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Climate change is affecting all of us and it is every single individual's responsibility to take action. Fortunately, there is increased and growing awareness of the consequences of climate change in our society. The actions of individuals such as 16-year-old activist Greta Thunberg, or Boyan Slat, founder of The Ocean Cleanup project, show that people care and are ready to make a change.

Taking action in one's own household needs a lot of rethinking, but it is manageable. The next question arising is: what can we do at our place of work? Or, even better: what can a company do to help stop climate change? More specifically: what is the cosmetics industry's contribution to that problem? The trend of producing 'green' cosmetics is a good start. But is 'green' actually green enough, or is it just about 'greenwashing' products? Before we get to the bottom of this question, however, let's have a look at the causes of global warming.

According to scientific data, the primary cause of global warming is the increased atmospheric concentration of greenhouse gases such as CO₂, stratospheric ozone depletion and changes to atmospheric aerosol content. There is no doubt that increased levels of greenhouse gases generated by humans cause the Earth to heat up. Paleoclimate evidence suggests that our planet is currently warming roughly ten times faster than during the recovery phase after the last Ice Age. CO₂ records reveal that since the Industrial Revolution, concentrations in the atmosphere have increased by 46% from 280ppm to 409ppm (August 2018) over the last 150 years. Such high levels of CO₂ were last seen about 20 million years ago. Greenhouse gases such as CO₂ are equally distributed in the atmosphere and their concentration is the same over the whole planet. Therefore it is important to know where and how much CO₂ is produced, and how we can take action to reduce or offset emissions.

WALK THE GREEN LINE

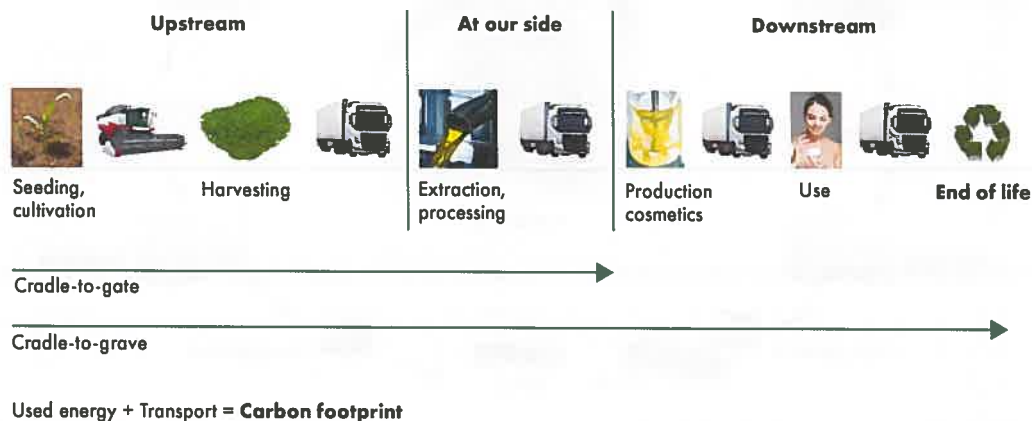
With the issue of climate change dominating headlines, **Emina Besic, Stefan Hettwer, Brigit Suter, Sandra Breitenbach and Barbara Obermayer** from Rahn discuss genuinely carbon-neutral cosmetics

Rahn acknowledges its responsibility in the fight against climate change and has taken the first steps to help counter it. Rahn's new cosmetic active, Cellactive, combines two 'superfoods', the green alga *Chlorella vulgaris* and the protein rich *Lupinus albus*. *C. vulgaris* has many benefits including detoxifying, anti-ageing, immune-enhancing, prebiotic, and repair- and growth-promoting properties. Its cultivation in photobioreactors is one of the most sustainable forms of production.

The whole *L. albus* production chain has been optimised and the entire plant is used either for food, manure or cosmetics. It contributes to the

Figure 1

Schematic explanation of the 'cradle-to-gate' and 'cradle-to-grave' life cycle assessment approaches



sustainability of cropping systems and it could become a true alternative to the soya bean.

In addition to its nutritional and health benefits, *L. albus* is able to improve the soil and can be used as a valuable green manure. Moreover, its deep roots loosen the lower soil layers, thus facilitating soil conditioning and enhancing fertility. Farmed *L. albus* does not need additional water or fertilisers. Its cultivation not only benefits the soil but also provides the basis for beautiful flowery meadows that serve as an important source of pollen for bees.

Rahn has chosen these two sustainably produced ingredients and even went one step further. In order to create a completely 'green' product, the company calculated its carbon footprint throughout the product life cycle and ultimately offset CO₂ emissions through two forest protection projects.

PRODUCT LIFE CYCLE ASSESSMENT

In general, a product life cycle assessment is a standardised technique (ISO/TS 14067, GHG Protocol and PAS 2050) that can be used to systematically analyse a product's impact on nature and the environment. This can be measured in terms of the amount of greenhouse gases, especially CO₂, generated. The analysis is applied to all stages of a supply chain. Nevertheless, there are several ways of analysing a product's life cycle (figure 1).

Rahn has selected the 'cradle-to-gate' principle as the most appropriate approach for assessing raw material suppliers. In this case, the whole supply chain is analysed, from seeding and harvesting, through extraction and processing of the raw material to packaging, transportation and delivery to the warehouse.

'Cradle-to-grave' is another method that in addition covers the cosmetic product manufacturing, distribution, use and disposal or recycling. Rahn encourages its customers to take the last steps to make their product genuinely 'green'. The downstream calculation of carbon emissions during the last three stages – production, use and disposal of the product – is ultimately in their hands.

The CO₂ emissions generated by the production of Cellactive were calculated on the basis of the Greenhouse Gas Protocol Life Cycle Accounting and Reporting Standard (GHG Protocol). The 'cradle-to-gate' approach, as mentioned, comprises all the relevant life cycle phases from the cultivation and the extraction of raw materials, to packaging and delivery of the goods to the warehouse. Cellactive is based on an algae extract obtained from *C. vulgaris* and white lupin extract. Both have to be cultivated, prepared for transport, extracted and assembled to be ready for our customers (figure 2).

The share of CO₂ emissions revealed that the production of the active unquestionably generates the major part of the greenhouse gases. Interestingly, it seems that packaging has a bigger share than transportation (figure 3). Using logistics partners with a climate neutral programme for the transportation of goods should generally be considered. This option was integrated in Rahn's production process.

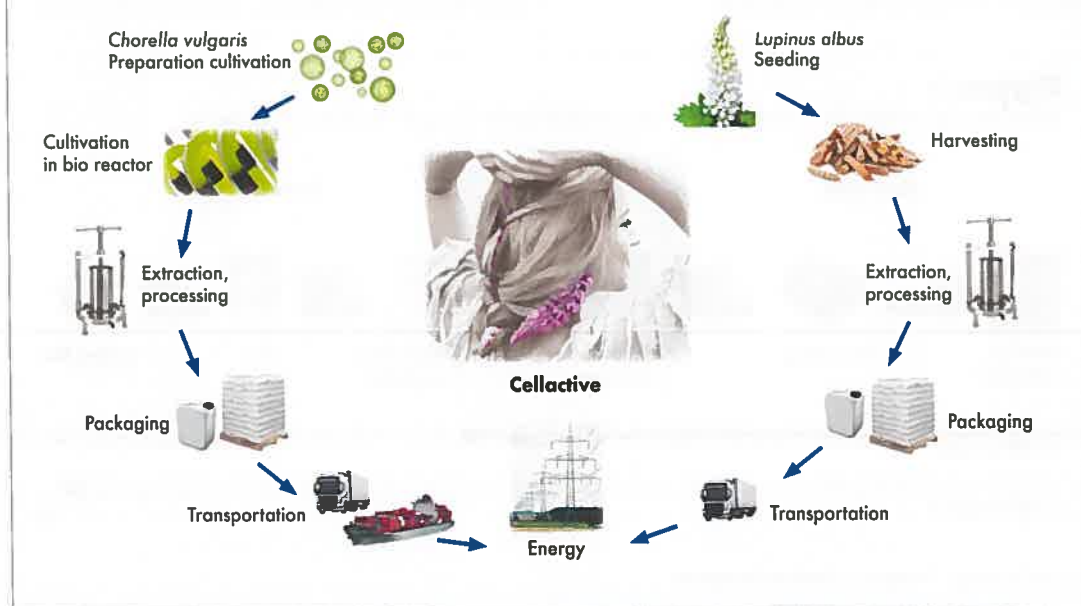
Calculations revealed that Rahn is already using the optimal set-up to reduce CO₂ emissions to a minimum during its process. No further optimisation can be achieved at the moment.

The calculation of CO₂ alone does not result automatically in climate neutrality. Businesses willing to apply the principle of climate neutrality

Businesses willing to apply the principle of climate neutrality must calculate the amount of CO₂ they produce and then offset this

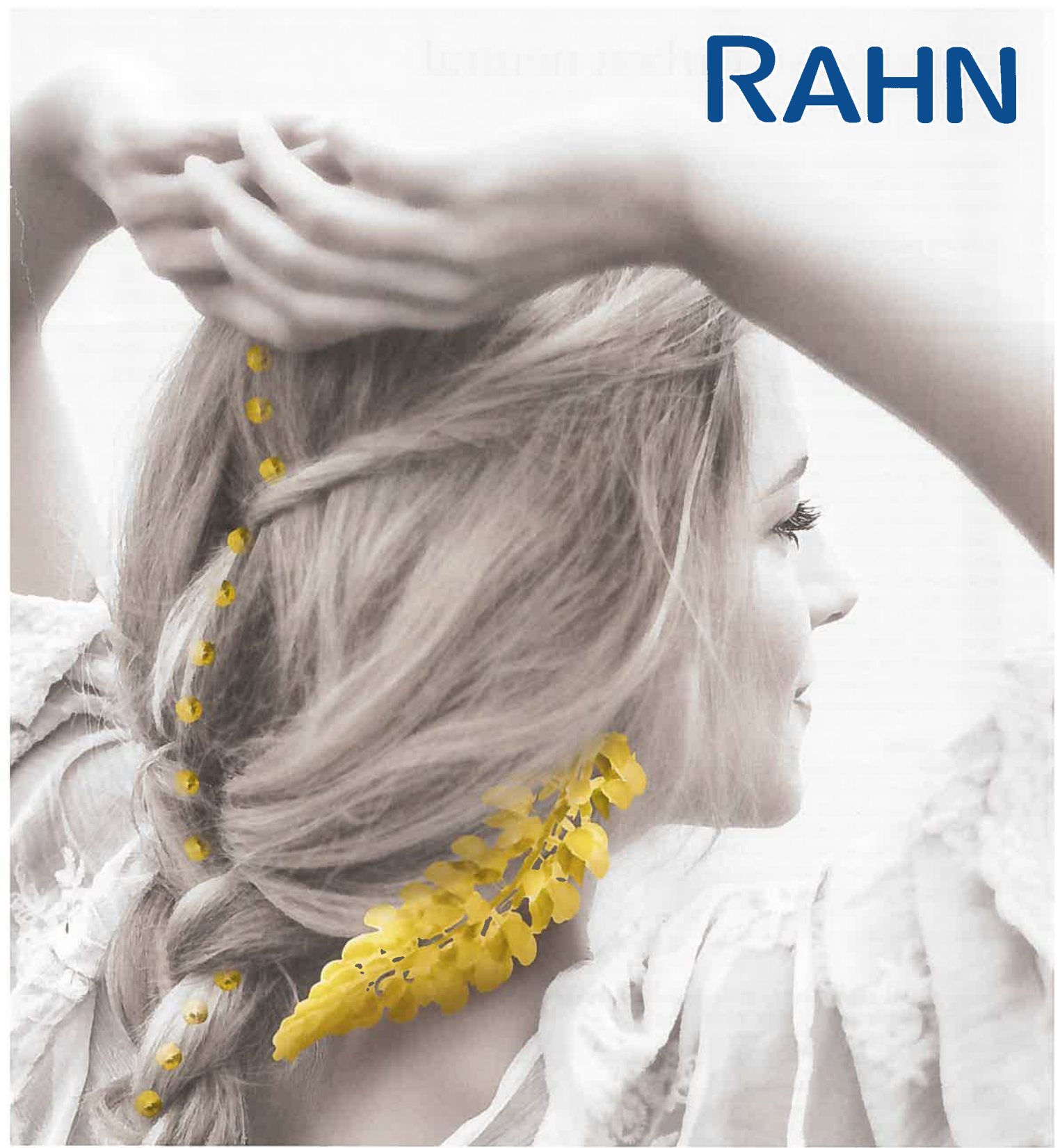
Figure 2

Schematic and simplified representation of Cellactive's life cycle assessment



Introducing

RAHN



CELLACTIVE®

Carbon Neutral Essential Cell Boost-Factor

NEW

- Grounds flying hair
- Improves hair quality



SWISS EXPERTISE 



must calculate the amount of CO₂ they produce and then offset this by supporting a recognised climate protection project.

CLIMATE PROTECTION PROJECTS

Forests, especially tropical forests, store CO₂. For projects aimed at combatting climate change, there are essentially three methods for creating and sustaining forestry as a carbon sink: forestation and reforestation, sustainable forest management (where the amount of timber harvested does not exceed the amount that can grow back) and financial incentives for the protection of forest land as a carbon sink (eg the UN's Reducing Emissions from Deforestation and Forest Degradation (REDD+) programme, whereby the project owner must ensure that tree cover is maintained).

In order to neutralise the amount of CO₂ generated by Cellactive, two certified climate protection projects were funded, namely the Stiftung Bergwaldprojekt in Switzerland and the forest protection project in April Salumei, Papua New Guinea. Both projects are dedicated to sustainable forest management. Furthermore, through funding of the projects, we also support the UN's Sustainable Development Goals (table 1).

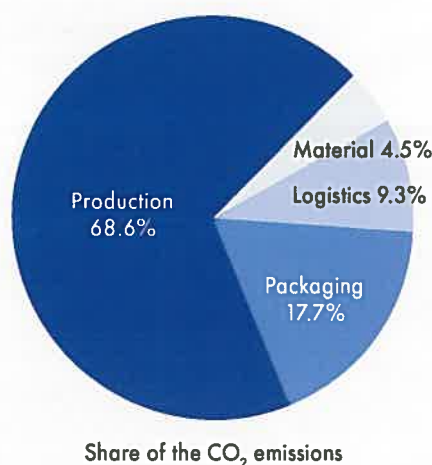
CONCLUSION

Cellactive is the first climate neutral and natural active ingredient for both skin and hair care. It supplies the skin and hair with an optimal blend of nutritional elements and reliably maintains skin homeostasis at the highest level, providing the skin with a vibrant and healthy appearance.

The white lupin contained in Cellactive is cultivated according to the key principles of sustainable agriculture while its second

Figure 3

Percentage share of CO₂ emissions generated by Cellactive's life cycle



component, *C. vulgaris*, is grown in closed photobioreactors using cutting-edge technology. This approach may represent a model for future climate neutral cosmetic developments.

Climate change is the major issue of our time and it calls for immediate action. There is still time to tackle climate change, but it will require an unprecedented effort from all sectors of society. The activities of every single individual matter; just as rain consists of countless individual drops of water, Rahn hopes to contribute the first drop of a downpour ●

References

Full references for this article can be found online at cosmeticsbusiness.com.

Table 1: UN Sustainable Development Goals for both projects supported through Rahn's funding

UN Sustainable Development Goals	Short description
Good health & wellbeing	Papua New Guinea: Construction of community health centres to improve health care accessibility.
Quality education	Papua New Guinea: Building schools and promoting literacy.
Affordable & clean energy	Papua New Guinea: More than 1,000 solar lamps were distributed in schools, hospitals, churches and homes. For many people in this area, it is the first time they've used electric light sources.
Decent work & economic growth	Papua New Guinea: Support in founding small enterprises – additional sources of income.
Sustainable cities & communities	Switzerland: Maintenance of the cultural landscape through the construction of paths and fences.
Climate action	Papua New Guinea: Preservation of 600,000 hectares of rainforest, saving 400,000 tons of CO ₂ per year.
Life on land	Papua New Guinea: Home to 5% of global biodiversity. Switzerland: Planting of native tree species and clearing of dense forests to allow young trees to grow; clearing areas by removing bushes with the help of goats.

The white lupin contained in Cellactive is cultivated according to the key principles of sustainable agriculture

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