An exploration of leather from natural materials

BIO LEATHER

SOPHIE ARMITAGE

Concept

Leather Based Sculptural Piece

- **Biomaterials**
- Translucent Qualities
- Ability to Fold and Create Forms
- Color Usage in Natural Leathers
- Experimentation
- **Connection to global systems, themes, and issues learned throughout the semester**

NEXT →

LEATHER TANNING

RESEARCH

Leather Production

Tanneries use large amounts of energy, water and chemicals. The environmental impact of this is significant.

Animal Usage

Animals, particularly cows, produce large amounts of methane which is released into the atmosphere which ultimately results in climate change. Animal byproducts are also leached into waterways. Deforestation of land is occurring in order to make room for pasture lands. 14.5% of gas emissions are directly related to livestock. In the Amazon alone, cattle are responsible for 14% of the deforestation. (otter.org)

Chemical Usage

Chromium is the principal chemical used in tanning. This chemical causes burns to workers and is leached out into waterways after the tanning process. People in communities near tanning factories suffer from rashes, respiratory illnesses and cancers as a direct result of tannery chemicals. 300kgs of chemicals are being added for every 900kg of animal hides tanned (goodonyou.eco)

NEXT →

"[During] the last four years I have worked no more than ten days per month. If I work more, the itching starts. It is unbearable. The doctor's ointment doesn't help much. But I need to work so my family can live"

Venkatesh: leather tannery worker

Environmental Impact

Waterway Contamination

Contamination of waterways leads to health risks to animal and human populations nearby. Animal feces contaminates waterways as well. Drinking water becomes unsafe for local communities and workers. This can also harm aquatic ecosystems.

Deforestation

Worldwide, livestock use accounts for 26% of land grazing and 33% for feed; For example, cattle in the amazon are responsible for 14% of deforestation. "Agriculture is estimated to be the direct driver for around 80% of deforestation worldwide." (2017) Wageningen University and Research Centre

Community Impact

Illness

It's not uncommon for tannery workers to become sick with a plethora of illnesses. Lung and leukemia cancers, rashes, burns, diarrhea, anthrax are among the most common. The workers don't earn a living wage and many child labor laws are violated.

Crop -> Food Affected

Because of the need for cattle, there's is less land for food crops to use for local and global communities. The contaminated waterways (because of chemical usage and cattle feces) are used for irrigation to crop which alters soil negatively, thereby affecting crop production

Natural Alternatives

What Exists?

Faux Leather- PVC

Many vegan leather alternatives use PVC (plastic) - not an eco friendly option - production of plastics

Kombucha Leather

Scoby - bacteria used to create the material. Cannot be quickly made (takes about 3 weeks to just create the scoby)

Biomaterial Recipes

Wide range of materials, recipes, and resources online. Trial and error is the best method to see what works best for desired outcome

DOCUMENTATION

Ellie Irons

PROCESS PIN-UP

RECORDING TYPE, DATE, STAGE, RESULTS, AND ITERATIONS AT EACH POINT IN THE PROCESS

Materiom: Red Clay Cornstarch Leather

Water: 0.5 Liter

Glycerol: 30mL

Red Clay: 20 grams

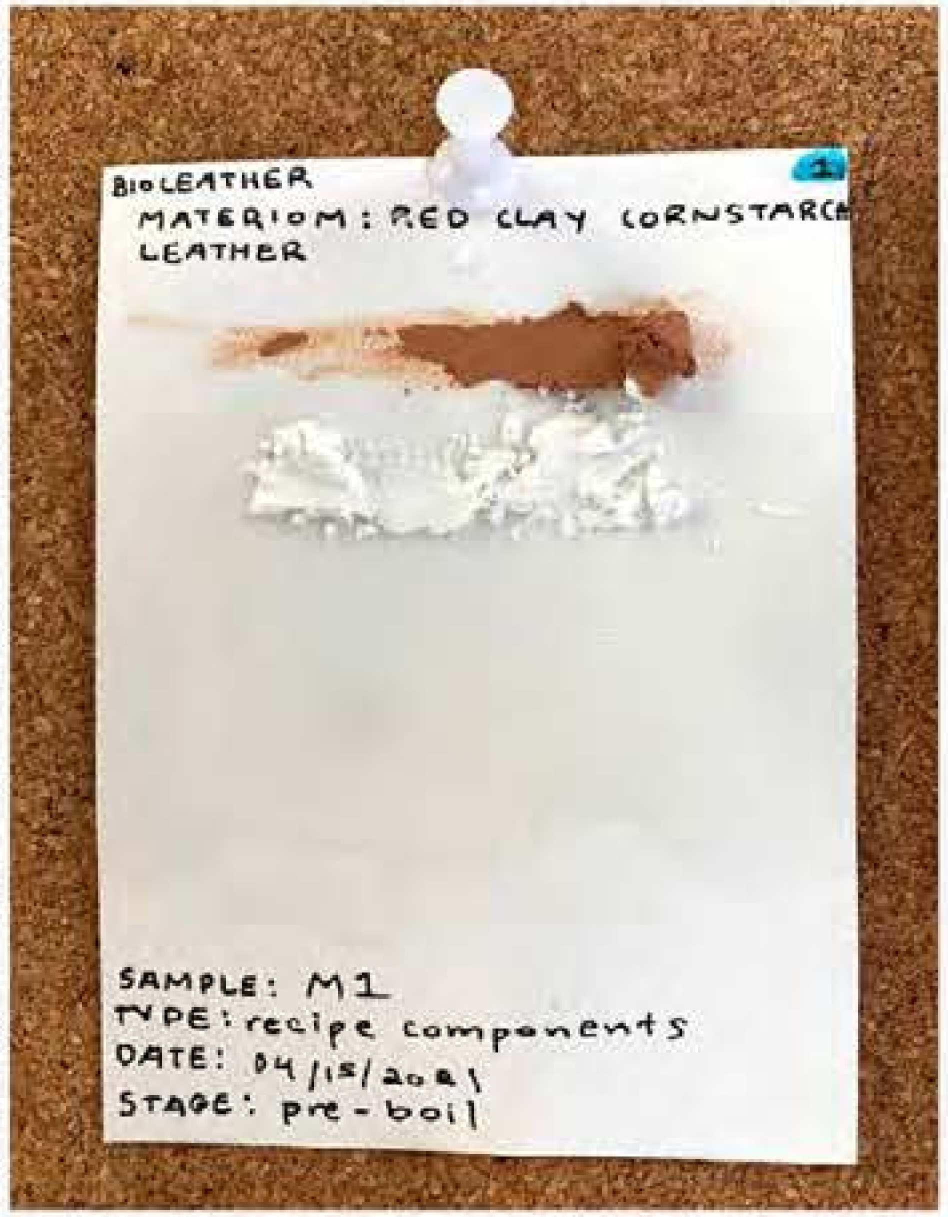
Cornstarch: 60 grams

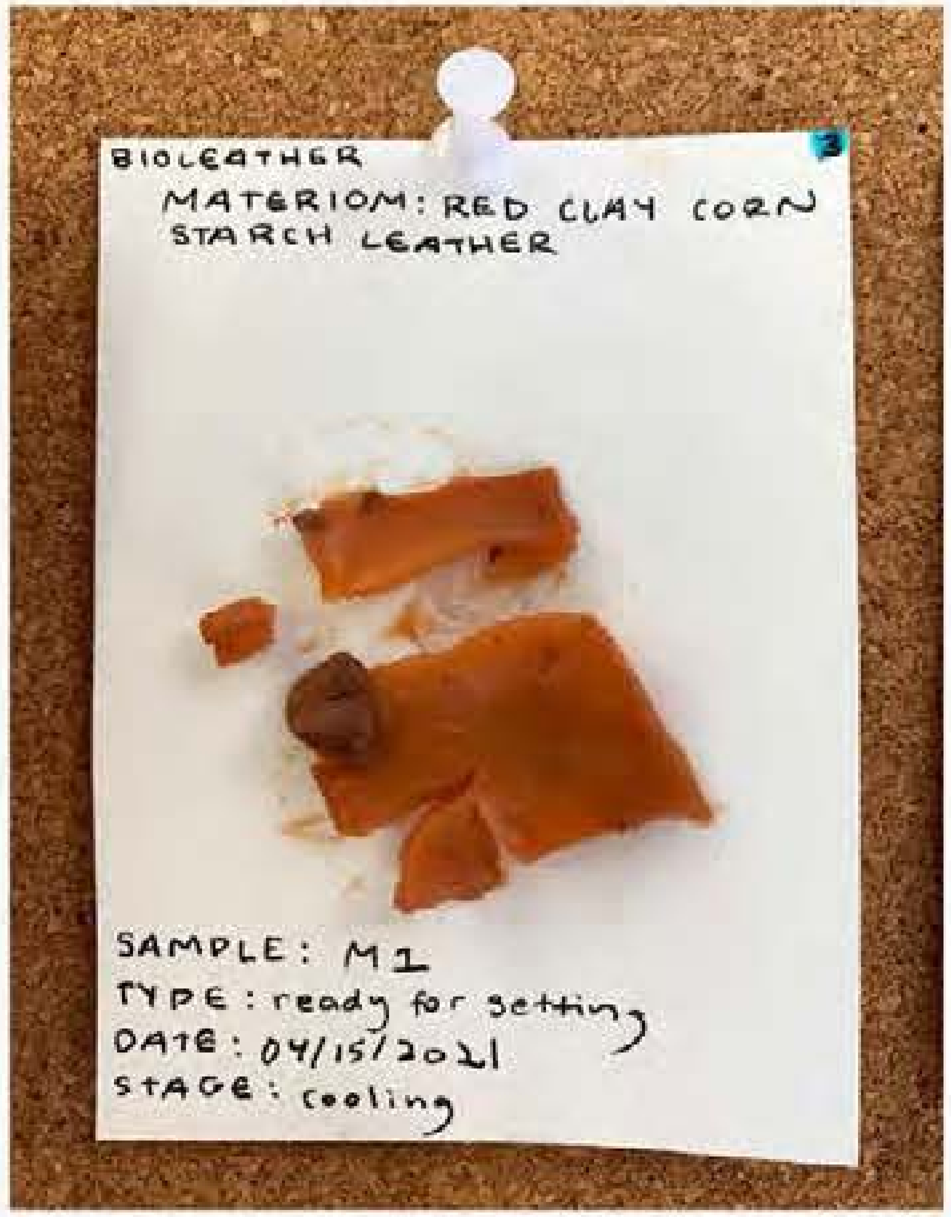
Ginger Oil: 2 drops

Vinegar: 2mL

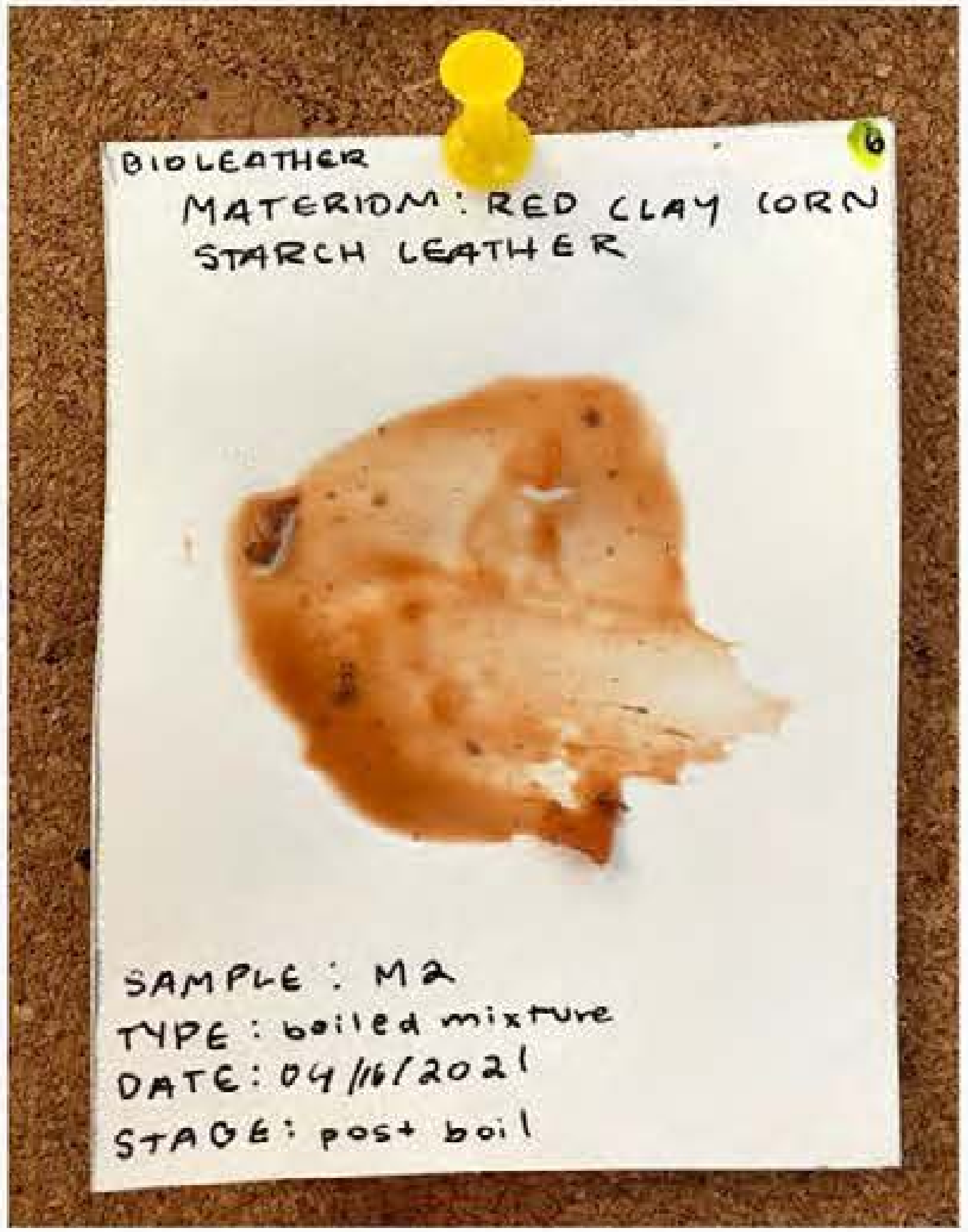
Combine ingredients and bring to a boil. Once at a boil, remove from heat and allow to set for 2-4 days

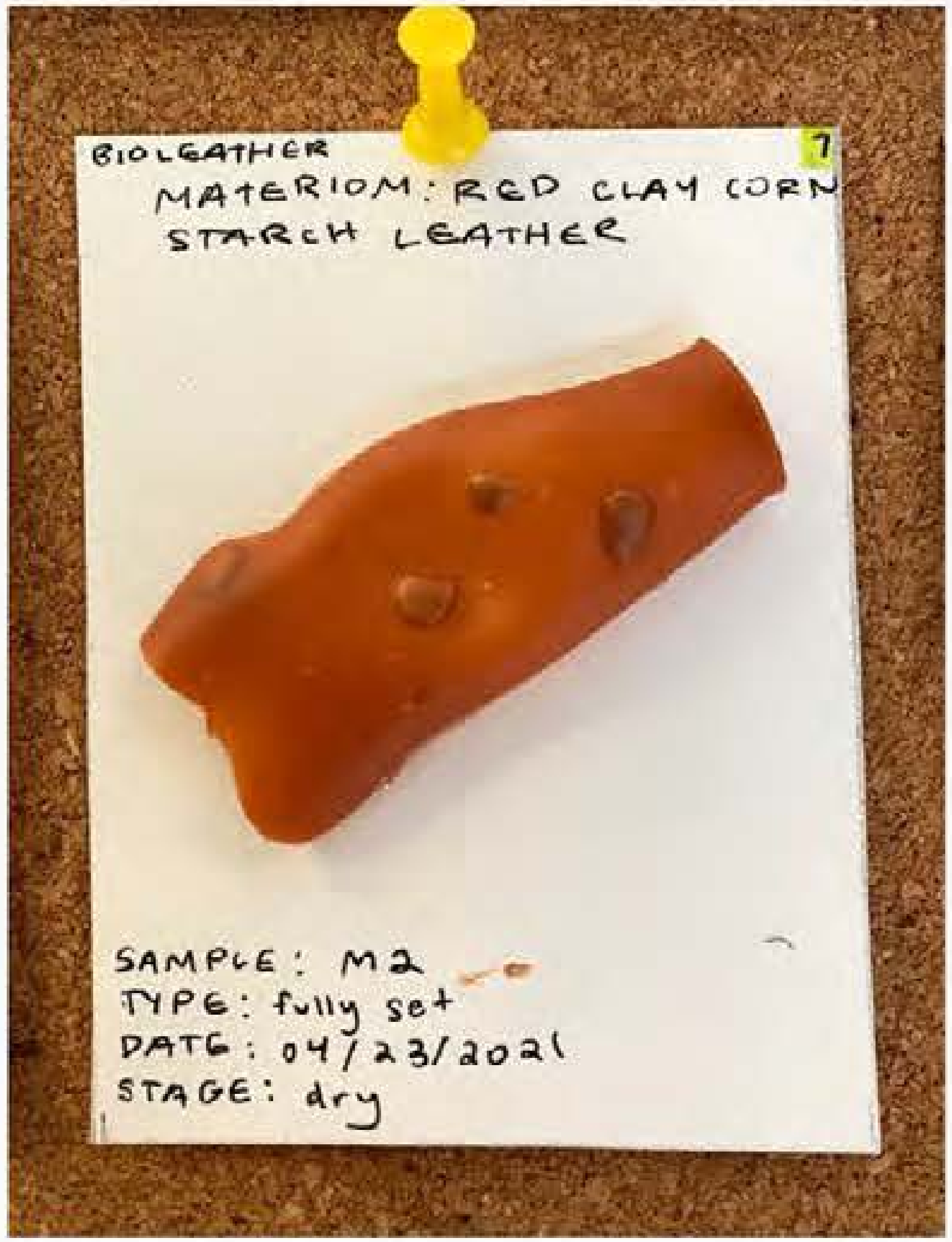
Red Clay Leather



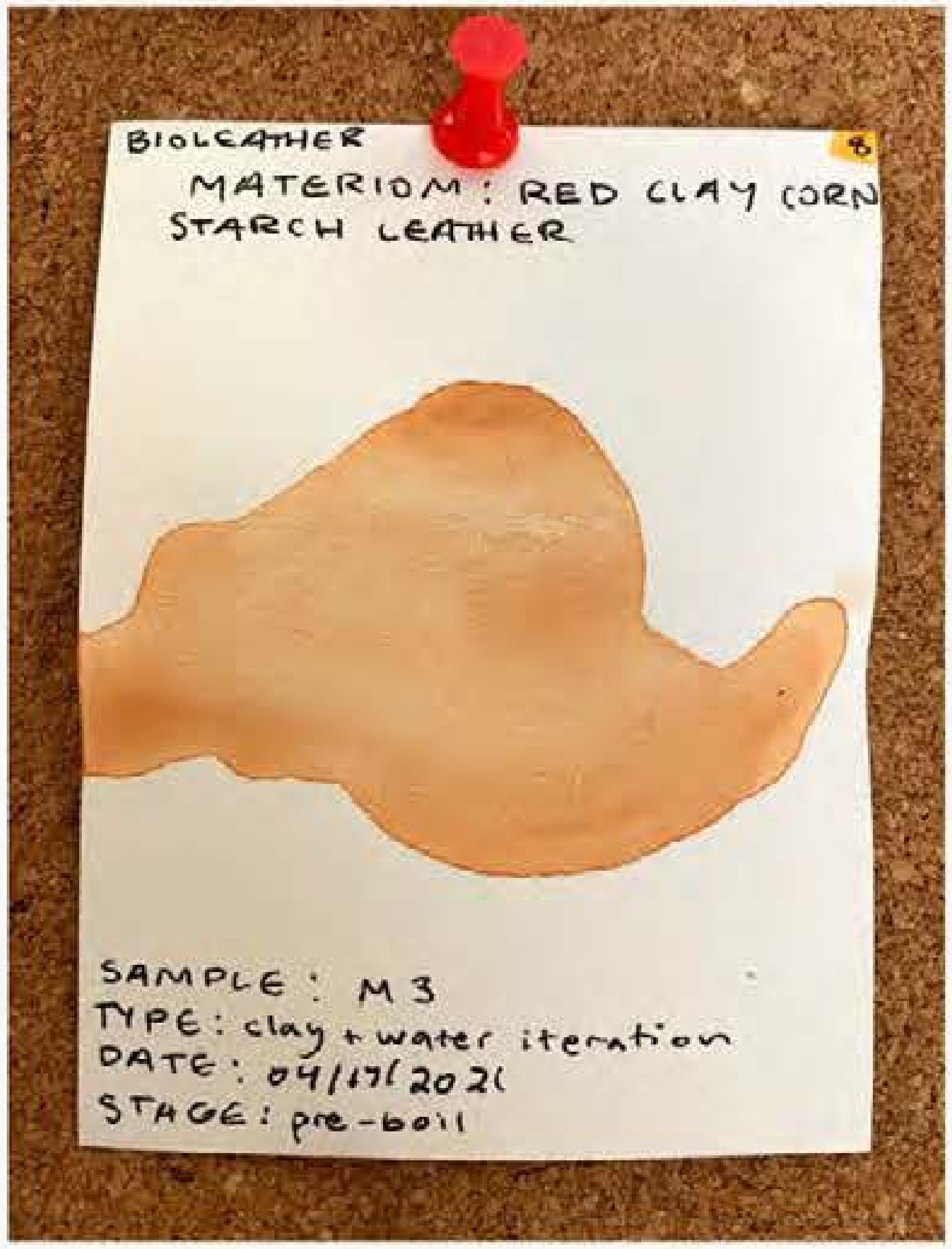


Red Clay Leather (#2)





Red Clay Leather (#3)



Algae and Mycelium Leather

Water: 300 mL

Glycerol: 44 mL

Borax: 20 grams

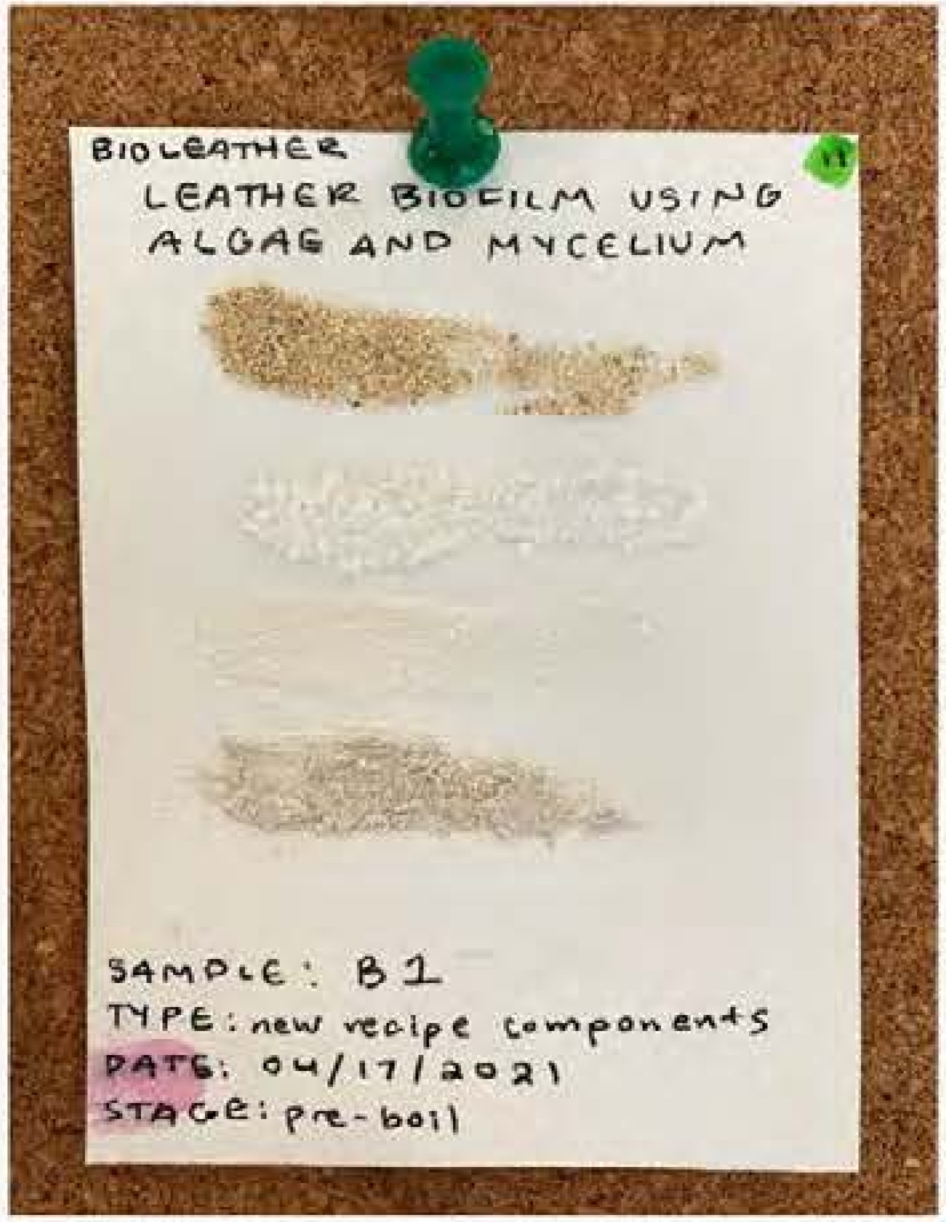
Agar Agar: 6 grams

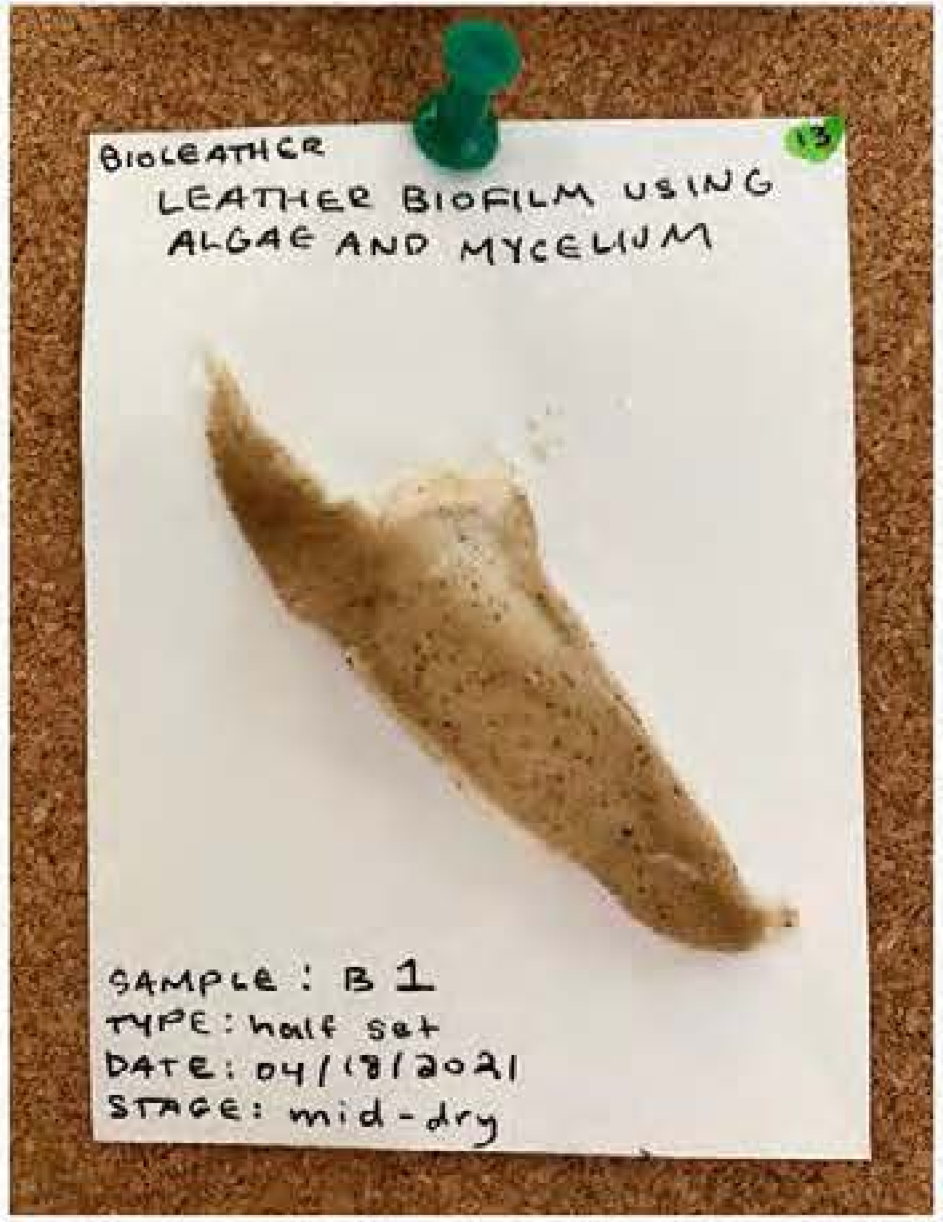
Diatomaceous Earth: 6 grams

Fine Powdered Mushroom: 6 grams

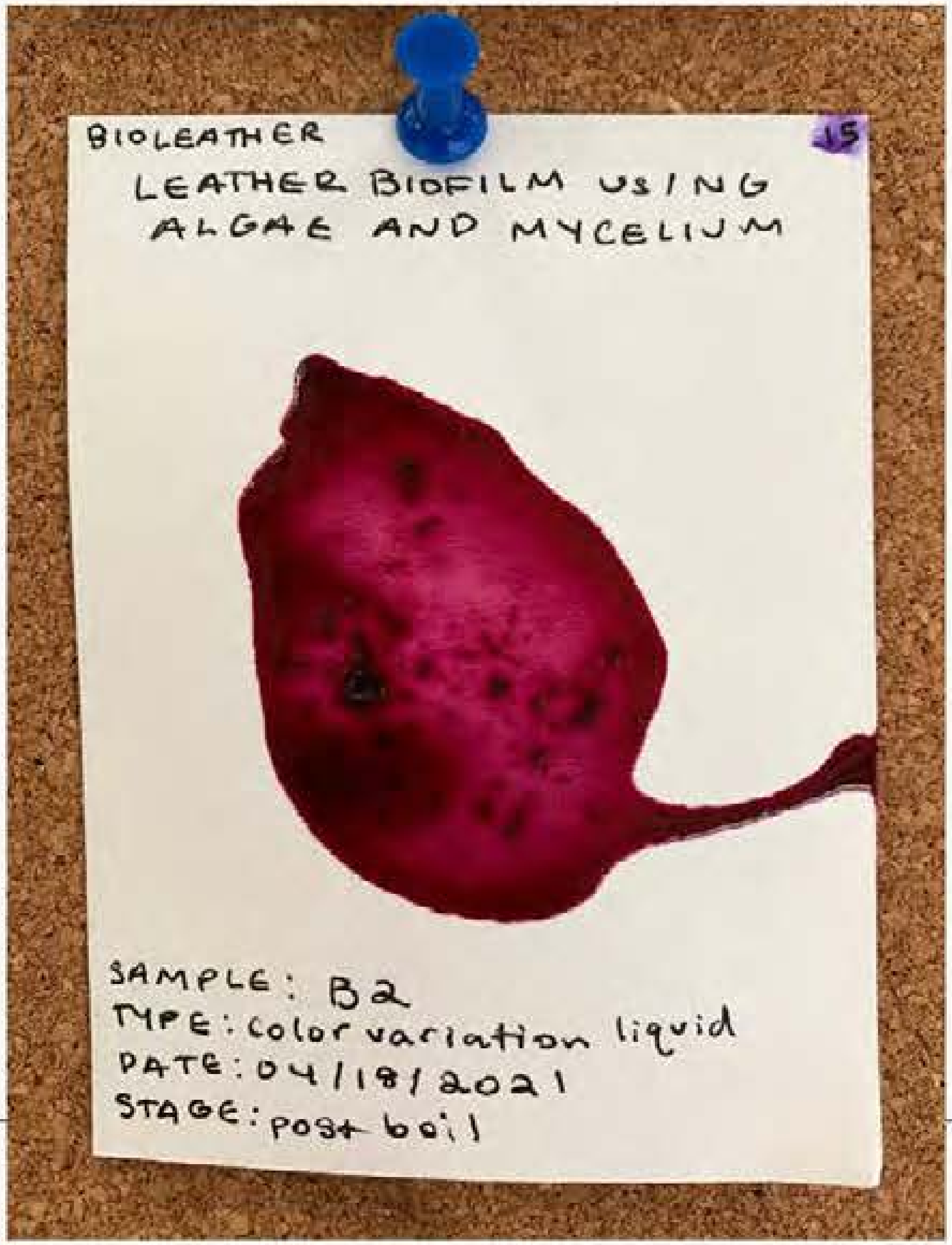
Bring water to a simmer. While rapidly stirring add in each ingredient. Bring to a boil. Transfer mixture to a plastic bin and pour over surface evenly. Allow to sit for 3 days before removing sheet and pressing between heavy object for 3 additional days.

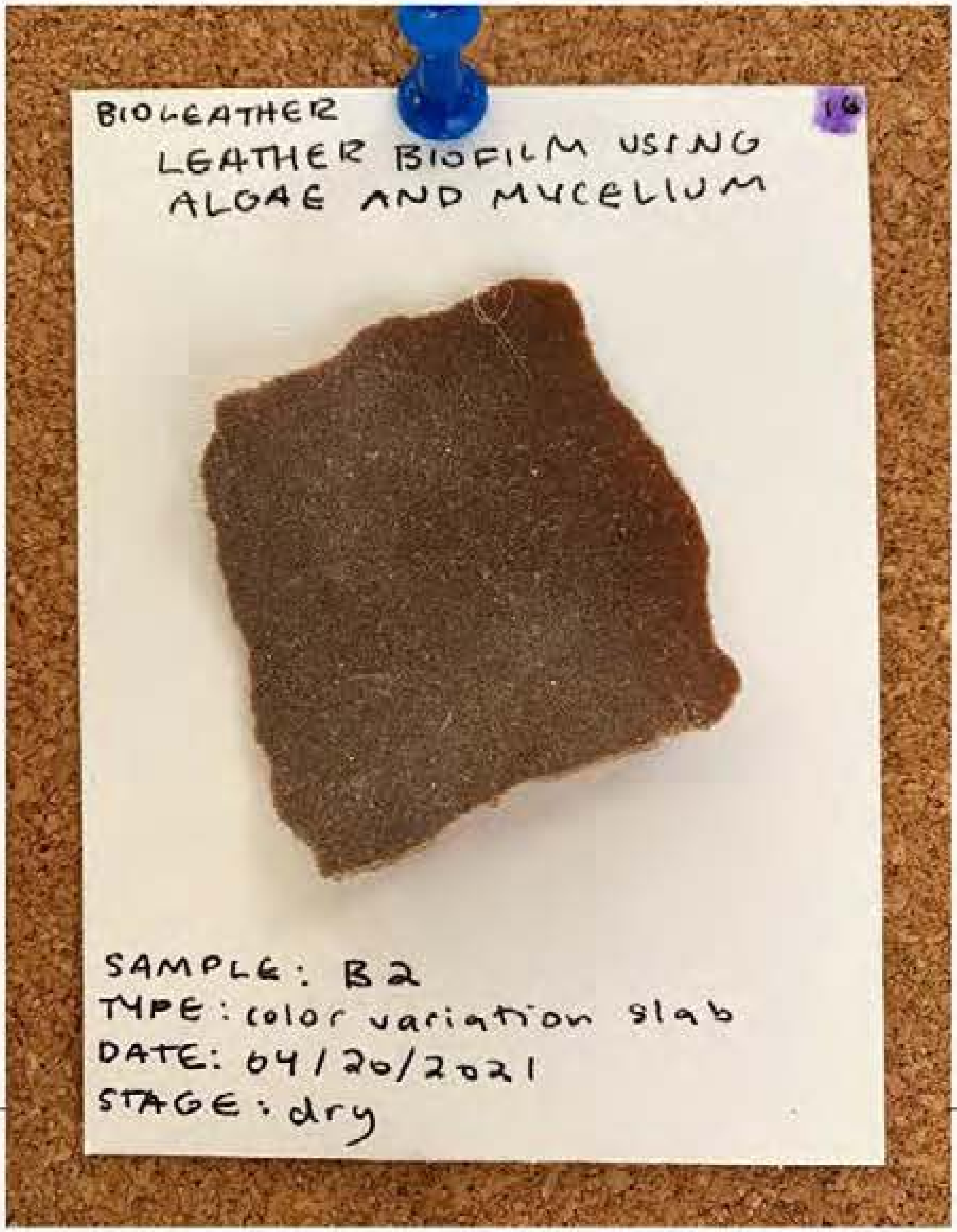
Mycelium Leather





Mycelium Leather (#2)





Overripe Mango Leather

1 Overripe Mango

Potato Starch: 1 Tbsp

White Vinegar: 1 Tbsp

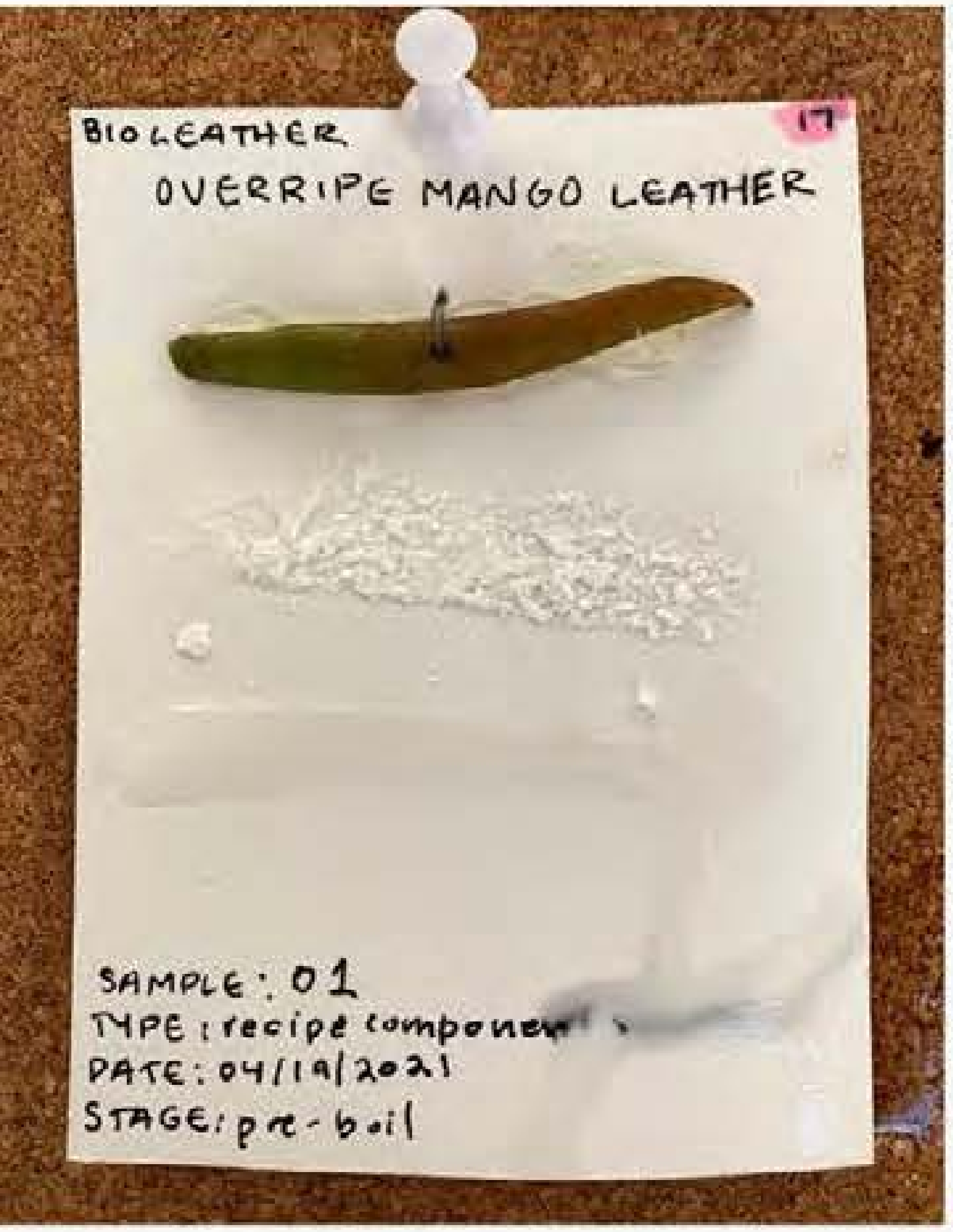
Salt: 5 grams

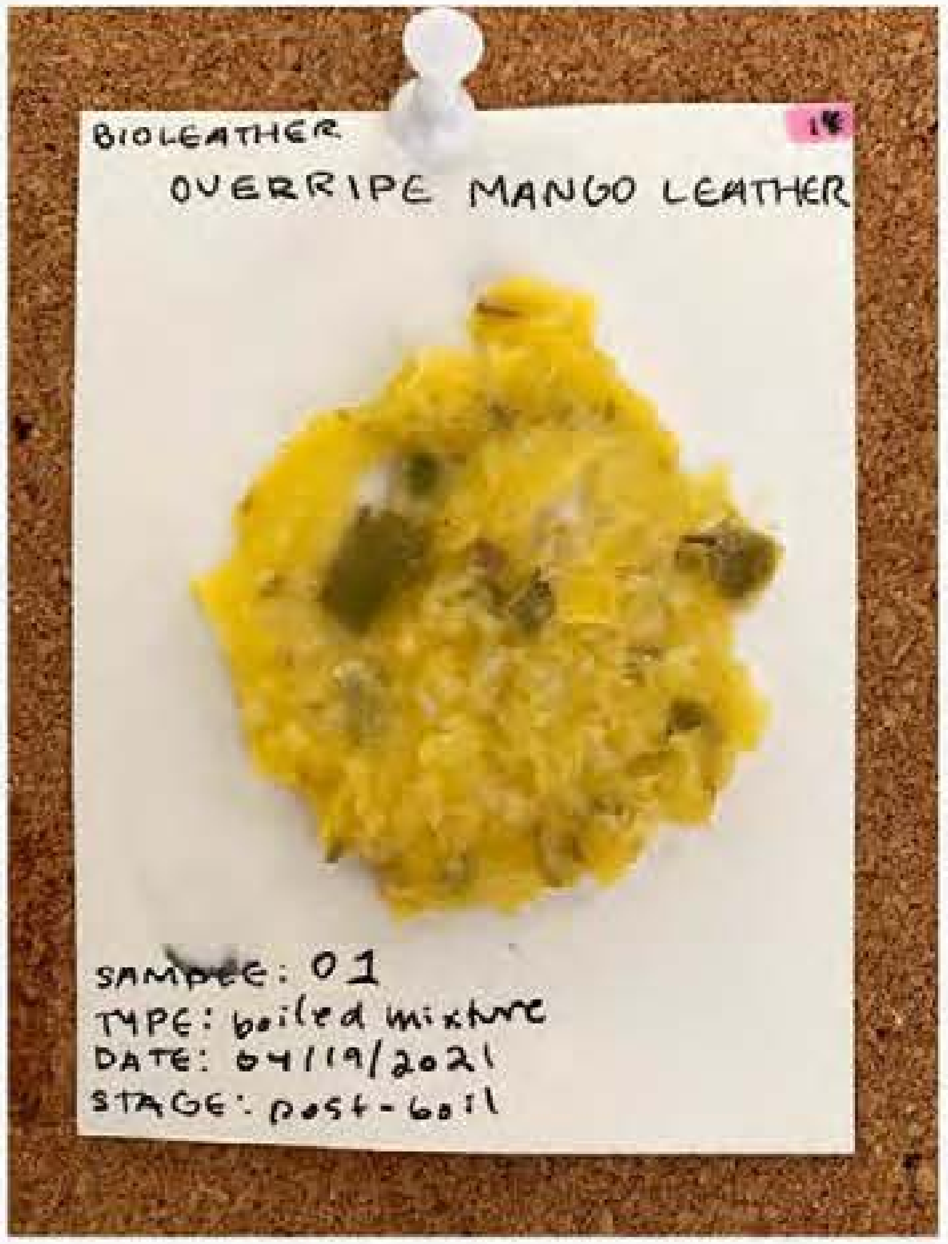
Vegetable Oil: 1 Tbsp

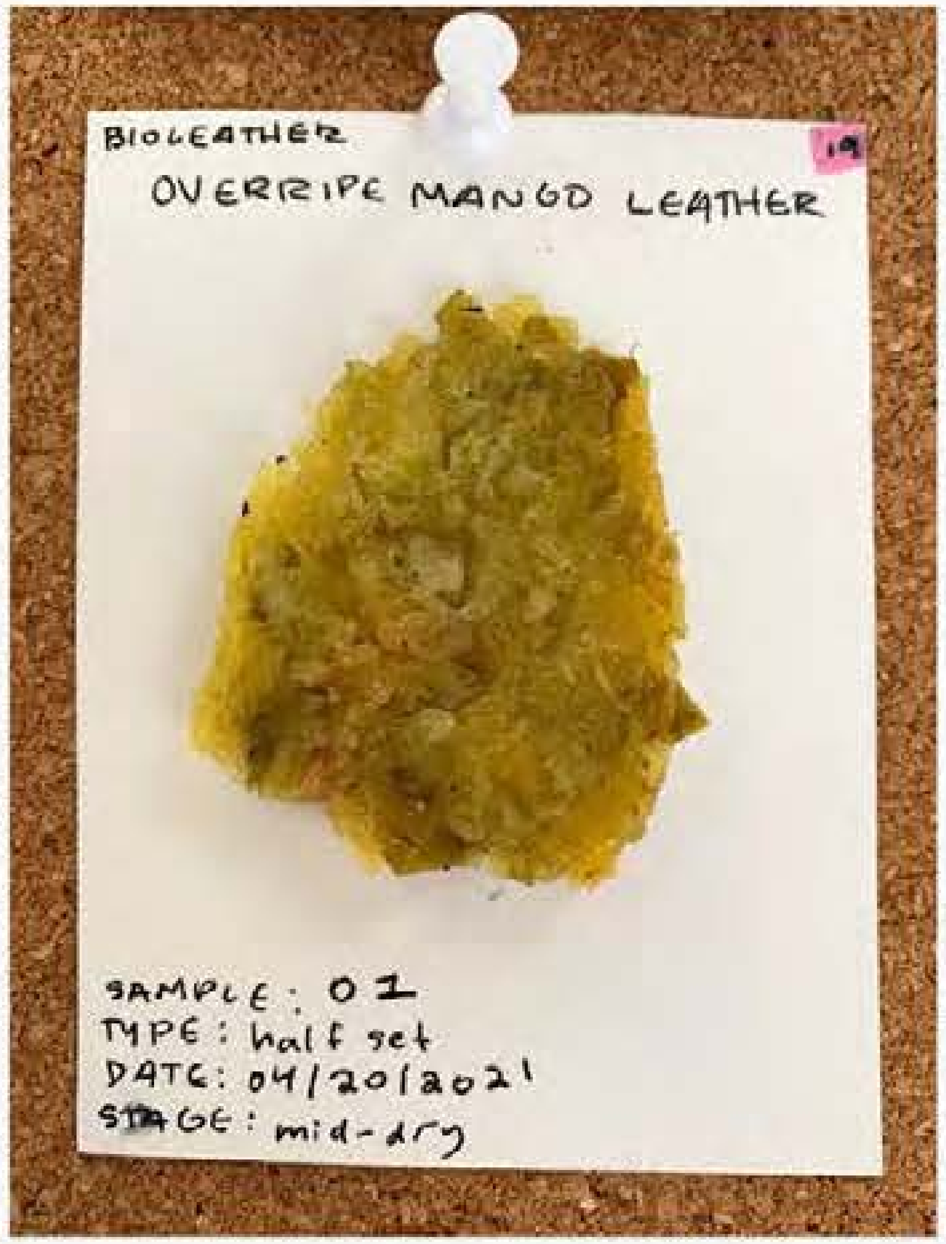
Puree mango in a blender until smooth. Combine mango, salt, and vinegar on stove, heat on low. Add starch and mix till it becomes a thick paste.

Heat oven to 50 degrees C and let paste sit in oven for 16 hours. Once fully dry, remove from tray.

Mango Leather







MYCELIUM LEATHER- BEST OPTION

AVAILABLE MATERIALS, EASY TO CREATE, SOMEWHAT QUICK DRY TIME, FLEXIBLE, TRANSLUCENT

Mycelium Leather



Sculpture Inspiration: A focus on material texture and round, organic forms

Untitled (Sea) (2016)

Kevin Beasley

Saddle (2000)

Janine Antoni

Sculpture Inspiration: A focus on material texture and round, organic forms

Casa Batlló (1877)

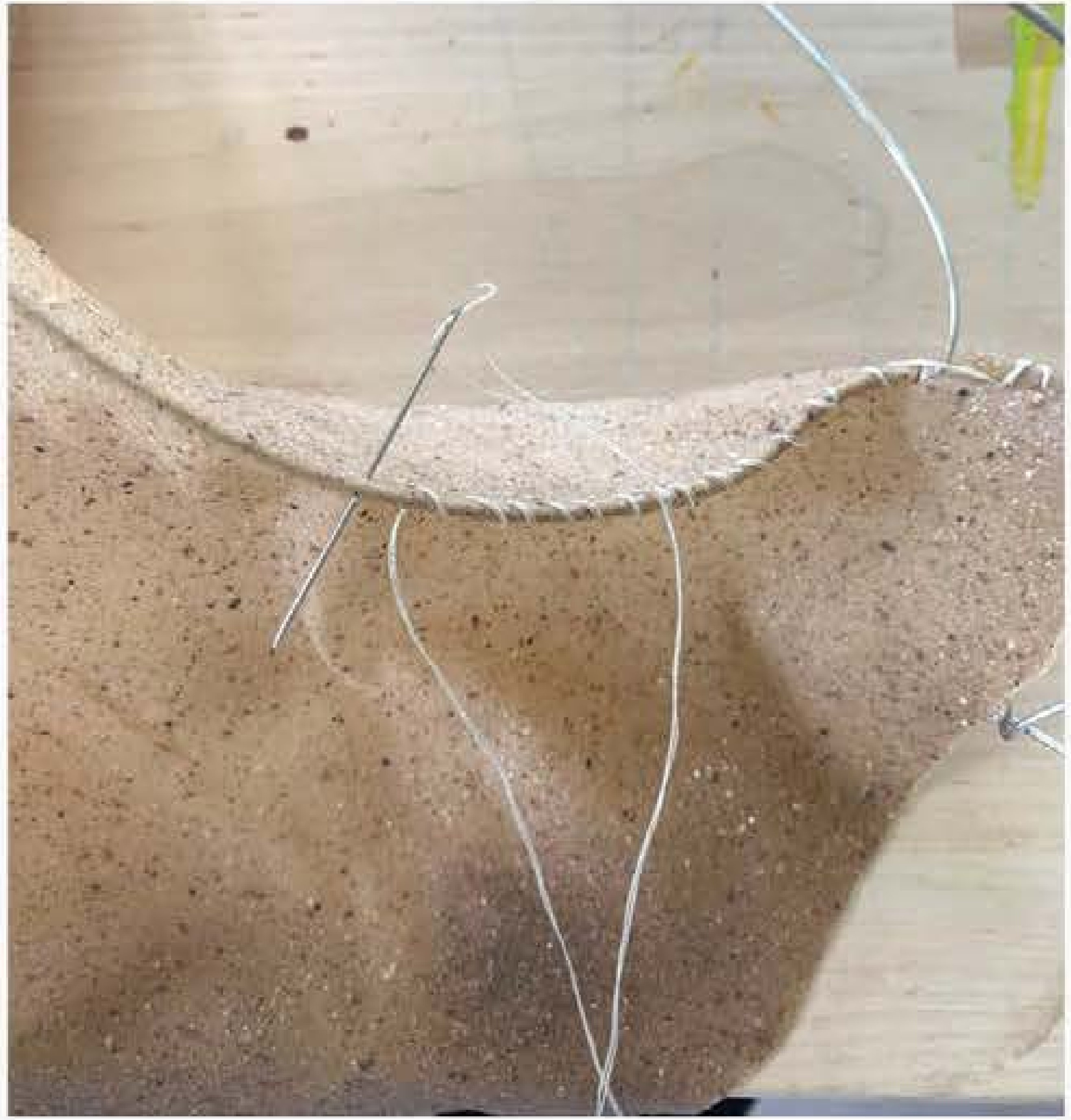
Antoni Gaudí

Who is Afraid of Red, Yellow, and Blue (2014)

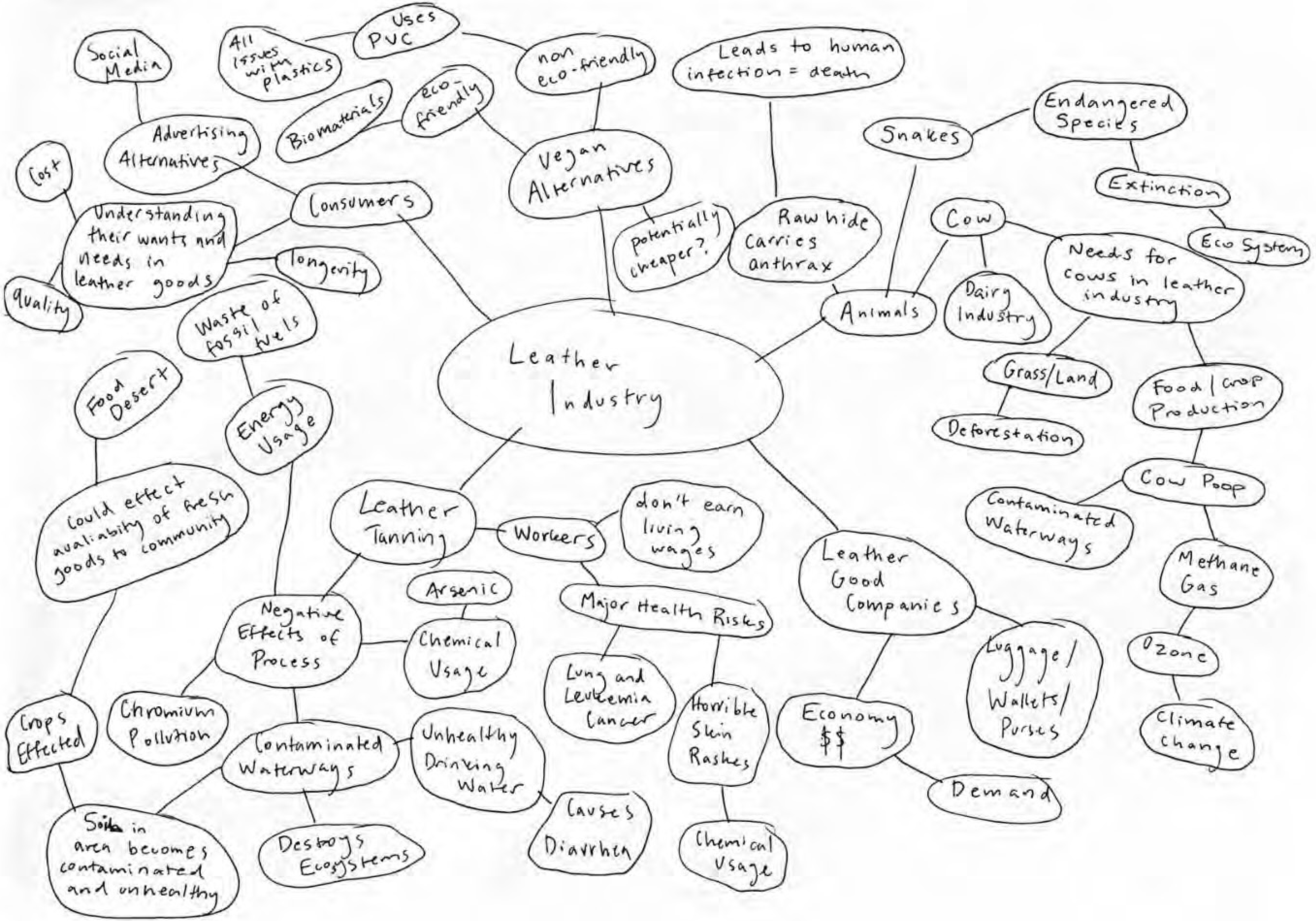
Kaari Upson

WIRE SCULPTURE BASE

APPLY SHEETS OF MYCELIUM LEATHER TO SURFACE TO CREATE DIMENSION, SHADOWS, FORMS



SYSTEMS MAP


Leather Industry
Social Media
Advertising Alternatives
Cost
Understanding their wants and needs in leather goods
Quality
Longevity
Consumers
All issues with plastics
Uses PVC
non eco-friendly
Biomaterials
eco-friendly
Vegan Alternatives
potentially cheaper?
Leads to human infection = death
Raw hide carries anthrax
Snakes
Endangered Species
Extinction
Eco System
Cow
Needs for cows in leather industry
Animals
Dairy Industry
Grass/Land
Deforestation
Food/crop Production
Cow Poop
Contaminated Waterways
Methane Gas
Ozone
Climate change
Waste of fossil fuels
Energy Usage
Food Desert
Could effect availability of fresh goods to community
Crops Effected
Soils in area becomes contaminated and unhealthy
Leather Tanning
Workers
don't earn living wages
Major Health Risks
Lung and Leukemia Cancer
Horrible Skin Rashes
Chemical Usage
Arsenic
Chemical Usage
Negative Effects of Process
Chromium Pollution
Contaminated Waterways
Destroys Ecosystems
Unhealthy Drinking Water
Causes Diarrhea
Leather Good Companies
Luggage/Wallets/Purses
Economy $$
Demand

The Adventures of a Novel in Four Chapters
(1991)

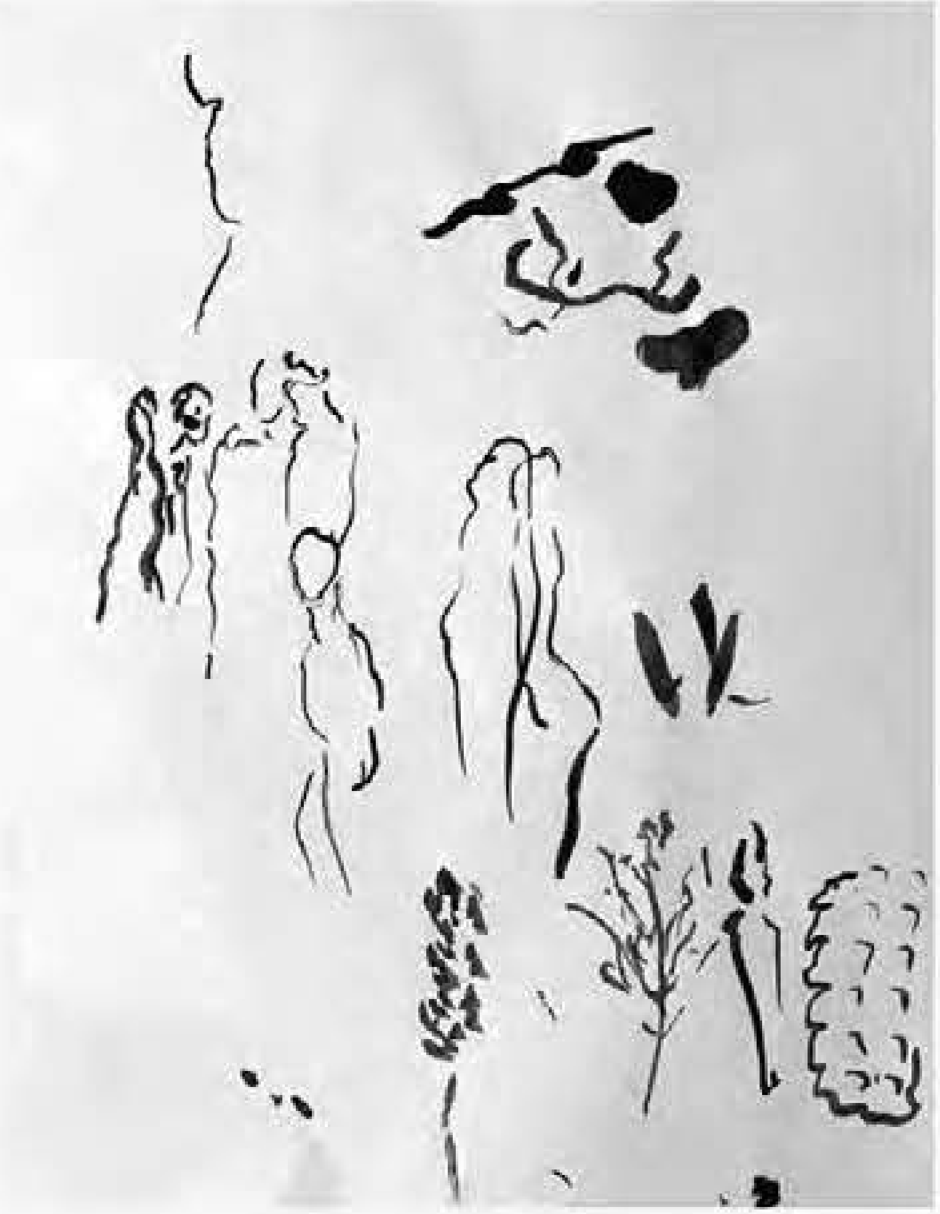
Bruce Conner

In Memory of My Feelings
(1976)

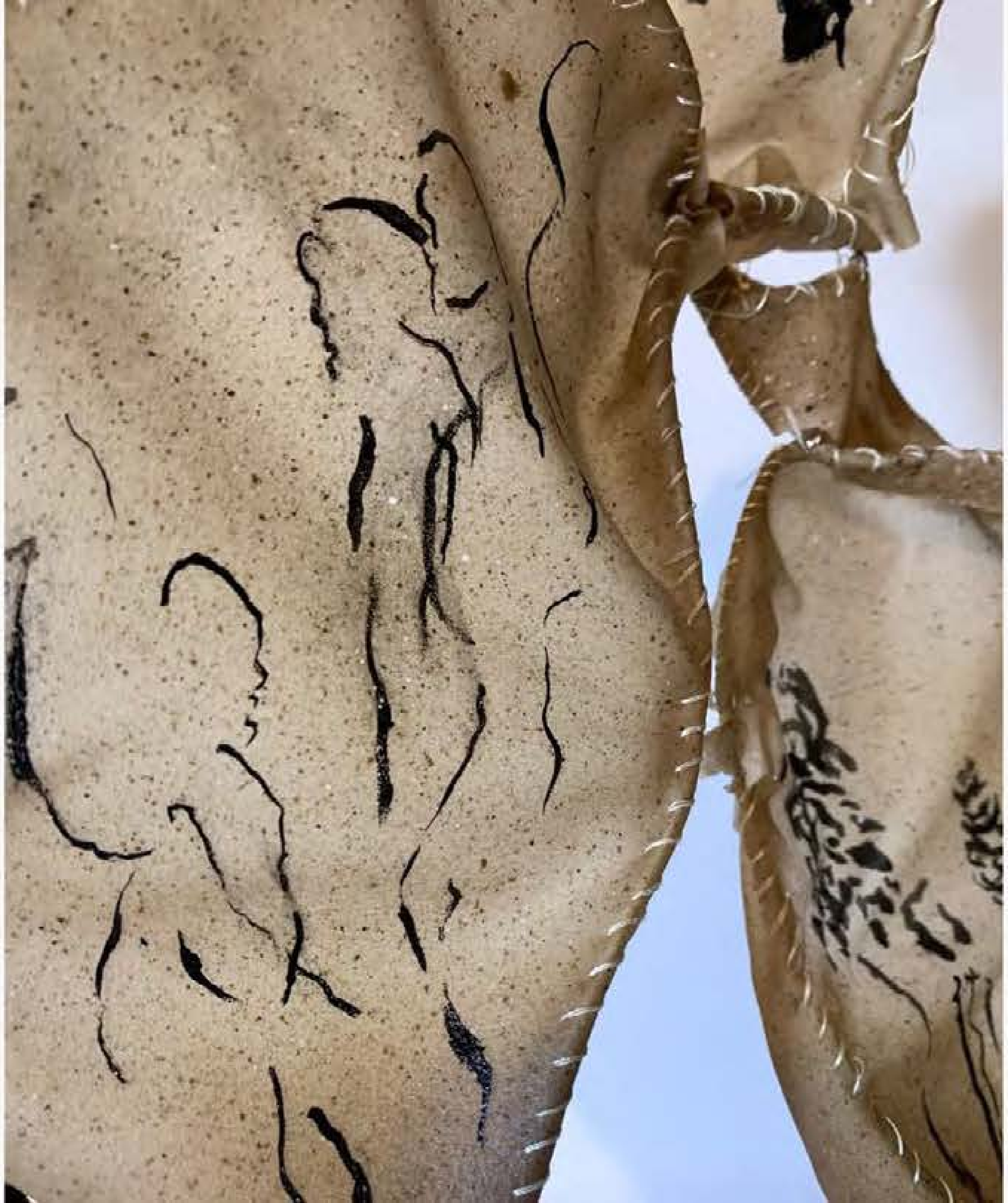
Philip Guston

Operation
(2003)

Ryoko Aoki



Gouache in sketchbook



Artist Statement

The environmental and social impact of leather production is significant and results in contaminated waterways, health consequences for workers and damage to forests and crops. I approached this project to investigate leather alternatives and to experiment with recipes for bioleather.

Recipe experimentation for this project began with recipes I found on materiom.com. The first recipe I tried was red clay cornstarch. This bioleather was very easy to make but resulted initially in a gloopy mixture – likely the result of the use of cornstarch. This clay leather took a few days to dry to a leather like fabric but also cracked significantly. I tried to alter the recipe but abandon this when I could not get a single sheet of uncracked bioleather. Subsequent recipes I used were for mango bio leather and mushroom agar bio leather. The resulting mango leather
was brittle and not usable for my intended purpose - sculpture. The mushroom agar bio leather was a success that only took a few days to dry, and resulted in lightweight, translucent, and flexible sheets of material that could be sewn without tears. I documented my process using Ellie Irons as an inspiration and presented this in a more curated fashion in my presentation. Each recipe was documented in various stages with a sample.

After creating several sheets of the mycelium leather, I began constructing my sculpture. I started with a simple wire frame with organic forms. I laid the leather sheets on the frame and stitched the leather to the wire creating 3D structures within the framework. After construction was completed, I looked at the systems map and realized how much I learned about leather production and wanted to connect my sculpture to this research. I connected these ideas to my sculpture by painting abstract figures with gouache to represent people and things impacted by production, namely, local and global communities.

Thank You

https://gizmodo.com/how-leather-is-slowly-killing-the-people-and-places-tha-1572678618

https://www.peta.org/issues/animals-used-for-clothing/leather-industry/leather-environmental-hazards/

http://otter.org.au/lowdown-on-leather-part-1/

https://www.worstpolluted.org/projects_reports/display/88

https://goodonyou.eco/the-hidden-costs-of-leather/#:~:text=The%20processing%20of%20leather%20also,900kg%20of%20animal%20hides%20tanned.&text=Leather%2Dmaking%20is%20also%20one,produce%20just%201kg%20of%20leather