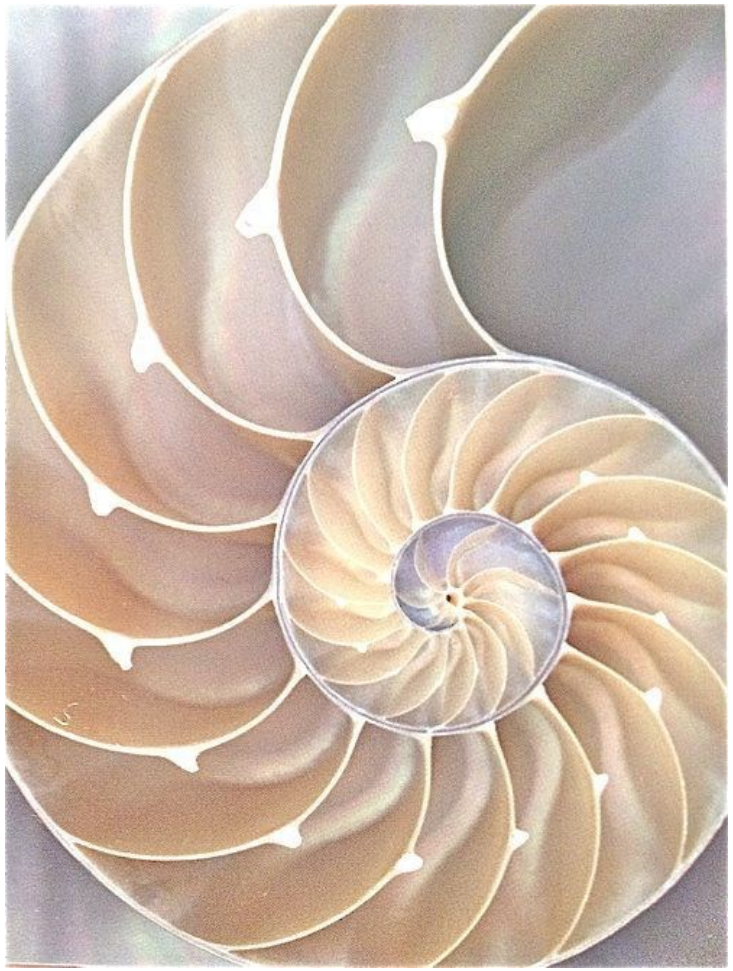
Cycling Europe Webinar: New & Innovative Materials

AXALKO

AXALKO

Natural Materials are Amazing and Beauty

Nature creates unique structures and shapes



Natural Materials are Amazing and Beauty

Those structures have been created and improved for millions of years, optimizing their design and used materials to achieve specific, unique functions

Natural Materials are Amazing and Beauty

Humanity has learned how to used those materials

We have transformed landscapes and create adapted ecosystems

AXALKO

Natural Materials are Amazing and Beauty

AXALKO

Natural Materials are Amazing and Beauty

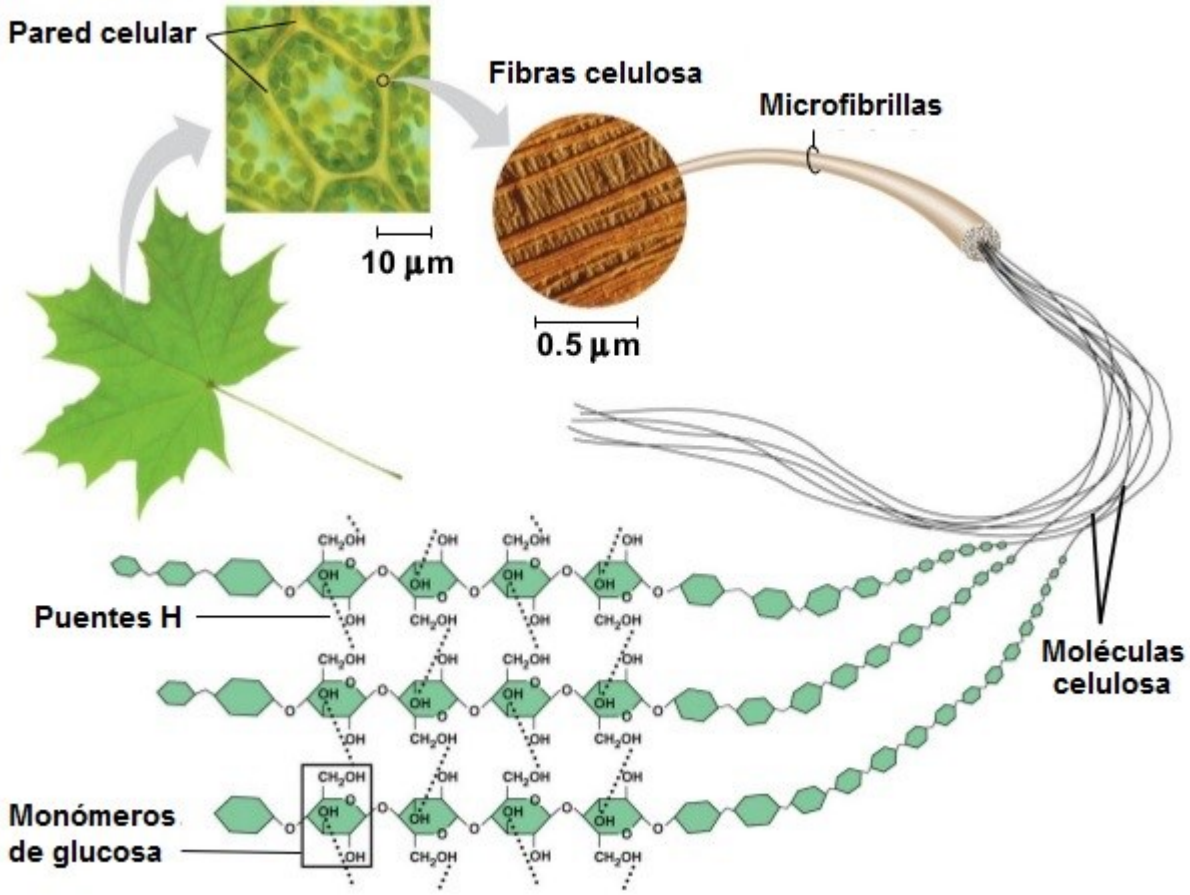
We have learned to harvest and transform those amazing materials

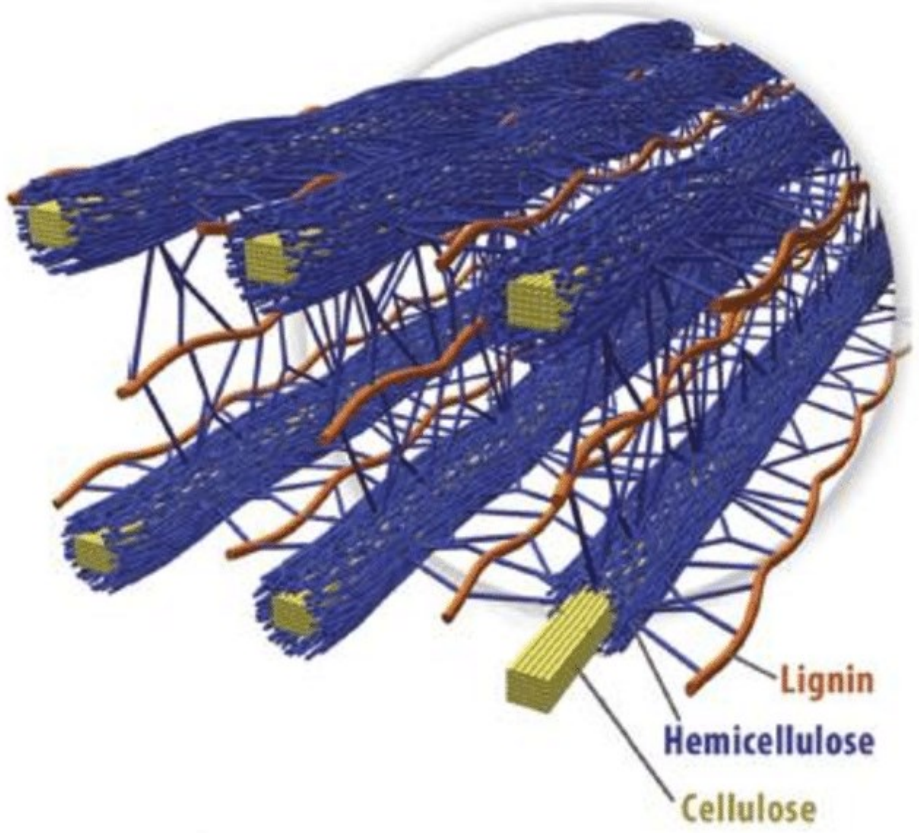
But we have hardly applied science on them before now

AXALKO

Natural Materials Properties

To discover and really understand how they work and behave, we must analyze their microstructures

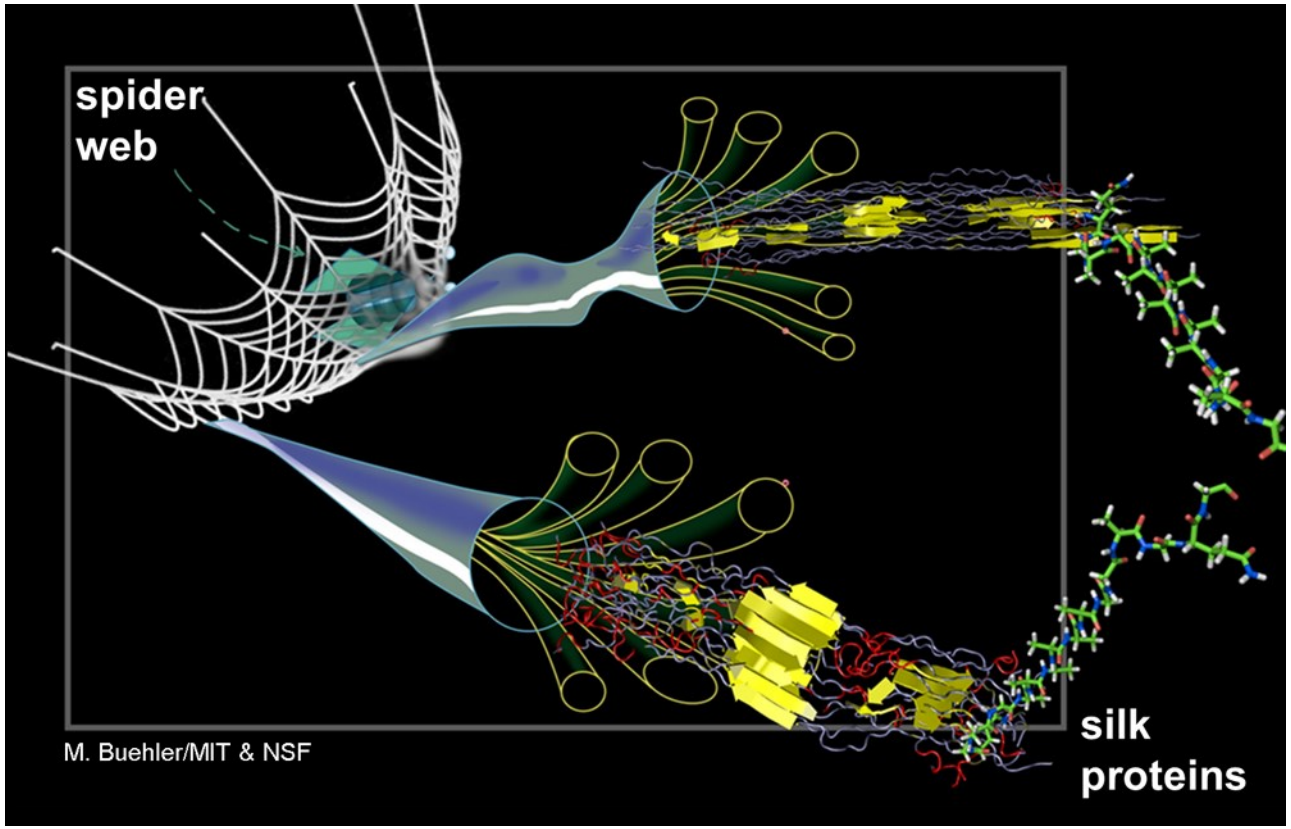


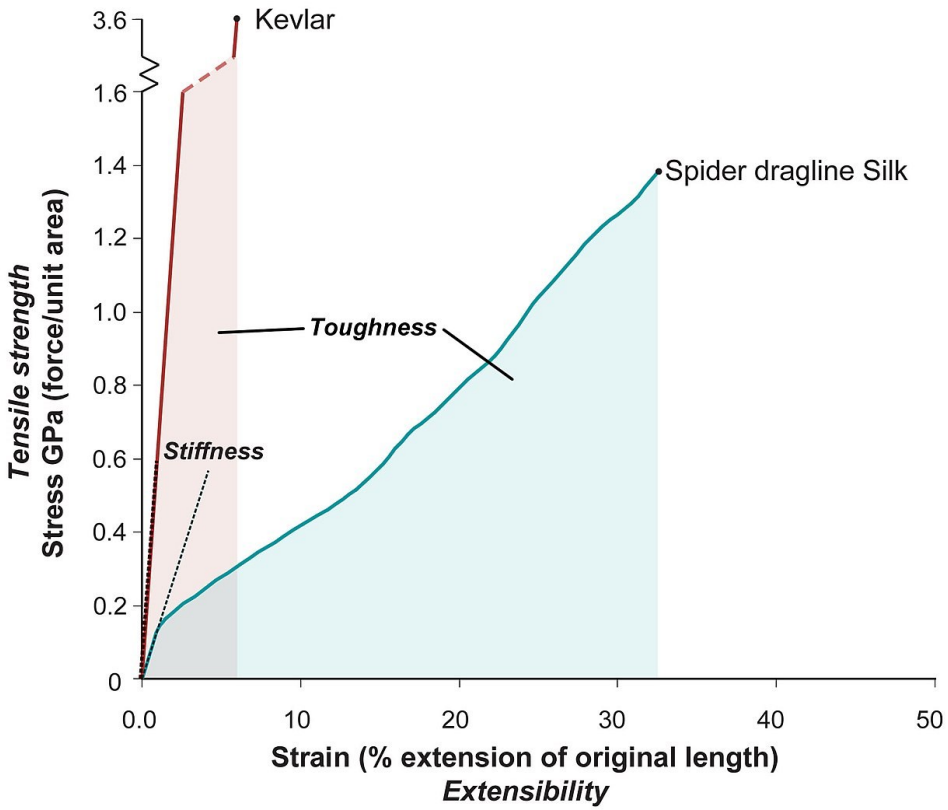


AXALKO

Natural Materials Properties

Because they have amazing properties we didn't even dream





Source: wikipedia

AXALKO

Natural Materials Properties

We must be **careful** when **comparing** natural biomaterials, to metals or synthetic materials

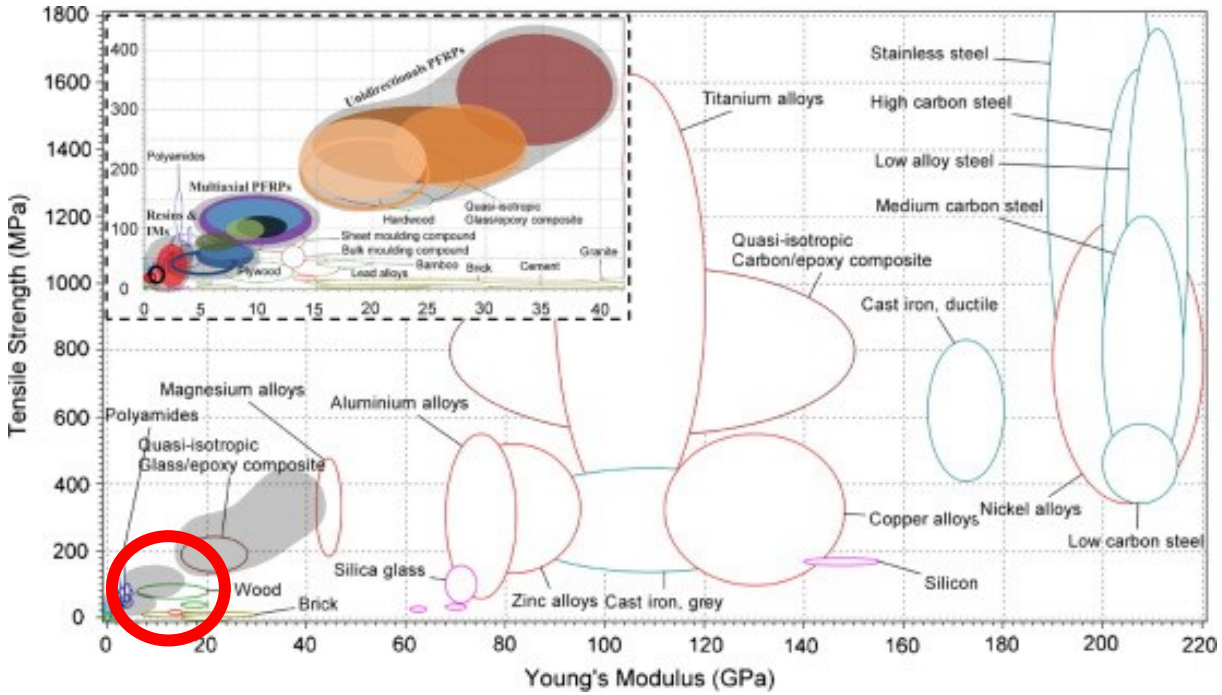
It is not easy to compare such different materials, because they don't work the same way and natural materials have specific behavior

- Natural materials "grow", so they are created through life processes
- Natural materials usually have unidirectional unique properties
- But those properties work only in one direction, the are hardly bidirectional and almost never isotropic
- When comparing materials for high end purposes, we must consider and balance weight to strength relationship

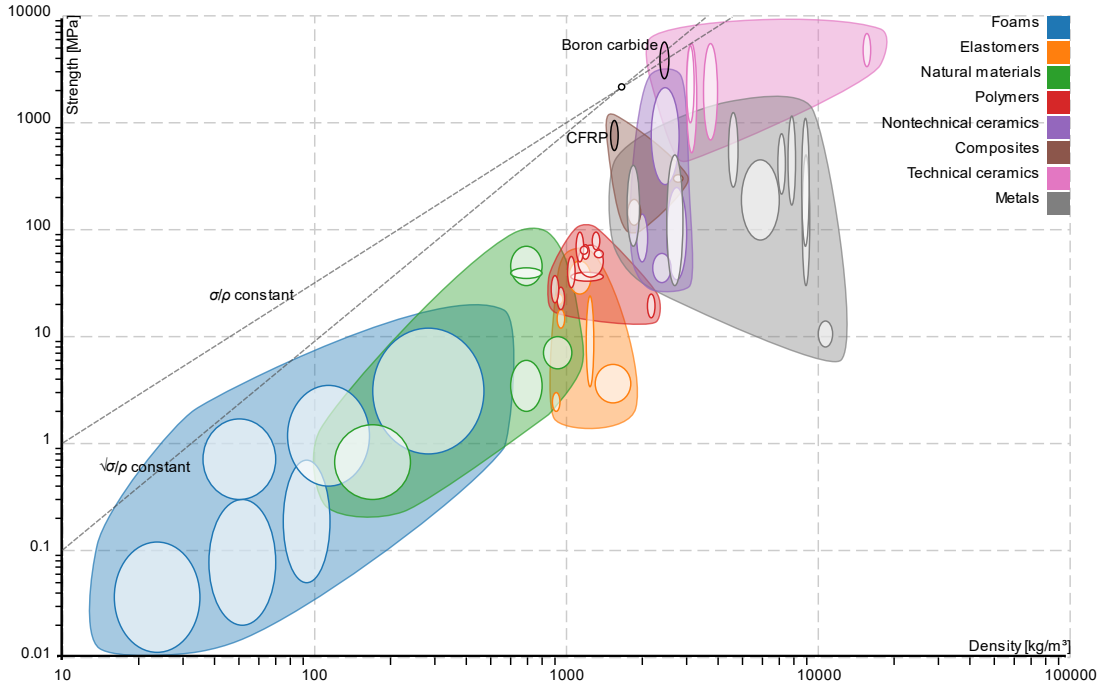
Natural Materials Properties

The mechanical properties could look a little poor in a first sight

But they are much more interesting when we consider density/weight



Source: science direct



Source: Ashby chart wikimedia

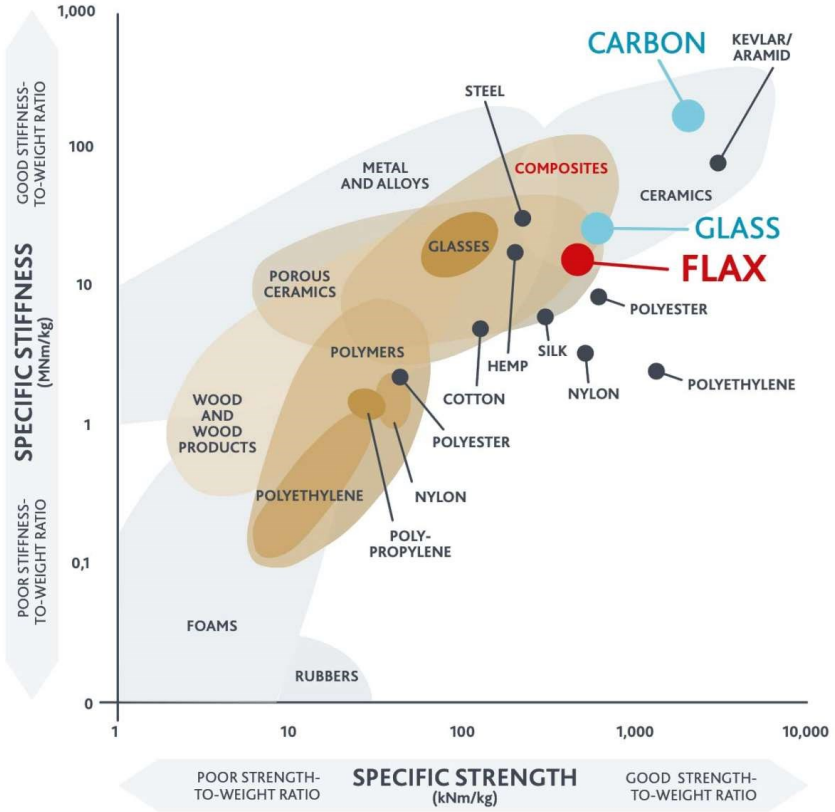
AXALKO

Natural Materials Properties

Numbers in working direction of some natural materials could be really impressive

COMPOSITES CONTAINING FLAX FIBER REINFORCEMENTS

SHOWS COMPARABLE SPECIFIC STIFFNESS AND
STRENGTH TO GLASS FIBER COMPOSITES OR EVEN STEEL



COMPARED TO OTHER FIBERS

FLAX SHOWS ALSO FAVORABLE PROPERTIES

FIBER	DENSITY (g/cm^3)	TENSILE STRENGTH (MPa)	STIFFNESS / YOUNG'S MODULUS (GPa)	SPECIFIC STRENGTH (MPa/g cm^3)	SPECIFIC STIFFNESS (GPa/g cm^3)	ELONGATION E (%)
FLAX	1.45	800-1500	55-75	550-1030	38-52	1.5-2.0
HEMP	1.48	550-900	40-65	370-600	27-44	1.6
JUTE	1.46	400-800	10-30	275-550	7-21	1.8
E-GLASS	2.55	2000-2400	70-74	780-940	27-29	3
CARBON (T300-T700)	1.80	3530-4900	230	1900-2700	128	1.5-2.1

Source: https://www.safilin.fr

AXALKO

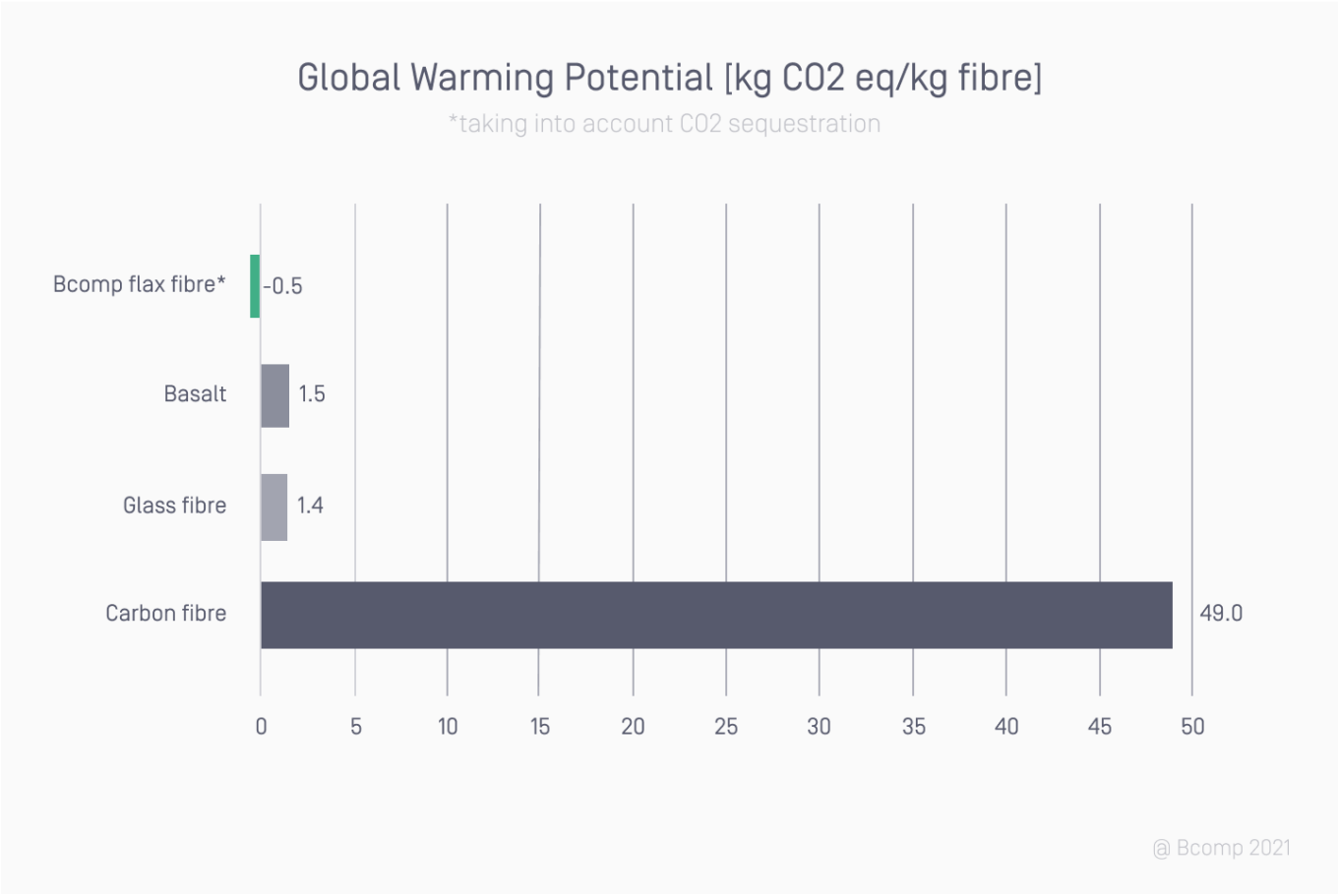
Natural Materials Properties

And of course, when we compare their carbon footprint and availability for future use, they are unmatchable

Objectifs / Enjeux du projet

- Développement d'une protection thermique externe durable pour lanceurs.
- Composite à base de fibres de lin et résine époxy faible densité, compatible avec le placement de fibres automatisées.
- Gain de coût visé de 50%.

Source: https://eco-technilin.com
Caulibri project



Source: https://www.bcomp.ch

AXALKO

Natural Materials Properties

Source: https://www.bcomp.ch

AXALKO

How Axalko uses Natural Materials

Materials we use, themselves are not innovative, they have existed for many million years

Axalko selects and mixes together the best natural materials to fit riders needs

We create spatial 3D structures to take advantage of the best properties of the materials and obtain the required resistance and the optimal riding experience

Cellulose fibers have a specific strength of 10.000kg/$cm^{2,}$ higher than the steel

Lignin stiffens cellular walls with a compressive strength of 2,400kg/cm^2, higher than concrete

AXALKO

How Axalko uses Natural Materials

AXALKO

How Axalko uses Natural Materials

1. Understand nature, natural behavior and what, why, how and with which purpose has evolution created those materials

2. Adapt Production Processes to biomaterial and their characteristics (it doesn’n necessary mean to make it more expensive)

AXALKO

How Axalko uses Natural Materials

3. Create products that match the market needs in Quality and Prices

4. Communication is the key, because after all this innovative effort, we must be able to make ir easy to understand to final customer

Innovation doesn't end in the Laboratory


Source: business insider

Innovation is to bring something new to the market…

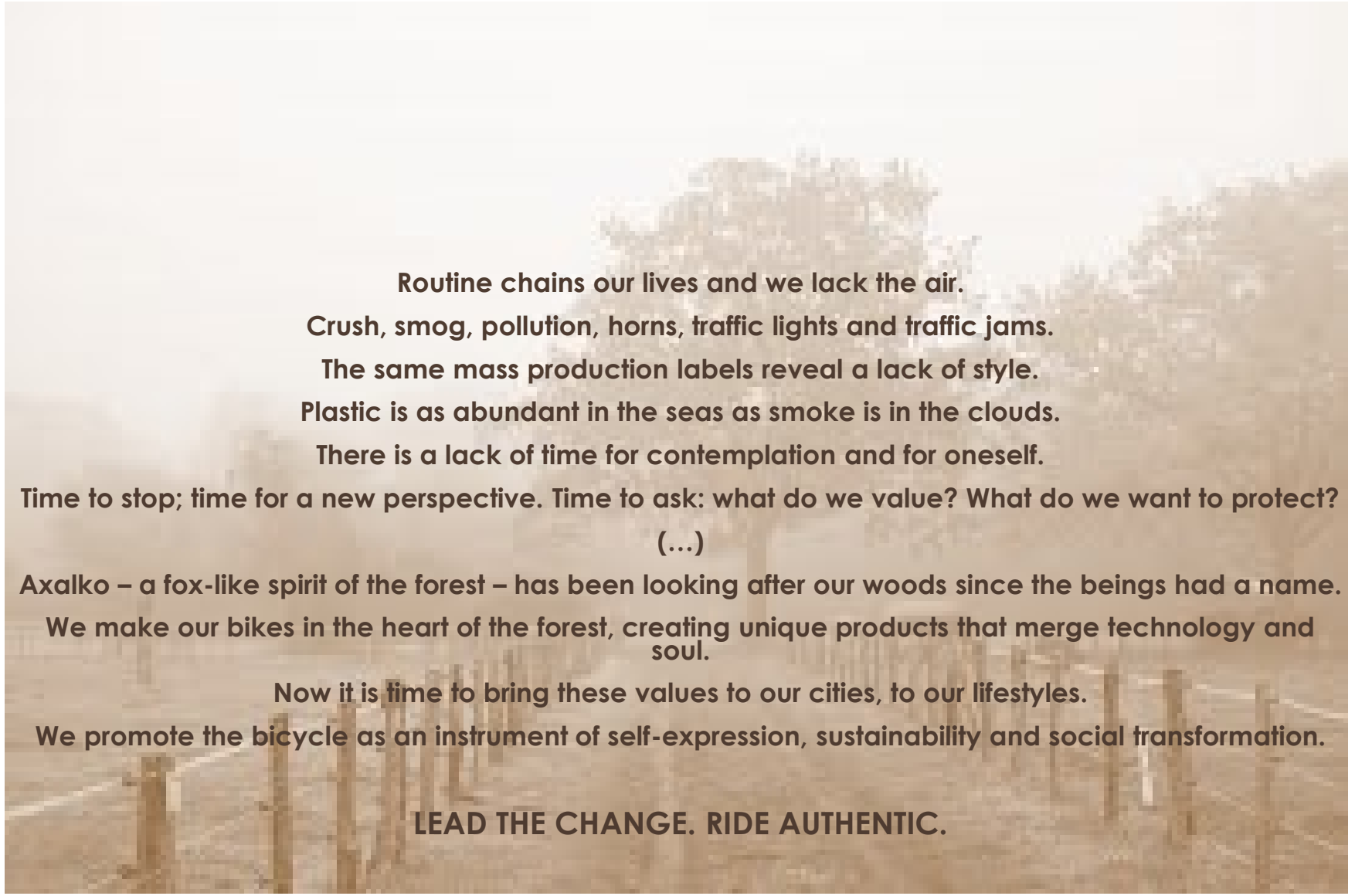
… or giving a new purpose to something already known as no one has done before

Innovation aims to reach market, and in this long way communication and commercialization are key factors researches and developers pay no enough attention

Join Axalko bringing biomaterials to market!!!

AXALKO

¿questions?



AXALKO

AXALKO