PRODUCT CARBON FOOTPRINT (PCF) - CALCULATION AND COMPARISON OF NATURALLY OR SYNTHETICALLY PRODUCED BARIUM SULPHATES

Brief summary of project work, done by Geronimo Steinkönig 02.10.2020
PREAMBLE

- Calculation of the Product Carbon Footprint (PCF) according to DIN EN 14044-44.

- "Cradle to Gate", i.e. Production of one metric ton from the time the raw ore was extracted until it is ready for sale and only needs to be packed. Type of packaging is excluded.

- Natural process: based on own process data from 2019.

- Synthetic process: access to literature, data from databases according to DIN 14 044 and expert knowledge.
ESTIMATED PRODUCTION PROCESS EFFICIENCY NATURAL BASO$_4$

Albawhite 110

447.37 kg CO2-e / t

325.78 electricity consumption new jet mill
32.24 electricity consumption manufacturing
5.26 truck
18.3 shipping - national
27.72 shipping - international
25.53 extraction of raw materials
142.63 gas consumption manufacturing
3.41 other
9.13 gas consumption manufacturing

Albasoft 110

593.03 kg CO2-e / t

325.78 electricity consumption new jet mill
32.24 electricity consumption manufacturing
5.29 train
31.61 electricity consumption manufacturing
16.08 other
25.53 extraction of raw materials
18.39 shipping - national
27.72 shipping - international
142.63 gas consumption manufacturing
9.13 gas consumption manufacturing
3.41 other
ESTIMATED PRODUCTION PROCESS EFFICIENCY SYNTHETIC BASO$_4$

Micronized barium sulphate (Blanc Fixe)
CONCLUSION

- Significantly higher CO\(_2\) emissions in the production of synthetic barium sulphate
  
  Manufacturing natural BaSO\(_4\): 450 - 600 CO\(_2\)-e / t
  Manufacturing synthetic BaSO\(_4\): ca. 2 300 CO\(_2\)-e / t

- The major influencing factor in the life cycle assessment is electricity consumption or production of electricity.

- The biggest consumers are:
  
  Manufacturing natural BaSO\(_4\): Jet mill grinding (approx. 325 CO\(_2\)-e / t)
  Manufacturing synthetic BaSO\(_4\): BaSO\(_4\) reduction to BaS (approx. 1060 CO\(_2\)-e / t)

→ The use of natural barium sulphate instead of synthetic products can reduce the carbon footprint of a company tremendously.