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**Beyond CBD:
Optimized Hemp Cultivars**



Engineering High Value Hemp Traits

Mike Petersen

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WORLD'S 1ST TRANSGENIC HEMP PLANT!



What Can We do With This New Technology?

How to edit cannabis DNA

A genetic-editing technique called Crispr-Cas9 replaces portions of the plant's genetic material.

1 Cultivators identify the section of the plant DNA to modify.

2 A guide RNA strand is created and attached to an enzyme.

RNA guide (Crispr)

Enzyme (Cas9)

3 The RNA finds the targeted section of DNA while the enzyme works like a pair of scissors cutting the section out.



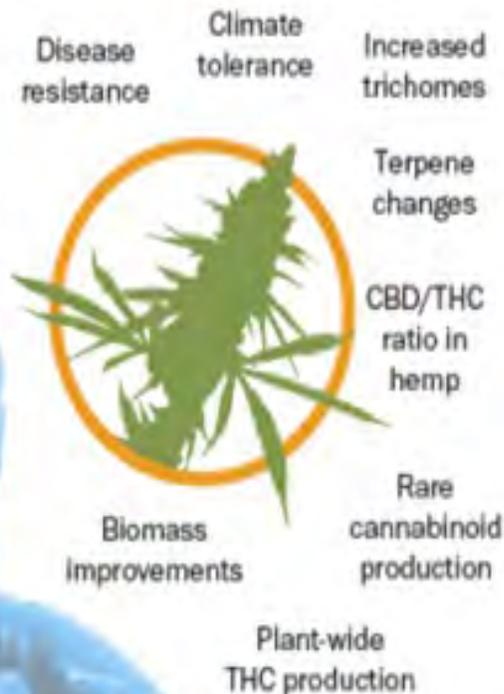
4 New genetic material is introduced and attaches to the missing segment.



The advantage of genetic editing

The Crispr-Cas9 method provides a cost-effective way to introduce specific changes without introducing foreign DNA.

Possible cannabis changes



Source: Marijuana Business Daily research

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WHY HEMP?

SEEDS

OIL



Cooking Oil

SEED



Flour



Fuel



Beer



Paint



Animal Feed



Body Care Products



Butter

INDUSTRIAL HEMP
Contains Less Than

1 % THC

Hemp is **NOT** a DRUG

ROOTS



Organic Compost



Medicine

Sustainable 

Over 50,000 Uses

LEAVES and FLOWERS



Animal Bedding



Mulch



Medicine

STALK

FIBER



Textiles

HURDS



Paper



Insulation



Organic Compost



Rope



Animal Bedding



Molded Plastics



Fiber Board

FIBER

\$43.75B

market by 2027

2x more CO²
capture than trees

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HEMPCRETE

DESIGNED TO BUILD, NOT TO SMOKE.

hempforvictory.co.nz



CARBON NEGATIVE BUILDING MATERIAL.

FIBER

\$43.75B

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capture than trees

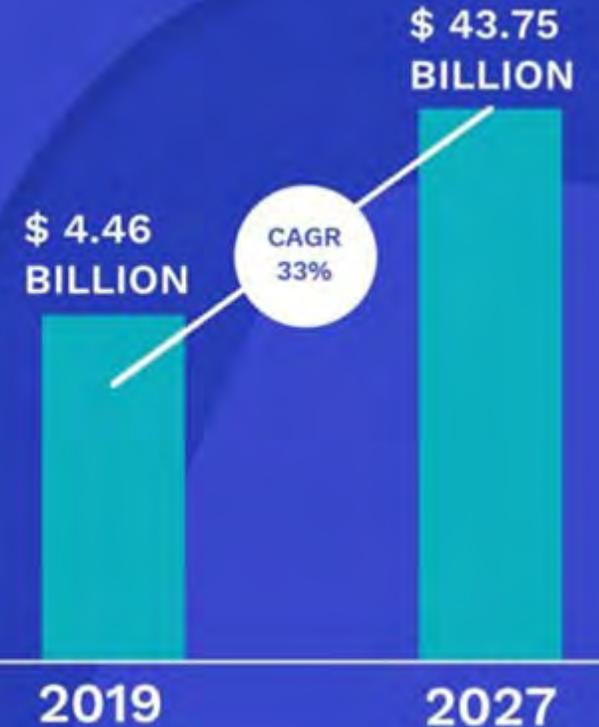


CARBON NEGATIVE BUILDING MATERIAL.



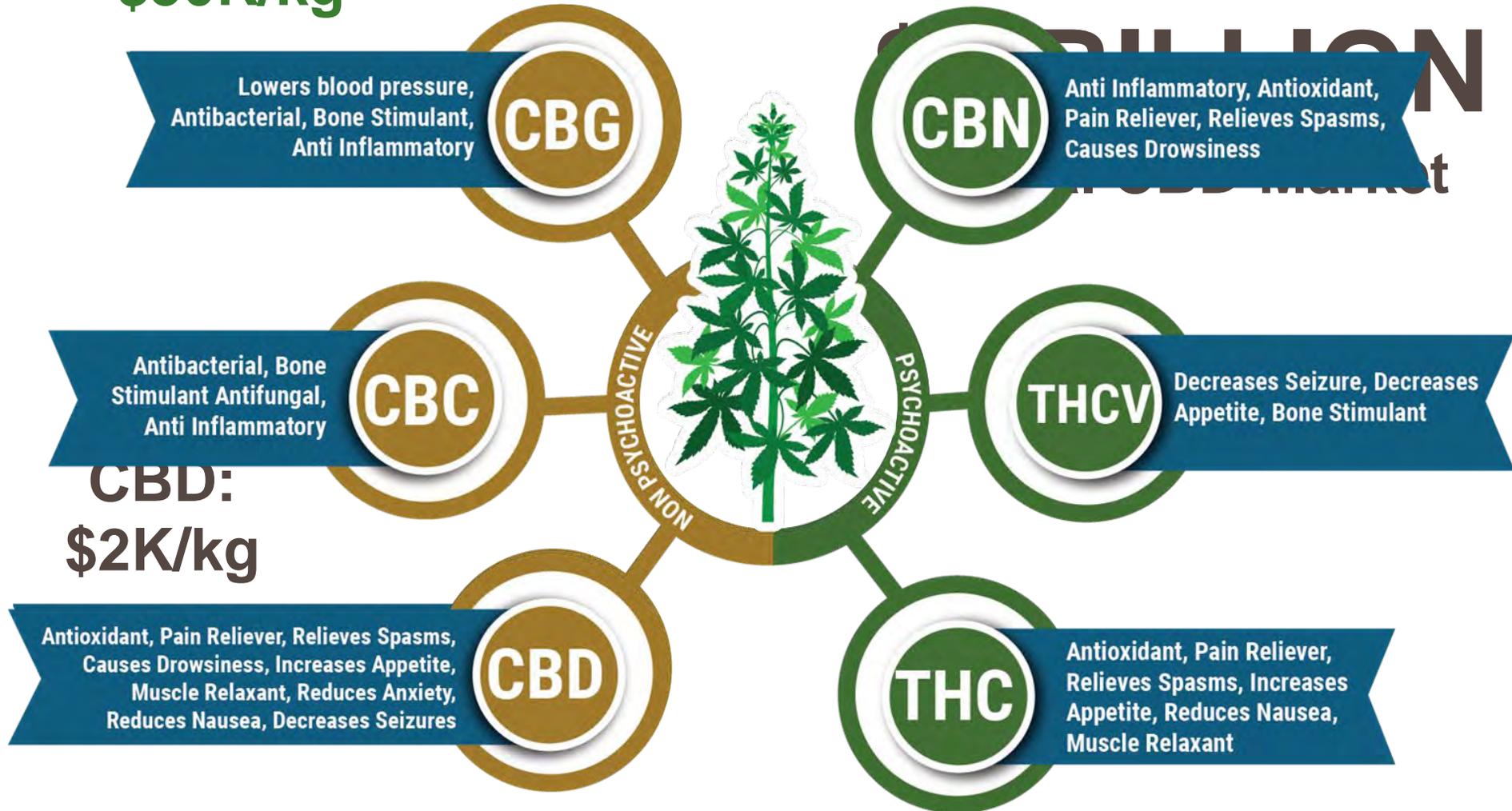
Global Hemp Fiber Market

2020-2027



CANNABINOIDS

CBG:
\$50K/kg



CBD:
\$2K/kg

TERPENES

\$774M

market by 2026

(360researchreports.com)

100+ types

	Myrcene	Linalool	Limonene	Pinene	Terpinolene	Carene	Eucalyptol	Caryophyllene	Humulene	Bisabolol
Reduces Inflammation										
Relieves Pain										
Inhibits Cancer Growth										
Suppresses Muscle Spasms										
Antibacterial										
Relieves Anxiety/Stress										
Sleep Aid/Relaxant										
Aids Digestive System										
Aids Immune System										
Antidepressant										
Antimicrobial										



TEAM 200 YEARS

COMBINED PLANT
ENGINEERING
EXPERIENCE



Mike Petersen
Sr. Scientist (WCIC)
Molecular biologist
Industry collaboration



Shawn Kaeppler
Professor
WCIC Director
Crop breeder, geneticist, biotechnologist



Shelby Ellison
Assistant Professor
Industry research & education
liaison

TRACTION

- ✓ **Proof-of-concept plants and new traits for industry customers**



**“ZeaKal’s Novel
Photoseed Trait
Boosts Hemp
Biomass Oil Output
By Up To 50%”**

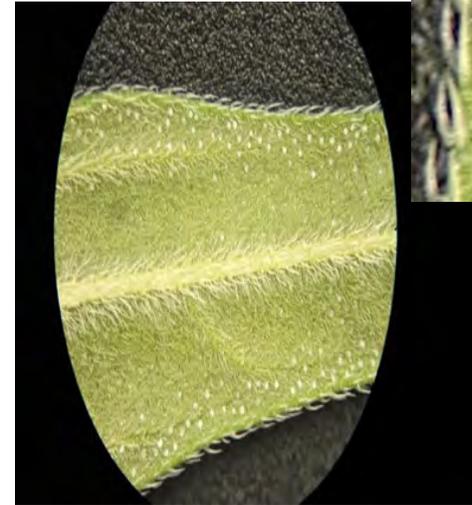
2021 News Release (ZeaKal.com)

TRACTION

- ✓ **Proof-of-concept plants and new traits for industry customers**
- ✓ **Plantlets for controlling cannabinoid production**



W/O Trichome Gene



With Trichome Gene



TRACTION

- ✓ **Proof-of-concept plants and new traits for industry customers**
- ✓ **Plantlets for controlling cannabinoid production**
- ✓ **>\$2M funding**



SEEKING



INDUSTRY PARTNERS & COLLABORATORS for

- Creating new varieties for commodity growers**
- Identifying new traits of interest**
- People interested in commercialization**

Engineering High Value Hemp Traits

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