

HEMP PACKAGING ROAD MAP

A PATH TO SUSTAINABLE PACKAGING SUCCESS



3D Printer

- Functional upgrades; printable add-ons and productivity accessories.
- Print moulds for Dr. AnnaRx Cosmetics and M2Bio Food Division.
- Prototypes: Flexi chocolate moulds; soap packaging and surfboard frame.
- Experiment with hemp fibre reinforced filaments and flexible filaments.



3D Printer

In-house CREALITY CR-10Max 3D Printer,
in action printing out M2Bio upgrades with Logo.



Research

Why packaging needs change?

“Packaging has more single use products than any other industry.”

Luke Colvin

“Non-conventional carbon sources, such as macroalgae (**kelp**), are **sustainable alternatives** for large-scale production of **biopolymers**.”



Research



Why Hemp will make the change.

“...hemp is divided into four parts: extractions, sugars, pulped fiber, and lignin.” According to Dr. Charles Cai (UC Riverside), all four parts can be transformed into marketable components, as nothing is destroyed in the pulping process.

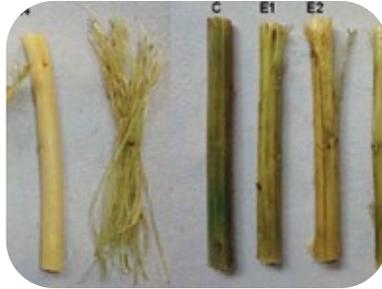


“Lignocellulosic fibers extracted from plants such as **hemp** and flax can **replace cotton** and **polyester fibers** in textile materials and glass fibers in insulation products.”

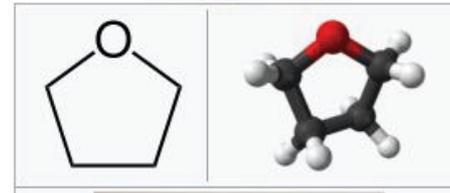


Hemp Processing

- We use only natural products in our processing.
- Research and experiment with different methods of hemp processing:
Soak, mash and separate hemp, use retting combined with mechanical process to separate fiber and hurd from hemp.



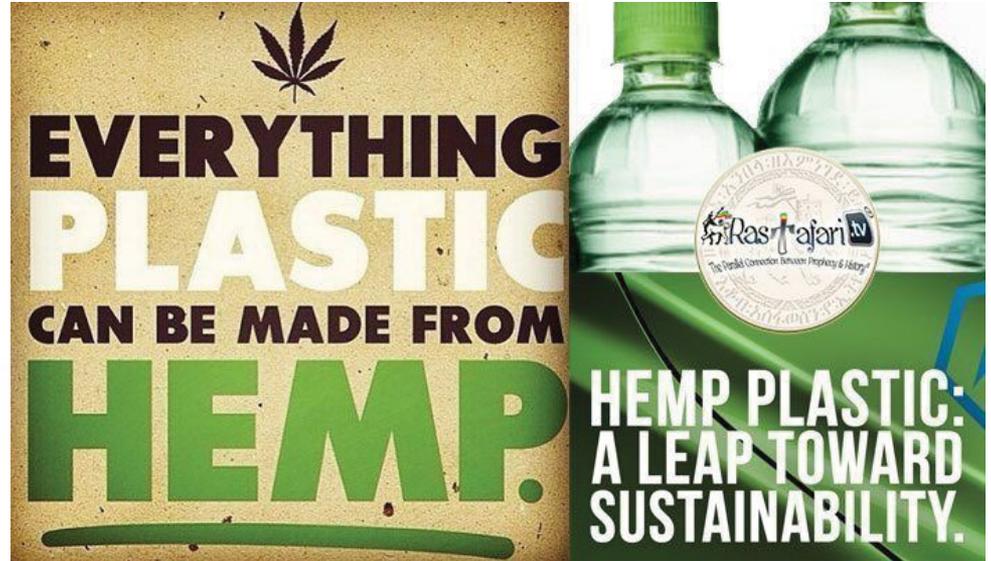
Tetrahydrofuran



Hemp Processing

- **Step 1:** Hydrolyse hemp fiber and hurd to further break down cellulose.
- **Step 2:** Source natural chemicals (such as HTF found in our research) for breaking down hemp into its constituent parts (Cellulose, Fibres, Monomers).
- **Step 3:** Refine these constituents into feedstocks which can be stored, used and sold.

Hemp Plastics





Hemp Plastics

All plastics, resins, films and composites can be made from hemp.

- Once the hemp is processed into its constituents to form feedstocks it can then be made into any plastic form we need.
- By preparing feedstocks with other natural additives in different ratios, a huge variety of materials with varying properties can be achieved.
- Dry, bake, cure, set for different material finishes.
- Explore different packaging applications.

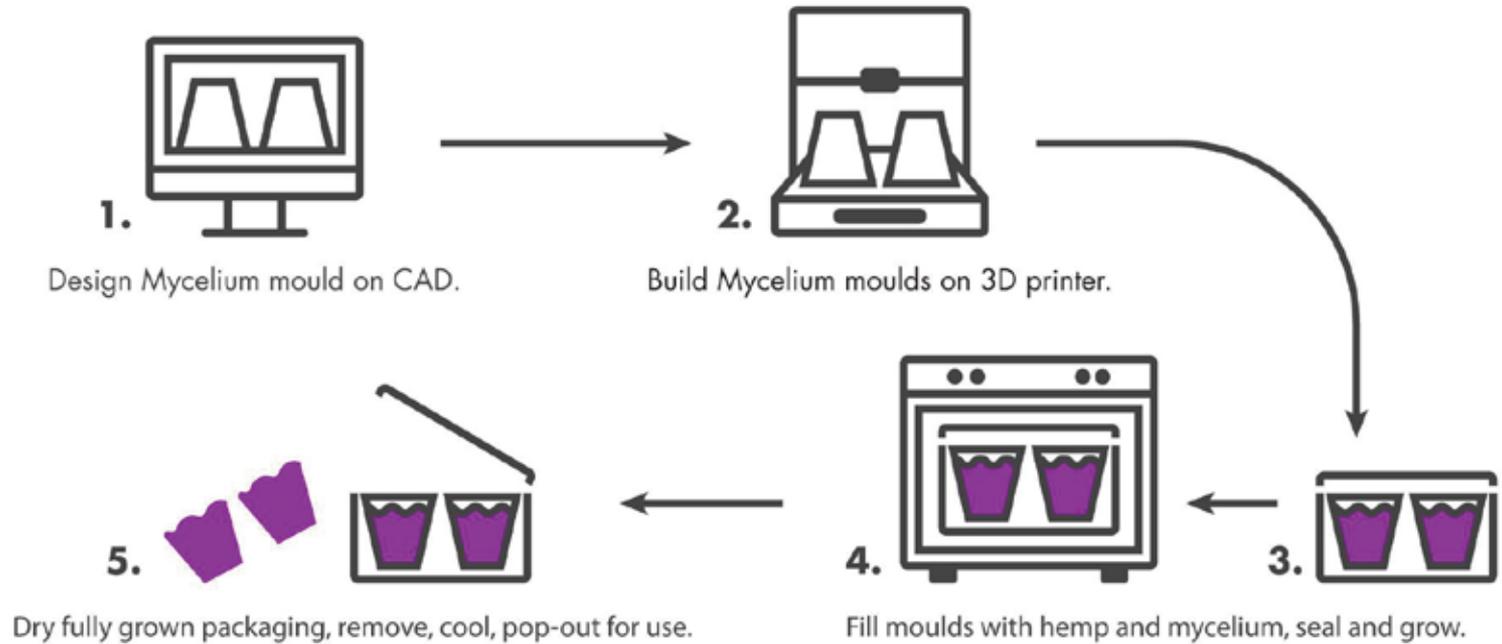


Mushroom Plastics

Biodegradable substitute for PU and EPS foam.

- Petrochemical products pose a threat to the environment as they take decades if not longer to degrade.
- Mycelium foam uses two simple ingredients, hemp agri bi-products and mushrooms.
- The material grown is strong and hydrophobic - yet can be broken up and tossed in the garden to degrade and add nutrients to the soil.

Our Process





M₂Bio
BOARD
Nature's Favourite Surfboard



THE WORLD'S FIRST MYCELIUM &
HEMP COMPOSITE SURFBOARD





M2Bio Surfboard

1. 3D print frame.
2. Prepare hemp hurd.
3. Mix hemp with mushroom spores.
4. Mycelium grows through hemp in 3D-printed Surfboard frame.
5. Grows in 7 days in climate controlled environment.
6. Lightly bake to stop growth.
7. Glass with hemp cloth and bio resin.

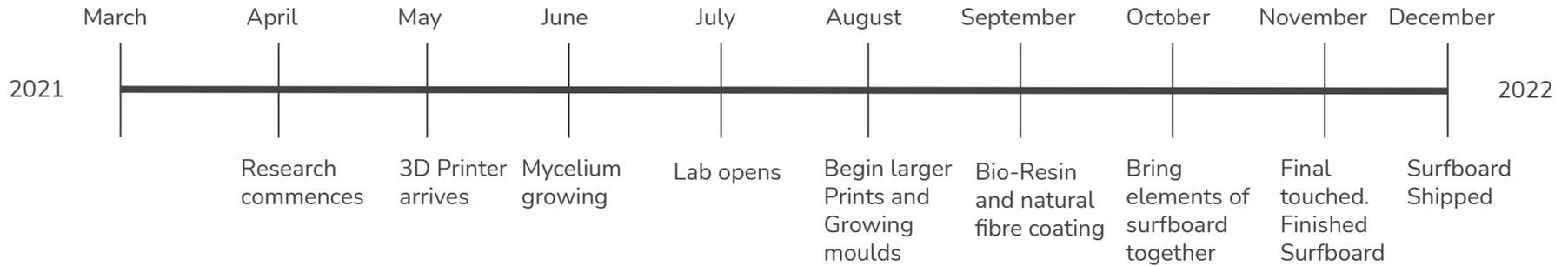
Goals

- Make coffee capsules and other plastic products fully biodegradable.
- Create new premium packaging for all M2Bio products.
- Revolutionise packaging in South Africa.
- Export sustainable packaging internationally.





Timeline



Contact Information



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Stephanus learned to have a real love and appreciation for nature. He wants to preserve and make that way of life available for future generations by taking an eco-friendly approach and implementing lasting changes in a sustainable way using hemp as the building blocks.

Contact Information



Luke Colvin

R&D Engineer, Hemp Plastics & Packaging

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“The cannabis plant has thousands of uses, every part from its roots to flowers has been used for making medicine, fabrics to building materials, plastics and bio-fuels.”
“We look forward to diving into the world of hemp plastics.”
Luke Colvin, R&D engineer.



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