of existing resources reduces demand for finite elements, such as mined Phosphates, and reliance on the highly energy-intensive processes usually involved in conventional fertiliser production.

2. Reduction of Carbon emissions – Current agricultural processes produce around 10% of all UK greenhouse gases but more importantly end-to-end food production are 23% of total greenhouse gas (GHG) emissions. By targeting the significant Carbon footprints associated with conventional fertiliser production with reductions in excess of 90%, CCm's technology can contribute meaningfully to achieving Net Zero ambitions in all jurisdictions, not just in the UK. Carbon savings result from:
    - Direct capture and utilisation of waste CO_2,
    - Avoidance of primary Carbon use, and
    - Carbon storage/sequestration in the soil.

3. Delivering high yields, improved soil fertility and low costs – CCm's products have been demonstrated to equal or outperform conventional fertilisers in terms of yield and protein quality, with between 15-20% less Nitrogen and Phosphate applied; thereby facilitating farmers' Net Zero transition. The fertilisers also deliver additional environmental benefits including enhanced water and nutrient retention contributing to significantly lower run-off/leaching resulting in reduced water pollution, and lower NoX emissions (in excess of 60% in both cases) as well as increased Carbon retention in the soil.

CCm Growth® fertilisers generate Carbon savings in the following ways:

- Carbon Utilisation
- Carbon Sequestration
- Carbon Avoidance

Carbon Utilisation

An important step in CCm's production process involves the capture and utilisation of CO_2 to stabilise the nutrients in the fertiliser. The innovative step centres on the simplicity of CCm's technology which is based around blending three constituents – CO_2, a fibre/cellulosic material (such as straw, grass, wood chip or digestate cake) and Ammonia. The CO_2 is drawn post-combustion from a chimney stack or bio-gas separator and flows through the fibre coated with Ammonia at concentration levels between 9% and100%. While the process works with virgin fibre and primary Ammonia, critically the flexibility of the process allows for the use of waste/recovered materials driving enormous Circular Economy benefits through effective resource optimisation.

Carbon Sequestration

CCm Growth® fertiliser pellets contain significant quantities of organic material and Carbon; the exact levels vary depending on the formulation produced. This Carbon comes from:

- CO_2 captured in the production process, and
- The anaerobic digestive waste used as a primary input into the process which is rich in organic matter and Carbon.

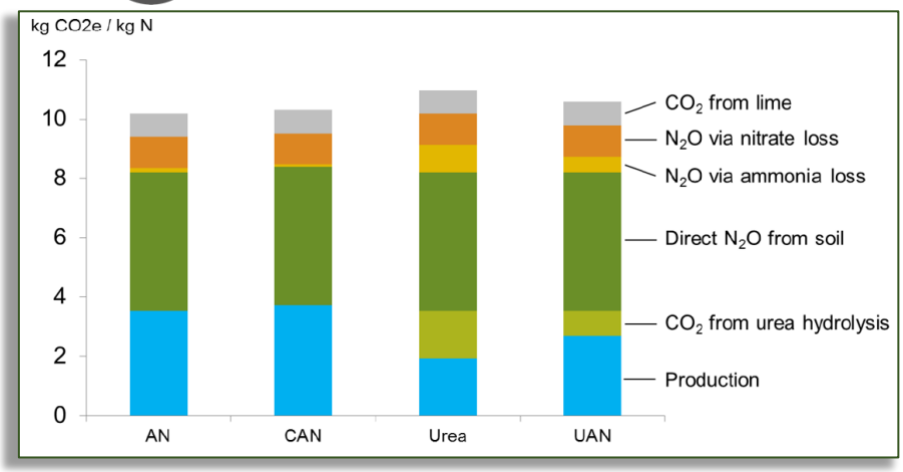
The Carbon in the pellet is sequestered in the soil when the pellets are applied to the land. The CCm process stabilises the Carbon in the pellet and therefore improves Carbon retention resulting in long term sequestration of Carbon in the soil. Unlike most Carbon sequestration, CCm's technology delivers two distinct positive environmental impacts. In addition to locking Carbon away thereby decreasing CO_2 in the atmosphere, depositing much needed organic matter and Carbon to soil denuded by decades of traditional fertiliser use will contribute to improving soil fertility.

Where is CCm in the process of attaining Carbon sequestration credits?

- Puro is a Carbon sequestration B2B marketplace that is now majority owned by NASDAQ (Link) as of June 2021. Puro have had CCm's pellets analysed using the "Yasso 7" soil carbon protocol and are in the process of selecting a verifier to certify CCm's Bagley plant. They are willing to certify that 18% of the carbon in the pellet will remain in the soil for in excess of 20 years. We believe this is an initial conservative assessment in light of the nascent nature of Carbon markets and expect that actual results will increase this figure significantly. The verifier is expected on site in October to certify the life cycle assessment of Carbon emissions and the predictability of Carbon in the pellet. Puro's credits are called "*CORC20+*" and are calculated by subtracting the amount of CO_2 used to make the pellet from the CO_2 equivalent of the carbon that will remain in the ground for 20 years. We would hope to have this certification by the end of 2022.
- CCm has commenced a process to get certification from the Verra platform for our sequestration through an existing methodology called VM0042 (Link). The Carbon sequestration period is 100 years, but the amount of CO_2 used in production is not subtracted. We would estimate that it will take until the end of Q2 2023 to get certification to be able to claim credits under VM0042.

Carbon Avoidance compared with using traditional fertilisers

- Traditional fertilisers bear significant responsibility for the Carbon footprint attributed to agriculture. Most of this footprint comes from the production and application of Nitrogen. The graph below illustrates the significant Carbon footprint of European-made Nitrogen fertilisers, although from a relative production perspective, other jurisdictions around the world are meaningfully more Carbon intentive.



As can be seen, the cradle-to-grave Carbon footprint of fertilisers is about 10t per tonne of Nitrogen in the fertiliser.

The diagram below shows how CCm Growth® fertilisers reduce this Carbon footprint:

Reduces CO2 used in production

Sequesters carbon into the soil

Reduces level of nitrogen required by crop

Reduces NOx gases emitted during and after spreading

Reduces Nitrogen leaching into water courses

Reverses soil carbon destruction by traditional fertilisers

CCm's progress in attaining Carbon credits for its CO_2 avoidance savings ?

Type of avoidance	Current Situation
Avoidance of Nitrogen from decreased fertiliser usage compared to chemical fertilisers which results in lower NOx gas emissions and Nitrogen leaching	The VM0042 certification discussed in the previous section will cover this avoidance.
Avoidance of NOx gas emissions during application of the fertiliser as the Nitrogen in CCm fertiliser is more stable than Nitrogen in chemical fertilisers and sludge to land and therefore less is lost to the atmosphere and water courses.	Currently there is no methodology that covers this avoidance. CCm will request a change to the VM0042 methodology to take account of this avoidance.
Avoidance of CO_2 emissions as CCm fertiliser has lower CO_2 emissions during production and transport versus chemical fertilisers.	There is currently no methodology that covers this avoidance in either VERRA or Gold Standard.