

# The environmental impact of vegan creams compared to dairy creams

## Goal

The aim of this study is to examine and compare the environmental impacts and the GHG emissions of vegan and vegetarian creams made from almond, cashew, coconut, oat, rice, soy, and cow milk per litre at the supermarket. This study was conducted as part of an internship.

## Method and Data

The inventory data for this study are taken from the ESU-services database [1]. The data includes the entire life cycle from agricultural production to supermarket taking food losses into account. The environmental impact is determined by means of the Ecological Scarcity Method 2013 [2] and the GHG emissions are defined by the IPCC 2013 with RFI Method [3]. According to this, the environmental impact is summarised to ecological scarcity points and the GHG emissions are represented in CO<sub>2</sub>-equivalents.

The study is based on the following assumptions: in each case the vegan creams are produced in Europe and the dairy cream in Switzerland. Sunflower oil is used for all vegan creams except from coconut cream. Soy and palm oil are used in soy cream. Rape and palm oil are used in oat cream. As main ingredients almonds, oat grains, rice grains, cashew kernels, coconuts or soybeans are used. The vegan drink corresponding to the main ingredient is also utilised. Coconuts come from the Philippines, almonds from the US, rice from Italy and cashews from Brazil. Soybeans and oat grains are from Switzerland. The transport by freight ship or lorry is included for a global or European average, respectively. No chilling is included, as all the creams are ultra-heat treated.

## Results

The results are shown in Fig. 1 and Fig. 2. The whole environmental impact and the GHG emissions of the creams are subdivided into different life cycle stages. The result show, that some vegan creams are connected to a smaller environmental impact than dairy creams. All vegan creams have lower GHG emissions.

Cashew and coconut creams cause higher environmental impacts in the ingredient category. Both have lower GHG emissions than dairy cream. Oat cream and almond cream have a high environmental impact in the ingredient category and higher GHG emissions compared to other vegan creams.

Contrary to vegan creams, dairy creams have the origin in Switzerland and so the transportation has a smaller impact on the environment and lower GHG emissions.

The vegan creams have a slightly higher value in processing for environmental impact and GHG emissions compared to dairy cream, because of different production processes. The packaging is the same for all creams and therefore does not differ. Vegan creams have a higher environmental impact in the distribution category, as the price per litre is higher. The disposal makes such a small share, that it can be neglected.

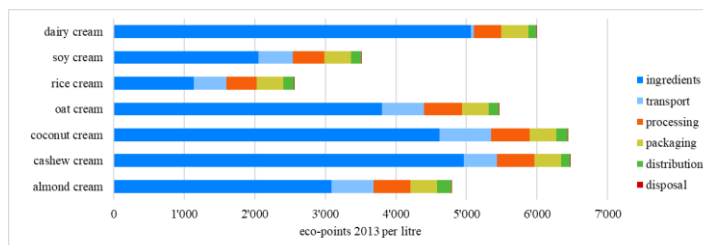


Fig. 1 Environmental impact of different creams per litre at the supermarket compared to dairy creams.

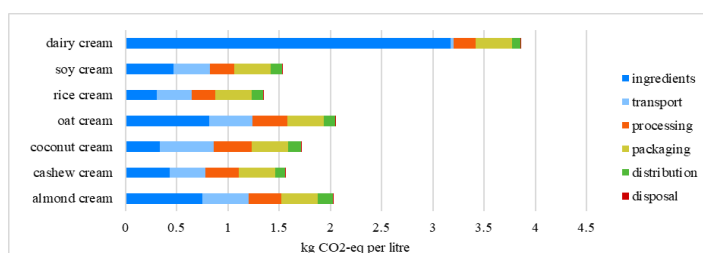


Fig. 2 GHG emissions of the different creams per litre at the supermarket compared to dairy cream.

## Discussion

The high environmental impact and the GHG emissions of dairy cream produced by raw milk is due to livestock farming and the associated emissions of e.g. methane by the cattle.

The environmental impact of vegan creams is dependent on the ingredients utilised. The reason for the high environmental impact of coconut and cashew cream is the large quantity of applied pesticides in the cultivation of coconuts and cashews. Oat cream and almond cream have a relatively high environmental impact compared to the dairy cream, because of the use of different oils, especially sunflower oil. This observation is applicable to all vegan creams (except for coconut cream). Optimising the use of pesticides in the cultivation of the different nuts and decreasing the quantity of oil as far as possible, would lead to a reduced environmental impact.

GHG emissions are lower for vegan creams, as the production of these creams mainly affects the impact categories, water pollution, pesticides, and heavy metals into soil.

Almonds, coconuts, and cashews are imported from overseas, so the impact of the transport is higher than the one of rice, soybeans, and oat grains. Using products growing in smaller distance would decrease the environmental impact and GHG emissions.

Greenhouse gas emissions are halved when consuming any vegan cream compared to dairy cream. Consuming vegan creams from rice and soy instead of dairy creams can also half the environmental impact while for other vegan creams there is no clear advantage from an environmental point of view. Differences in nutritional qualities are so far not evaluated in this short poster. They might revise such recommendations if huge differences are found.

## Literature

1. Jungbluth, N., et al., *Life cycle inventory database on demand: EcoSpold LCI database of ESU-services*. 2017, ESU-services Ltd.: Schaffhausen, CH.
2. Frischknecht, R., et al., *Ökofaktoren Schweiz 2013 gemäss der Methode der ökologischen Knappheit: Methodische Grundlagen und Anwendung auf die Schweiz*. 2013, treeze und ESU-services GmbH im Auftrag des Bundesamt für Umwelt (BAFU): Bern.
3. Jungbluth, N. and C. Meili, *Recommendations for calculation of the global warming potential of aviation including the radiative forcing index*. Int J Life Cycle Assess, 2019. **24**(3): p. 404-411.