



## HANF SKI

Sekundäre Rohstoffe als Schlüssel für zukunftsweisende Werkstofflösungen

2. Dezember 2024

Valentine Troi, Research Group Leader

# GROWN

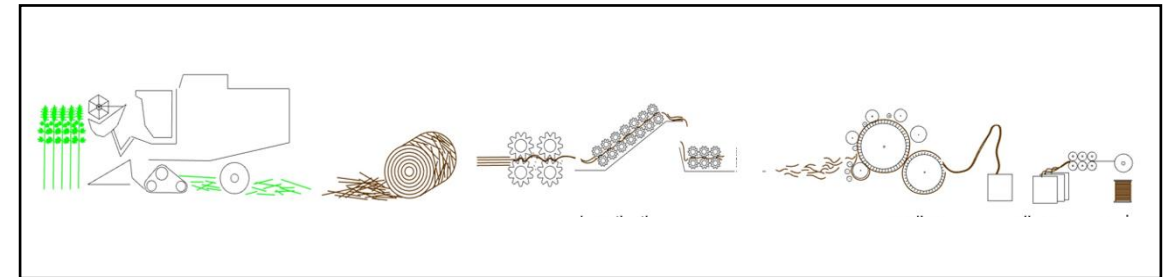
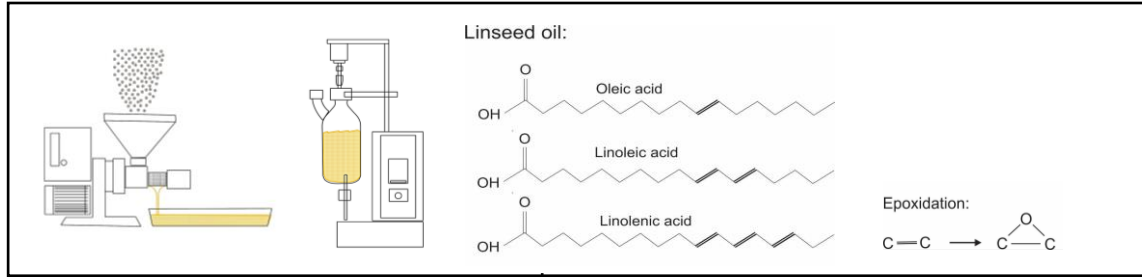
LAB for fast growing materials

Institute of Engineering Design and Materials Science,  
University Innsbruck



Alpenhanf 360° 

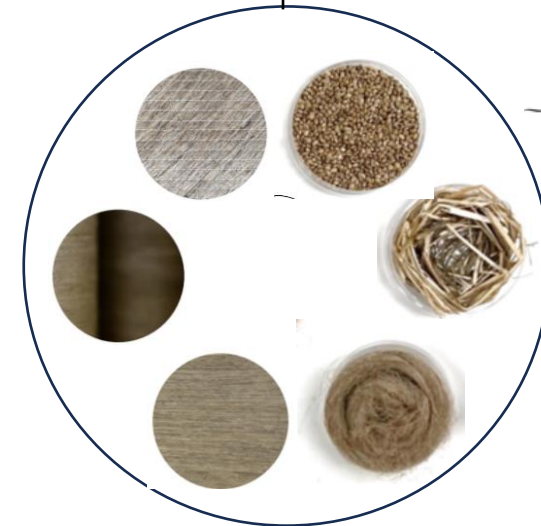




## Matrix

## Faser

## Skiherstellung



Hanf Ski



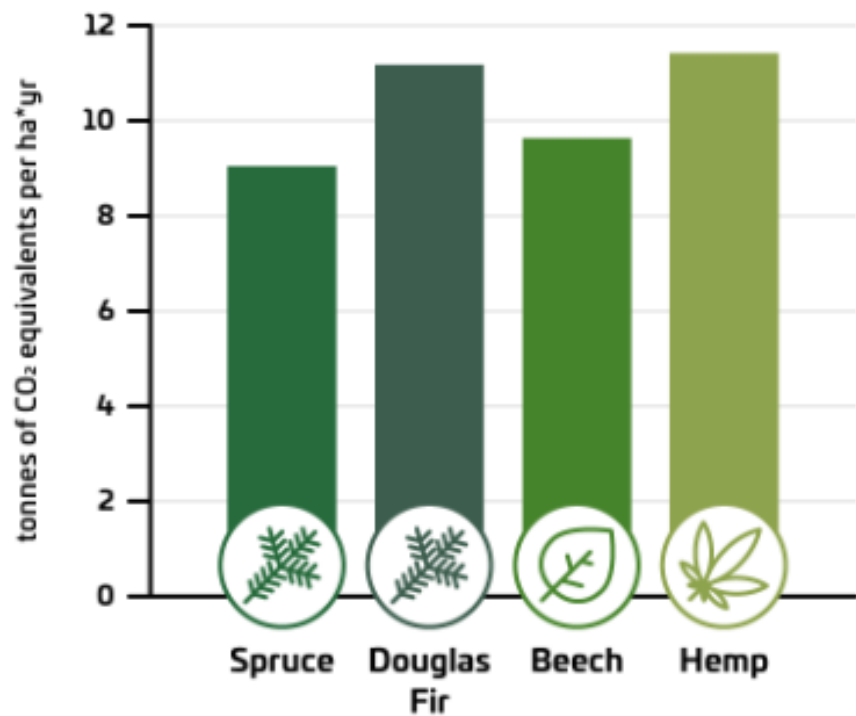




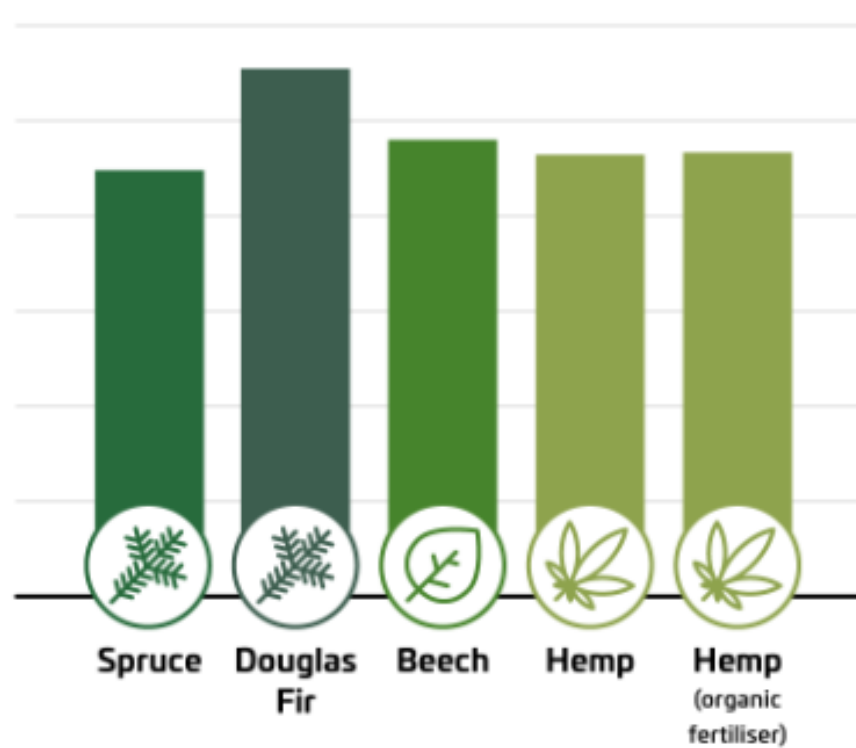


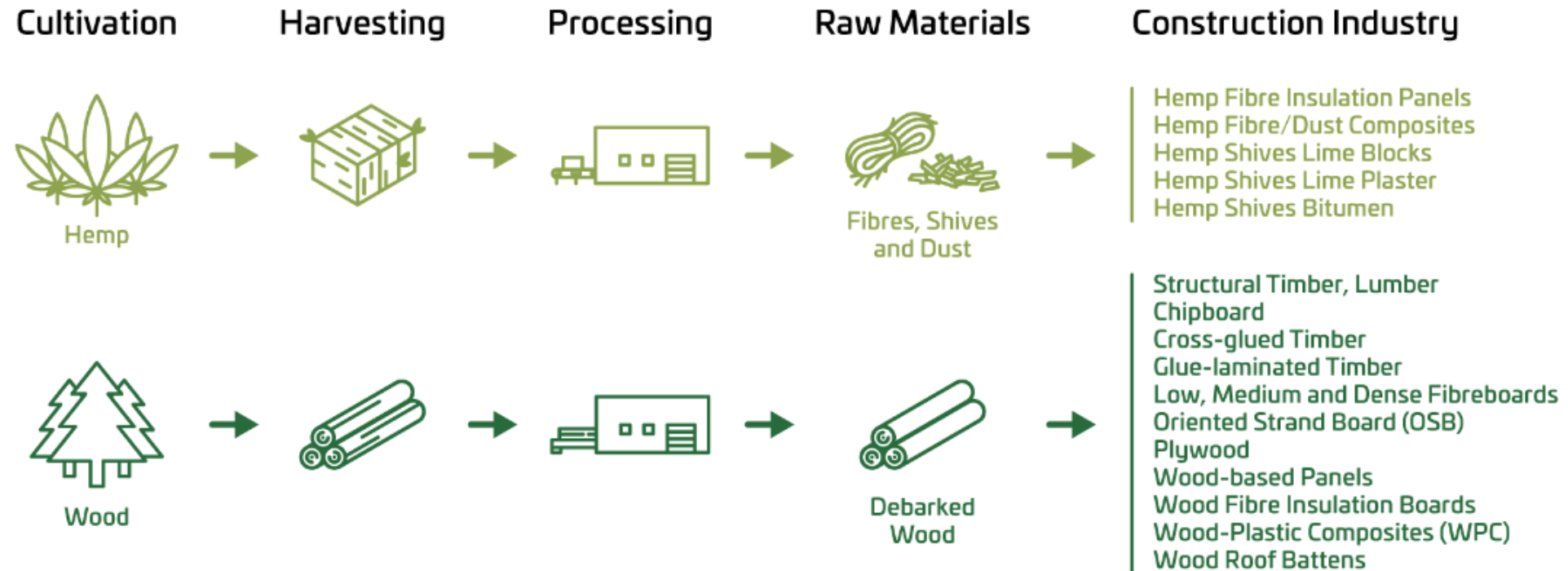


## Carbon Removal Gross



## Carbon Removal Net







### Carbon footprint of one tonne natural fibre and storage of carbon in the intermediate product fibre (economic allocation)

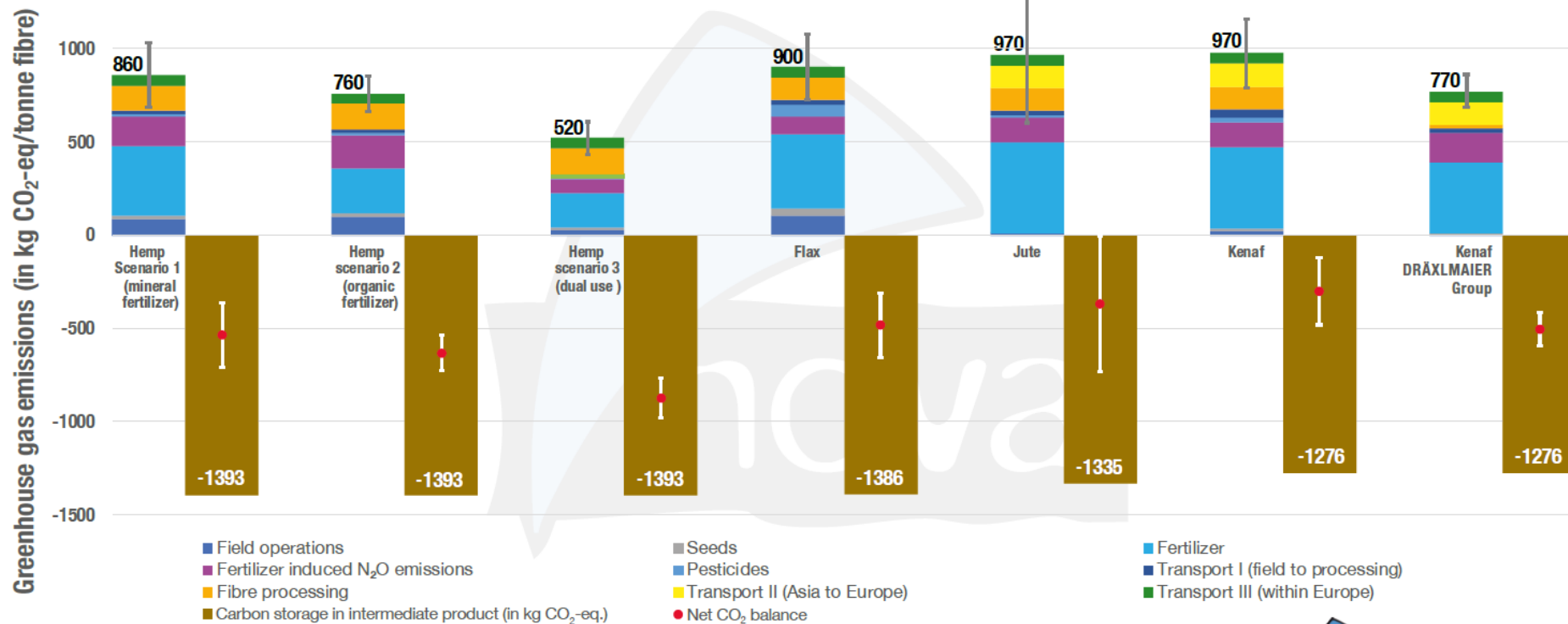
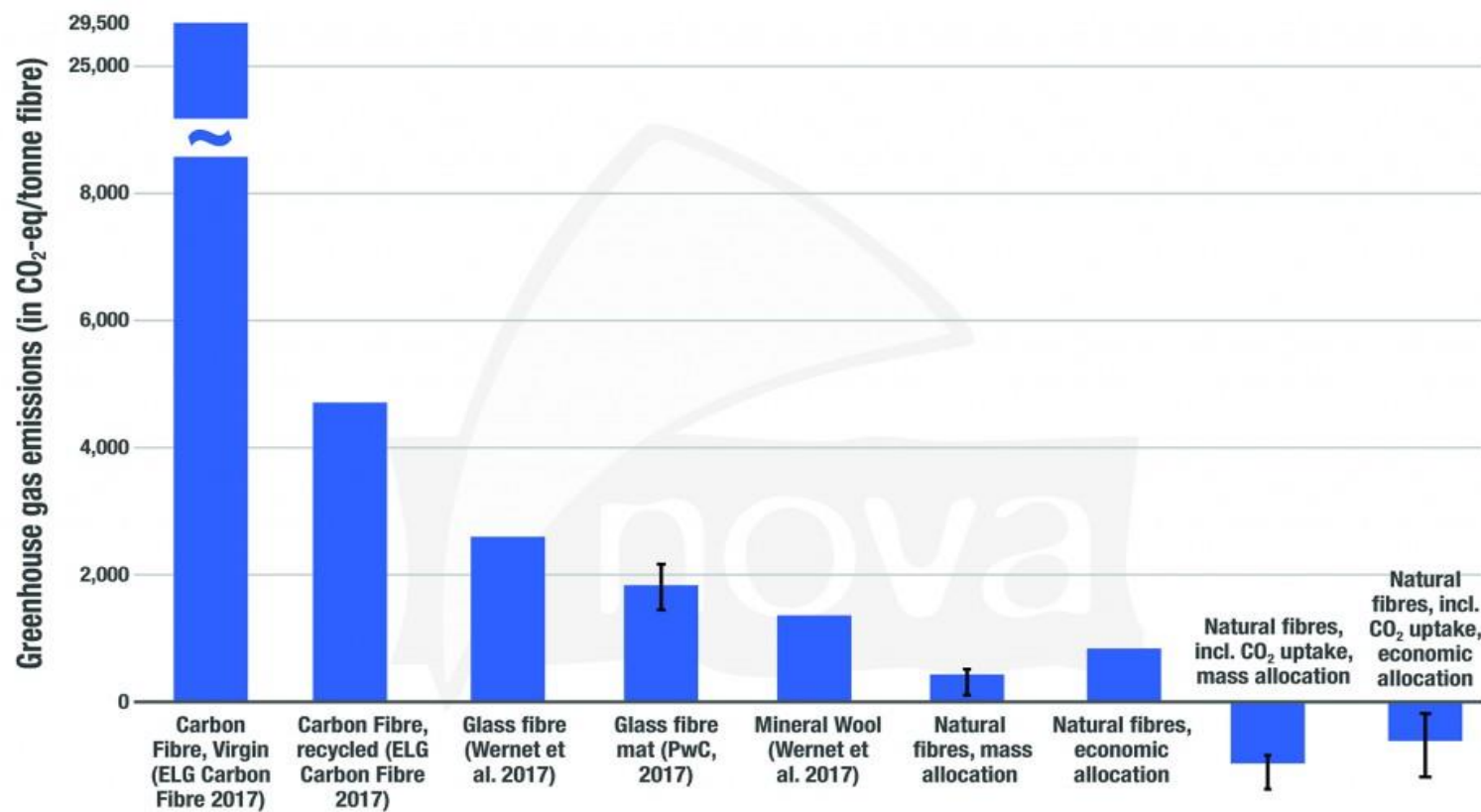


Figure 18: Overview of the greenhouse gas emissions per tonne natural fibre and carbon storage (in CO<sub>2</sub>-eq.) in the intermediate product fibre (flax, hemp, jute and flax) (nova 2019)





## Carbon footprint of different materials in kg CO<sub>2</sub>eq/t





















Cultivation

Harvesting

Processing

Raw Materials



Hemp



Fibres, Shives  
and Dust



~10% dust



~60% shive



short fiber



long fiber

~30 % fiber





raw long fiber

cellulose

raw short fiber

combed/carded fiber

UD Layup

sliver

roving & yarn





tape



UD roving



yarn wet spun 100% hemp



yarn dry spun 50 % hemp



regenerated fiber filament







**composite specimen  $\varnothing$  8mm\_ 50%fiber/50% biobased Epoxyresin, vacuuminfusion**

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**composite specimen 100 x 15 x ~3 mm \_ ~70%fiber/~30 % biobased Epoxyresin, heatpressing**

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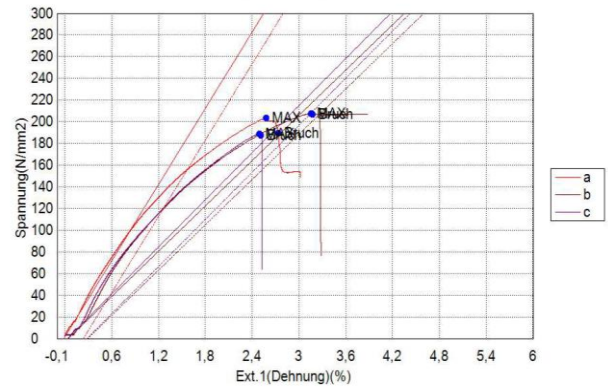




## HF\_frW\_F5\_K GROWN

Schlüsselwort		Produktname	
Testdateiname		Methodendateiname	2024-08-27.3-Punkt-Biegeversuch_rund.xmak
Berichtsdatum	27.09.2024	Testdatum	27.09.2024
Testverfahren	Einzel	Testart	3-Punkt-Biegung
Geschwindigkeit	2mm/min	Form	Rundprobe
Chargengröße:	1	Losgröße:	3

3-P Biegetest Rundstab



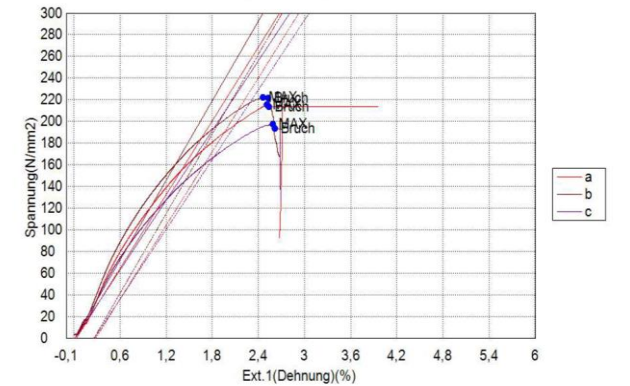
Name	Bruch_Spannung	Bruch_Kraft	Bruch_Ext.1 (Dehnung)	EModulus
Parameter	Empfindlichkeit: 10	Empfindlichkeit: 10	Empfindlichkeit: 10	Ext.1(Dehnung) 0,05 - 0,25 %
Einheit	N/mm2	N	%	GPa
a	189,414	373,743	2,73602	11,7184
b	207,105	408,651	3,17329	6,96460
c	187,601	370,165	2,51069	7,24432
Durchschnitt	194,707	384,186	2,80667	8,64244
Standardabweichun g	10,7755	21,2624	0,33690	2,66753
Maximum	207,105	408,651	3,17329	11,7184
Minimum	187,601	370,165	2,51069	6,96460
Bereich	19,5040	38,4860	0,66260	4,75380
Median	189,414	373,743	2,73602	7,24432
Variation	0,05534	0,05534	0,12004	0,30865
3Sigma	32,3264	63,7872	1,01071	8,00259



## HF\_TB\_F4\_K GROWN

Schlüsselwort		Produktname	
Testdateiname		Methodendateiname	2024-08-27.3-Punkt-Biegeversuch_rund.xmak
Berichtsdatum	27.09.2024	Testdatum	27.09.2024
Testverfahren	Einzel	Testart	3-Punkt-Biegung
Geschwindigkeit	2mm/min	Form	Rundprobe
Chargengröße:	1	Losgröße:	3

3-P Biegetest Rundstab



Name	Bruch_Spannung	Bruch_Kraft	Bruch_Ext.1 (Dehnung)	EModulus
Parameter	Empfindlichkeit: 10	Empfindlichkeit: 10	Empfindlichkeit: 10	Ext.1(Dehnung) 0,05 - 0,25 %
Einheit	N/mm2	N	%	GPa
a	213,757	421,775	2,53311	11,3577
b	221,538	437,128	2,52562	12,2611
c	193,409	381,626	2,61320	10,7392
Durchschnitt	209,568	413,510	2,55731	11,4527
Standardabweichun g	14,5248	28,6593	0,04855	0,76538
Maximum	221,538	437,128	2,61320	12,2611
Minimum	193,409	381,626	2,52562	10,7392
Bereich	28,1290	55,5020	0,08758	1,52190
Median	213,757	421,775	2,53311	11,3577
Variation	0,06931	0,06931	0,01898	0,06683
3Sigma	43,5745	85,9778	0,14564	2,29615































# SPURart Skibau Workshop mit FUSE Composite UD-Tapes



Später ans..



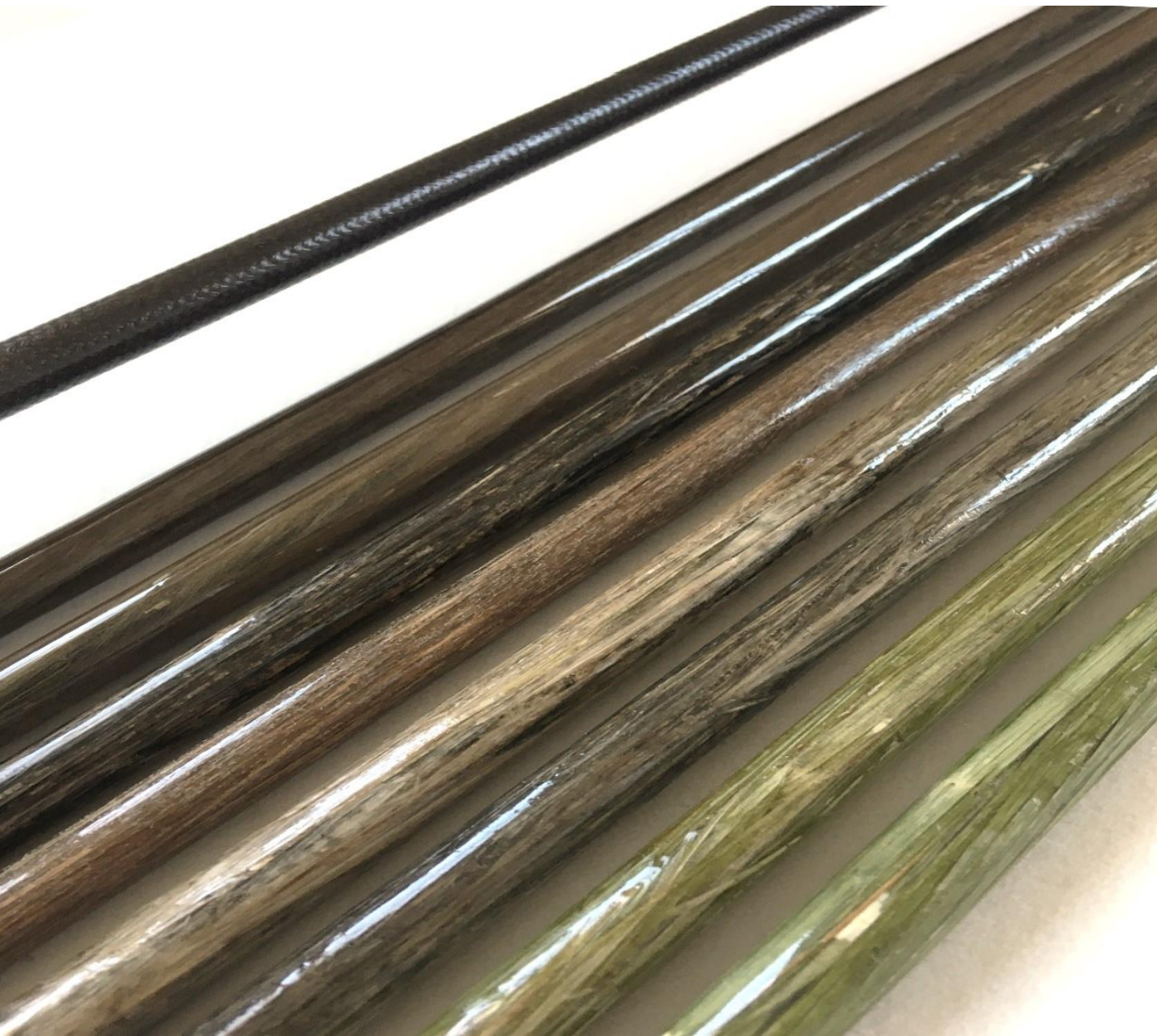
WEITERE VIDEOS



4:17 / 4:52











**THE  
FUTURE  
BELONGS  
TO THIS  
HIPPIE.**



© LEKI







## Vielen Dank

 Bundesministerium  
Klimaschutz, Umwelt,  
Energie, Mobilität,  
Innovation und Technologie







**Vielen Dank für Ihre Aufmerksamkeit!**

**Valentine Troi, Research Group Leader**

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**GROWN**

**LAB for fast growing materials**

**Institute of Engineering Design and Materials Science,  
University Innsbruck**