Non-toxic bioplastic for the food packaging industry

Using renewable biomass to replace

non-degradable plastic

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Cultivated kelp can provide much biomass

- Much research on bioactive compounds
  - > Not my field
- Hydrogels
- > How about making films – > for food packaging and

Voilà … I made films you can just as well eat

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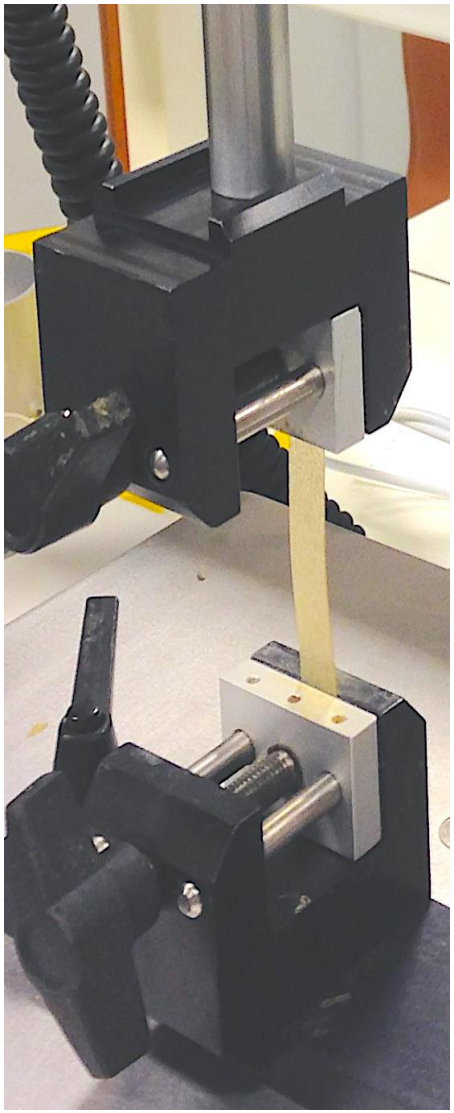
Tests and measurements

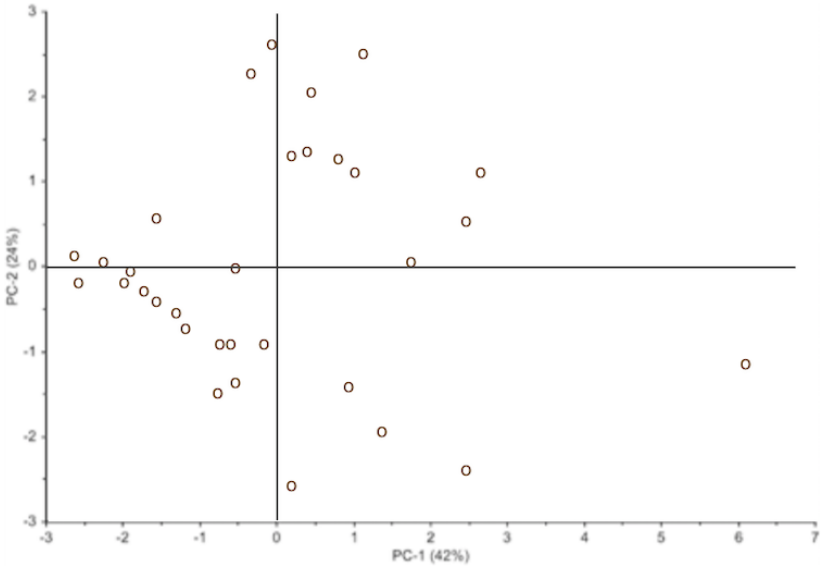
- Complex comparison between films
  - > many compounds, 3 types of alginate and 3 of water
- Texture analyser & thickness
  - > films tested for strength, elongation & toughness
- CIELAB color, water activity, FT-NIR, microscope

☺ Great relief ☺

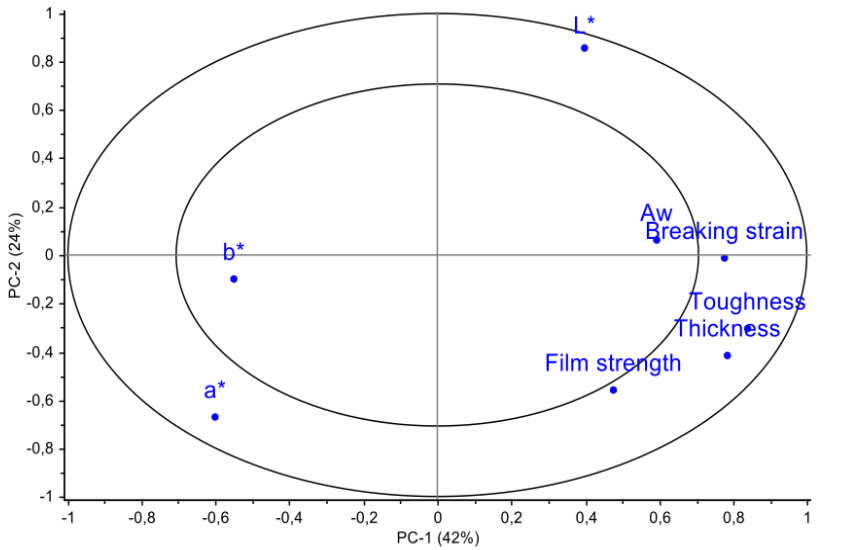
- 12 films selected for evaluation in 1000x microscope



Principal component analysis (PCA)



Similarity (close groupings) or variety (high separation) between the film samples. PC-1 on x-axis explains 42% of the variability, while PC-2 explains 24%.



Connection between the variables: L*a*b* colors, water activity (Aw), thickness and texture measurements (breaking strain, toughness & strength).

Pearson's correlation factor calculated between individual parameters for these films:

Thickness had strong correlation to strength (r= 0.802) and toughness (r= 0.708), but intermediate to breaking strain (r= 0.461).

Toughness and breaking strain had strong correlation (r=0.754).

Color measurements: The only correlation was inverse (r=-0.934) between L* and a* values.

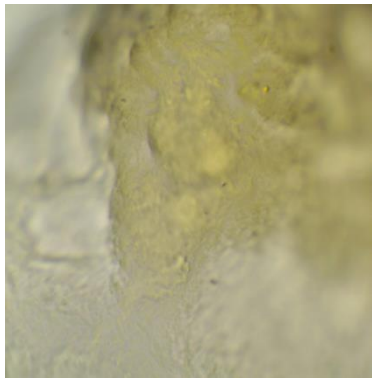
Water activity (Aw) had intermediate correlation between the film breaking strain (r=0.580) and toughness (r=0.506).

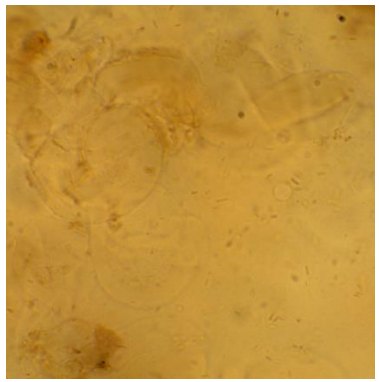
Different kind of films - many possibilities

- The colors range from white opaque to dark brown
- Most are semi transparent
- Smooth texture or rough
- Flexible or hard
- Water sensitive or not
- Needs more research before scale up

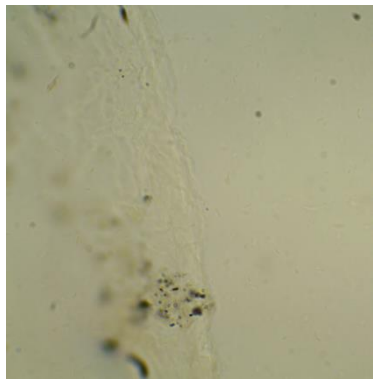
New trends suitable for these films

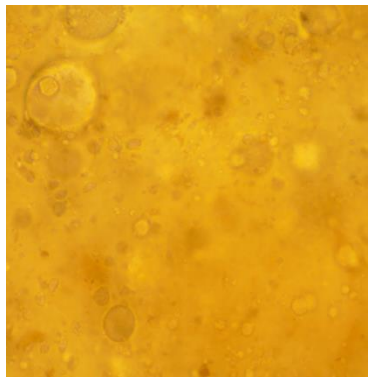
- Food coating
- Edible films
- 3D printing
- Conventional films
- Future applications

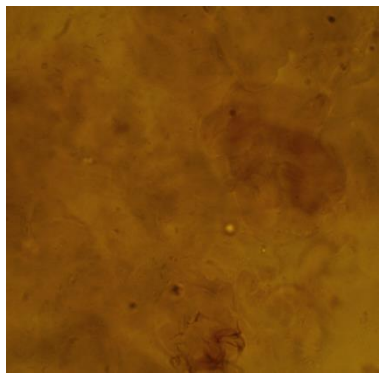

Film no 5


Film no 9b


Film no 10


Film no 12


Film no 14


Film no 18