Research content for the short video CO2 4 Food_ Utopia 2023

"Imagine a future, where CO2 is on the plate, not in the atmosphere ... powered by new bioreactors using recycled CO2 for sustainable food"

Student Statement: "The video showcases the dual potential of CO2: accelerating plant growth and transforming into protein powder for food production."

Capture, store & use CO2 from various sources.

Climate change requires rapid and comprehensive reductions in CO2 emissions. In order to achieve the goal of "net zero emissions", it is absolutely necessary to also bind CO2 emissions in order to cancel out remaining emissions in the balance sheet.

CO2 capture, especially from industrial or power plant waste gas streams, is already helping to reduce emissions. Andritz is currently scaling up a pilot plant for CO2 capture at cement plants. If biomass is burned instead of coal, a CO2 sink is created in the balance sheet.

Research at Graz University of Technology and the COMET Center BEST is investigating methods for additional production of green hydrogen from this process (bio-looping). Residual materials such as sewage sludge are also used in this process.

If the CO2 is then used as a material, emissions from the substituted products are again avoided. For example, acib and several startups are working on the extraction of proteins from CO2, which replace more climate-intensive animal feed. Methanation of CO2 via synthesis or hydrogenation processes also enables a sustainable energy carrier.

But farmers are also changing once again. With biogas & large PV plants they became "energy farmers", in the future they will probably become CO2 sinkers: with the active build-up of the humus layer as carbon storage in the soil (especially by avoiding plowing, pilot region Kaindorf), with the introduction of biochar, i.e. charred biomass into the soil (research by BEST) as well as sustainably optimized forestry (special CO2 storage plants?).

Geological storage (cf. current prototypes in Denmark) will also be a building block on which little research is being done in Austria and which is not currently permitted here.

Highlights from the Valley:

Econutri - extracting proteins from CO2: https://econutri.com/

Andritz AG: Environmental solutions

Research at the site

BioLooping: ***https://www.tugraz.at/institute/ceet/research/hacker-group/projekt-uebersicht/bio-loop/***

From Slurry to high-purity Hydrogen: ***https://www.tugraz.at/en/tu-graz/services/news-stories/tu-graz-news/singleview/article/von-guelle-zu-hochreinem-wasserstoff0***

Protein research for industrial applications: ***https://acib.at/de/home/***