

1.5 Good practices examples in CE business models in the food supply chain

e-module 1: Circular economy and food supply chain
October 2021



Good practice examples

- UNVERSCHWENDET, AT



- OLIO, UK



- Permafungi, BE



- LIVIN, AT



- Circulus Agtech, CAN



UNVERSCHWENDET, AT

- Gives superfluous fruit and vegetables a new purpose by reworking them into jam, mustard, syrup, chutney, bruschetta etc.
- Founded in 2016 by the siblings Cornelia and Andreas Diesenreiter in Vienna
- Saved over 5 million kilograms of perfectly fine fruits and vegetables
- Use of an AI to help dealing with the surpluses



<https://unverschwendet.at>

Field of Work

- Process fruits that are not sold because they are too big, too small, ripe at the wrong time, do not have the right color or are simply too much
- Use unprinted newsprint rolls for the packaging of the glasses
- The start-up relies on regional farmers and people who want to share their harvest
- Their network consisting of more than 43 fruit donors

“For us it's all about
enjoyment! Sustainability has
nothing to do with doing
without”

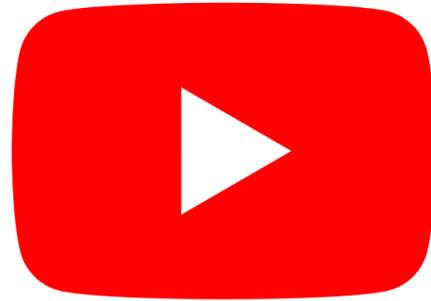
Working with an Artificial Intelligence

- In the food industry, food sometimes arrives on the market too early or too late due to "wrong planning" and then finds no buyers.
- "Overproduction" causes the tonnes of discarded food to grow enormously.
- By developing a smart surplus management system (an Artificial Intelligence), they could systematically record surplus fruit and vegetables in agriculture and make them commercially available for the food industry, gastronomy and (wholesale) trade
- In the long term, data collection and the use of machine learning should improve the predictability of surpluses.

Smart Surplus Management System

- All surpluses available on the market are displayed clearly to make them commercially available for the food industry, gastronomy and (wholesale) trade
- Potential buyers are suggested accordingly
- Together with the *University of Natural Resources and Applied Sciences* in Vienna relevant factors for surpluses (precipitation, market prices, standards, etc.) are identified and an automated forecast model for future surpluses will be developed
- Surpluses are brokered and/or sold via different distribution channels as fresh products or storable intermediate products

Watch a video



https://www.youtube.com/watch?v=0EkYH4S_ncs

Lessons learned

- Perfectly fine food is often not used for commercial sale because of its' size, shape or color -> can be reworked into other products to avoid food waste
- Food waste is often the result of wrong planing that leads to overproduction -> new technology can help to predict surplusses and avoid food waste
- Sustainability and technological innovation go hand in hand
- Companies involved in research activities can create remarkable win-win situations



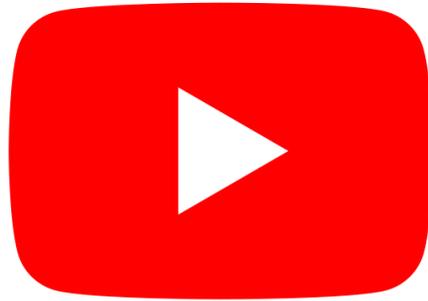
OLIO, UK

- OLIO is an UK based app that connects neighbors with each other and with local businesses so surplus food can be shared, not thrown away
- Founded in 2015 by Tessa Clarke and Saasha Celestial-One
- The app has almost 5 million users



<https://olioex.com>

Watch the background to the app



<https://www.youtube.com/watch?v=80CFkR30Kxg>

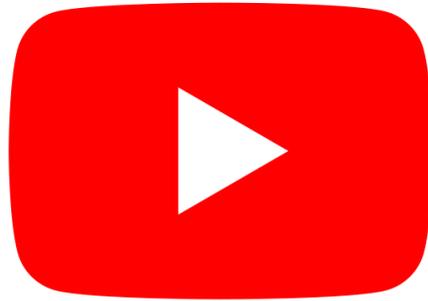
Impact

- 50% of food waste is produced in the gastronomy or private homes
- The impact of the app in numbers:
 - 21,267,532 shared portions of food
 - 52,355,572 equivalent car miles saved
 - 3,177,992,110 saved litres of water
- Also redistributes surplus food from companies, restaurants and markets to the people
- Offers a lesson plan and other tools to talk about food waste in schools

Carbon Negativity commitment

- OLIO is a carbon negative company
- Far more greenhouse gas emissions are diverted than being produced
- The carbon emissions the business creates offset 4% of all the carbon they are saving as a result of the waste saving
- Transparency about emissions: yearly publication of emissions

Watch how the app works



<https://www.youtube.com/watch?v=AdVt92QOUSQ>

Lessons learned

- Community is an important factor in CE and food waste avoidance
- Information of the community plays an important part in sustainability and for social entrepreneurship
- Starting small can be the base for a worldwide success



Permafungi, BE

- Permafungi is a social cooperative settled in Brussels
- Grow oyster mushrooms from urban waste (coffee grounds)
- Provide a sustainable and stable job to young people in Brussels
- In 2018, Oyster mushroom production reached 1 ton per month.



<https://www.permafungi.be/en>

Field of work

- From 5 tonnes of coffee grounds, they produce one ton of fresh oyster mushrooms and ten tons of organic fertilizer
- Every morning, they collect organic coffee grounds from their collaborators by bike
- Coffee grounds are then used as a substrate or a base for growing our oyster mushrooms, which are also organic labelled
- The oyster mushrooms are used as a material for their Ecodesign-project (for example LumiFungi – a lamp that is handmade, organic and biodegradable)
- Permafungi has a training program to teach their methods

“In nature, waste does not exist.
Why not be inspired by it?”

Mushroom cultivation

- Inoculation
 - Coffee grounds are mixed with straw and mycelium (the mushroom seed) and put in bags
- Incubation
 - The bags prepared during the inoculation step are then placed in an incubation room for an approximate period of 2 weeks
 - During this stage, the mycelium is going to colonize the substrate, “eating” and decomposing the coffee grounds
- Fructification
 - When the mycelium has colonized all the substrate, it is forced to reproduce.
 - To do so, it is confronted with a shock of lamp, freshness and humidity.
 - A few days later, the oyster mushrooms are ready to be harvested
 - The residue or rest of the oyster mushroom production is reused as a compost for chicory cultivation

Ecodesign

- Champost (a residue of oyster cultivation) is turned into a sustainable and biodegradable material by adding mycelium
- Mycelium (the mushroom seed) can be transformed into a material which can replace plastic – the myco material
- This material generates ten times less carbon dioxide (CO₂) and uses about eight times less energy than the production of polystyrene foam
- Many possibilities exist with myco material: lights, flowerpots, decorative objects, packaging, building bricks, acoustic panels

Lessons learned

- Innovative techniques can open the door to new sustainable materials
- Waste is reworked into new materials without producing new waste – 100% circular
- Sharing their knowledge and techniques is in the true spirit of social entrepreneurship



LIVIN, AT

- Livin is a collaborative design development office, based in Austria, that was established by Industrial Designer Katharina Unger
- Livin consists of Livin Studios and Livin Farms
- Livin produces protein through insects or fungi by using waste
- Their products are for the private consumption and big scale farming
- Commercialized since 2013
- The goal is to bring people closer to the origins of their food through design

LIVIN

<http://www.livinstudio.com/>

Field of work

- Livin Farms empowers companies with plug & play insect technology to close the loop and upcycle low value waste streams with the **power of insects**.
- Their *Hive PRO* insect farms turn agricultural residues and industrial food waste into natural insect protein, lipids and fertilizer.
- It becomes precious food for animals and plants and saves resources from being wasted while reducing the dependency on unsustainable, imported feeds.
- Companies with low-value side streams from food or feed production can therefore reduce their waste and **upcycle** it into high value protein feeds.
- They produce insect derived ingredients (de-fatted protein meals, fats and fertilizers) **for livestock, pets and humans** in Europe.

“And you are eating them
already! We eat about 500 g of
insects per year, in our
everyday food.”

A closer look at insects

- Livin sells *The Hive Explorer* – an insect farming kit for private homes
- With the kit, food waste can be used to feed mealworms whose excrements can be used as fertilizer. The mealworms themselves are high value protein for human or animal consumption
- Part of their mission is also **an educational program**
 - *The Hive Explorer* can be used in schools for hands-on learning
 - Livin provides learning materials for teachers
 - Workshops by Livin can be booked
 - Livin provides an online teacher training
- They cover topics such as insect biology, sustainable food, the environment, design thinking and technology

Lessons learned

- For a sustainable future, some things – such as protein sources and insects – need to be thought in a new way
- Food waste is used as food for insects that can be food for animals, plants and humans - 100% circular
- Design can be an important feature in efficient technology



Circulus Agtech, CAN

- Circulus Agtech produces liquid organic fertilizers.
- They monitor specific ion activity to determine nutrient contents in liquid extracts of organic matter.
- The final product is used especially in the green house industry and in innovative farms.
- This product allows to break away from synthetic fertilizers and support local suppliers of organic matter.



<https://www.circulusagtech.com>

The service in short

The Process to a Sustainable Future



Manure/Compost Generators

Manage fertilizing residual matter (FRM) to respect high environmental standards



Circulus Agtech

Perform liquid extractions on FRM, monitor biological reactions and provide precise rich organic liquid fertilizer.



Hydroponic Farms

Replace unsustainable synthetic and mineral fertilizers with economic locally sourced sustainable inputs.

Product

- Liquid organic fertilizer with tailored nutrient values for the customer.
- High-tech monitoring software allows such a precise product.
- The precise nutrient values have a positive environmental impact...
- ... and mean less risk and higher yields for farmers.

“By monitoring achieved
nutrient levels, the
concentrates can be precisely
included into fertilization
plans.”

Lessons learned

- High tech (in this case high-tech nutrient monitoring) can be part of a sustainable agriculture.
- By cooperating with local suppliers of organic matter, synthetic fertilizers can be reduced.
- This leads to a positive environmental impact.
- The price of the product is still low compared to other liquid organic fertilizers.



GROUP WORK

Working tasks – 2.5 hrs

- Find three good practice examples. (The following link can help:
 - *<https://www.startus-insights.com/innovators-guide/industries/agriculture/>*)
- Choose one favorite example and sum up the key facts about this CE business model.
- Explain it to one of your colleagues and describe the most fascinating aspects.

CONSULTATION

Working task – 1 hr

- Tell your supervisor what you found out so far and where you had difficulties.



TRAIN-CE-FOOD project

<https://trancefood.si/en/home-english>

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