Peer reviewer:
Carbotech AG
Eulerstrasse 68
CH-4051 Basel
+41 61 206 95 25
www.carbotech.ch

Peer review of the study

Balancing of greenhouse gas emission from sugar

On behalf of Migros, the greenhouse gas emissions from sugar of the assortment in Migros stores were evaluated. Thereby, emissions of the whole life cycle were considered. The aim of the study was to determine if there are products that produce significantly lower greenhouse gas emissions than others. Such products could be suggested for a climatop labelling.

Functions of a critical peer review

Calculations of life cycle assessments are complex, because of the large amount of data that needs to be collected, processed and evaluated for their impacts on climate respectively the ecosystem. A review of all data and calculations is neither possible nor reasonable, because nowadays there are large amounts of base data from renowned databases on one side and software tools on the other side that are being used for such calculations. It is admissible to rely on the calculations when using a certain selection of data and calculation methods. The experience shows that the critical point of such calculations is rather the selection of the constraints and the goals of the study, in other words, the critical points are the procedure and the preconditions of the calculations and not the calculations themselves. Accordingly, these have to be checked when performing a review. According to ISO 14040 ff, the process of a peer review should ensure, that

- the applied methods are corresponding with the international standard,
- the applied methods are scientifically and technically valid and applicable,
- the used data are appropriate and reasonable for the aims of the study,
- the conclusions consider the goals and limitations of the study,
- the report is transparent and consistent.

Within this review all of these points were examined and the results were reviewed for their plausibility.

The review was made concomitant to the study, the most important decisions, such as the definition of the functional unit or the system boundaries as well as the expected relevance of the subprocesses were discussed at the beginning. This review is based on the one hand on those discussions and on the other hand on the draft of the report from the 28th August 2008.

TRANSLATION:
The translation of this peer review is provided by climatop with the aim of reflecting in the most accurate way the original German text. In case of interpretation difficulties, please consult the original, valid German text.
**Aims and constraints**
The chosen constraints such as the functional unit, system limitations and the considered indicator are adequate for the imposed goal. It was clearly defined what was and what was not considered. The cultivation method of sugar containing plants (sugar beet respectively sugar cane) as well as the processing and transportation are of critical importance. Although the aim of the study was to evaluate the climate relevant emissions, other ecological impacts were considered, using the Swiss method of ecological scarcity (Environmental Impact Points, UBP 06). This was considered as desirable, as the experience with agricultural products shows that results from climate impacts are often not consistent with environmental impacts in general.

**Methods and data**
The methods used within the study are scientifically comprehensive and consistent with the aims and constraints of the study.
The data were mainly from other studies, specifications from producers and from processes listed in the database of ecoinvent. The latter was partially adapted to the specific circumstances. Thereby one has to remark that for example the module sugar beet no heavy metal benefit was granted, because it remains within the system. This and other assumptions were considered as reasonable.
A high traceability is given by the transparent assignment of the primary data to the used data from ecoinvent as well as by the description of the assumptions and the foundations of the calculations. While the data for transport are rather good, the data concerning the cultivation methods show high uncertainties. Therefore some estimation was necessary, for example concerning the cultivation of organic sugar beet in Paraguay or the nitrate and nitrous oxide emissions of sugar cane in Columbia or Paraguay. The used data, assumptions and estimations can be considered as justifiable. However, it would be desirable to check their influence on the results by performing sensitivity analyses.

**Results**
The results were reviewed for their plausibility, thereby the transparent description of the different steps of the lifecycle were adjuvant. In addition, the relevance of the different processes was tested with a recalculation. Based on these tests and the examination of the input data we came to the conclusion that the results are reasonable. It would be good to have an indication about the uncertainties and a calculation of scenarios to further support the results and to show their limitations, respectively. Concerning the impacts on the ecosystem, the evaluation of the whole ecological impacts using the Environmental Impact Points, UBP 06, can be considered as sensitivity. Although the results show high uncertainties and, compared to the greenhouse gas emissions, no significant differences were found, they show, however, that regarding environmental impacts no converse of the results has to be expected.
The results answer the preliminary defined problem.

**Summary**
The results are plausible and according to the performed tests can be considered as correct. The procedure is scientifically correct and corresponding to the initially defined objectives. The testing of the results using the Environmental Impact Points, UBP 06, as well as the discussion of the relevant influencing factors are both remarkable.

*Basel, 26th November 2008*