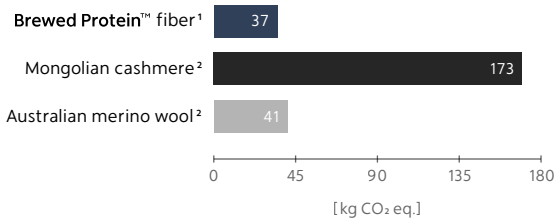
Future Projections

# Environmental footprint of **Brewed Protein**™ fiber

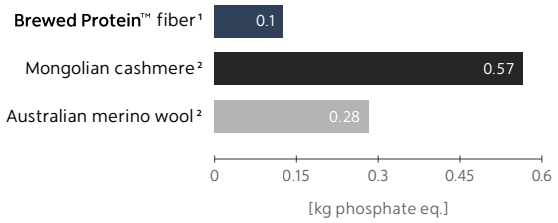
Below are highlights from a lifecycle assessment (LCA) study which quantifies and compares the environmental performance potential of Spiber's Brewed Protein fibers to Mongolian cashmere fibers and Australian merino wool fibers.

Compared to cashmere[2] production, Brewed Protein fiber[1] production can cause:

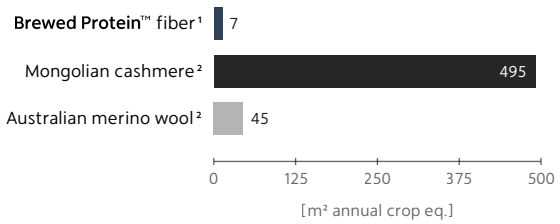
## 79%↓ Greenhouse gas emissions[3]



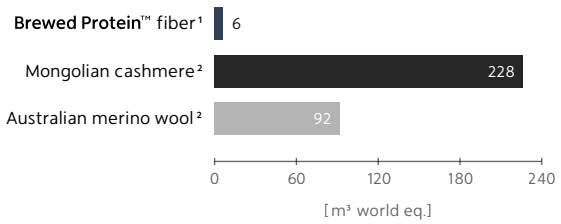

## 82%↓ Eutrophication[4]




## 97%↓ Land use[5]




## 97%↓ Water use[6]




This cradle-to-gate[7] comparative LCA study was carried out by Spiber together with EarthShift Global, a leading LCA and sustainability consulting firm, and has been critically reviewed by a panel of three third-party experts in accordance to the International Organization for Standardization (ISO) 14040 and 14044 standards for comparative assertion and public disclosure.

The potential environmental impact of a forward-looking Brewed Protein fiber production plan was found to be significantly smaller than cashmere and merino wool, largely due to the lower environmental impacts of inputs for Brewed Protein polymer production (primarily plant crops and renewable electricity) when compared to livestock farming for cashmere and wool production.

Stay tuned to see the full results of our LCA study, which we are preparing to publish on our website within the first quarter of 2023.

1. Brewed Protein fiber values are pre-production LCA estimations based on the future inputs, outputs and process of Spiber's polymer plant in Thailand and fiber spinning plant in Japan, assuming use of renewable electricity and plant operation at full capacity.
2. Cashmere values and merino wool values use PEF allocation factors applied for co-products.
3. IPCC AR5 GWP100, including climate change feedback, excluding biogenic carbon [kg $CO_2$ eq.]
4. Center of Environmental Science of Leiden University (CML). 2013. CML-IA Baseline. Eutrophication Potential (EP) [kg phosphate eq.]
5. ReCiPe 2016 v1.1 Midpoint (H) - Land use [$m^2$ annual crop eq·y].
6. Environmental Footprint 3.0. EF 3.0 Water scarcity method. [$m^3$ world eq.]
7. This study is based on "cradle-to-gate" boundary conditions which cover impacts of all activities starting from extraction of resources from nature (the cradle) until the fibers are ready to be shipped from the factory gate. Impacts of the use phase and end-of-life are assumed to be the same for all three materials and thus excluded from this comparative study.