

More than just a nut – new products for the bioeconomy

Plants are often used for one particular purpose only. However, walnut trees have much more to offer than just delicious nuts. The AlpBioEco project is studying the potential of walnut trees for the bioeconomy and how the potential can be exploited commercially. The international team of researchers is also focusing on apples and herbs.

Prof. Dr.-Ing. Christian Gerhards forscht und arbeitet seit rund zehn Jahren an der Hochschule Albstadt-Sigmaringen.
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Sometimes winding roads lead to an exciting project. From late 2020, the city of Sigmaringen and the Albstadt-Sigmaringen University of Sciences are planning to work together at InnoCamp Sigmaringen, a site that houses a model factory, an academy for further education and the ITZ innovation and technology centre. Their joint objective

is to take innovative R&D ideas to application. The ITZ first came up with the idea to set up a bioeconomy project, and many network partners have since contributed ideas to the project. It has since become a prime example of a cooperative project that is working towards innovative sustainable development across national borders in a special geographic area, in this case the Alpine region. As defined by the EU, the Alpine region is composed of territories with contrasting demographic, social and economic trends and huge cultural and linguistic diversity. Two of Baden-Württemberg's southern-most administrative districts, Freiburg and Tübingen, which include the city of Sigmaringen, are part of the Alpine region.

The three-year AlpBioEco project was launched in May 2018 with a total funding volume of around 2 million euros, largely provided by the EU under the "Interreg Alpine Space Programme". In addition to walnuts, AlpBioEco is also studying the bioeconomic potential of apples and herbs. As far as herbs are concerned, the project is specifically focusing on herbs that are traditionally used in the Alpine region, mainly in the flavourings and cosmetics industries. Alpine hay meadows have long been used for many purposes, including producing cheeses with a unique hayflower aroma. The AlpBioEco researchers are studying the bioeconomic potential of meadow plant mixtures, as well as how the apple residues that accumulate during apple juice production can be reused. The South Tyrol and Lake Constance regions near the Alps are famous for apple production and processing. This particular AlpBioEco research focus is therefore of great interest for these two regions.

Bioeconomy in the Alpine region will be strengthened

Bei der Herstellung von Walnussöl fallen als Reststoffe Presskuchen an, die auf ihr Potenzial für neuen Wertschöpfungsketten untersucht werden.

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AlpBioEco brings together 13 project partners. The city of Sigmaringen is both lead partner and in charge of the project application. "This means a lot to us as it is the first EU application the city of Sigmaringen has ever filed. The project also nicely demonstrates the effectiveness of the collaboration between the ITZ and the Albstadt-Sigmaringen University of Applied Sciences," says Prof. Dr.-Ing. Christian Gerhards whose team is one of the academic project partners. MCI Management Center Innsbruck is another academic partner that is currently running 18 workshops throughout the Alpine region. "We want to use these workshops to develop ideas with experts and partners from different industries, including food producers, marketers and processors," says Gerhards. And last but not least, the project also involves BUND Regionalverband Bodensee-Oberschwaben and the Bavarian competence centre for nutrition (KErn) and eight regional associations and business agencies in France, Italy, Austria and Slovenia.

Based on a suggestion from Ulfried Miller from the BUND regional association, the project partners decided to focus on walnuts. Walnut trees grow very well in mid- altitude areas of the Alpine region. "They offer huge potential for the large number of small producers in the area, especially if they can be used for several different purposes," explains Gerhards. Together with his team of two scientific assistants, Gerhards is analysing the walnut as a raw material as well as the intermediates that result from the different processing steps in order to establish the basis for identifying their utilisation potential. "For example, we are investigating the extrudability of walnut flour and the sensory and physiological quality of the press cakes created during walnut oil production," says Gerhards. The results provide him and his partners with the key basic

information required to set up new value chains. Their experiments have shown that it is highly important to define standards for the composition of press cakes in order to be able to utilise them. "Although this is beyond the scope of the current project, we have looked into this with further development aspects in mind," says Gerhards.

More than just food – walnut trees as the source of a diverse range of organic products

Extrakte aus den Schalen von Walnüssen können zur Färbung von Naturtextilien genutzt werden.
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In keeping with a holistic bioeconomic approach, Gerhards and his team are not only focusing on walnut kernels but also on the potential use of walnut tree leaves as well as both woody and green nut shells. The researchers are also working with external experts, including pharmacists, to discuss how the leaves can be harnessed as teas and

tinctures. These plant parts also have the potential to be used as biological pesticide. Walnut leaves contain juglone, a chemical that enters the soil via the leaves that fall from the trees in autumn, thus influencing the growth of other plants. This type of interaction between plants is referred to as allelopathy.

Paper production is another highly interesting use of walnut trees. "Walnut paper has a special, visible fibre content and a slightly yellowish colour. It can be used for many applications, from information leaflets to menus and is becoming quite popular in the booming eco-sector," says Gerhards. The group of researchers has also identified the potential of walnut shells. We have produced shell extracts and used them to dye natural fibres. We can produce a wide range of colours, from natural yellow to dark red. I think walnut extracts have the potential to be used for dyeing sustainably produced textiles," says Gerhards.

Two innovative concepts will be selected to be tested in the next phase of the project. Gerhards of course hopes that walnuts will be one of them. "In this phase, SMEs will have the opportunity to get involved in the further development of a product," says Gerhards. As far as the overall project is concerned, the goals go beyond model product development. "A comprehensive approach will be used to show how structures can be changed to make it easier to implement the bioeconomy in the Alpine region. "We will share our experiences, ideas and business models with regional associations and other bodies, which in turn can act on the regional and EU levels. The aim is to ensure the sustainability of the project," says Gerhards.

Project name

Despite the similarity in name, AlpBioEco, the project discussed in the article above, has no connection whatsoever with the AlpLinkBioEco bioeconomy project supported by BIOPRO. However, both projects are funded through the Interreg Alpine Space Programme.

Article

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