CAPSTONE/SENIOR DESIGN EXPERIENCE 2018

Purdue University Student Soybean Innovation Competition

Caitlin Nelligan (ENRE), Brianna Kate Barker (ASM), Zifan Zhu (ASM)

PURDUE UNIVERSITY

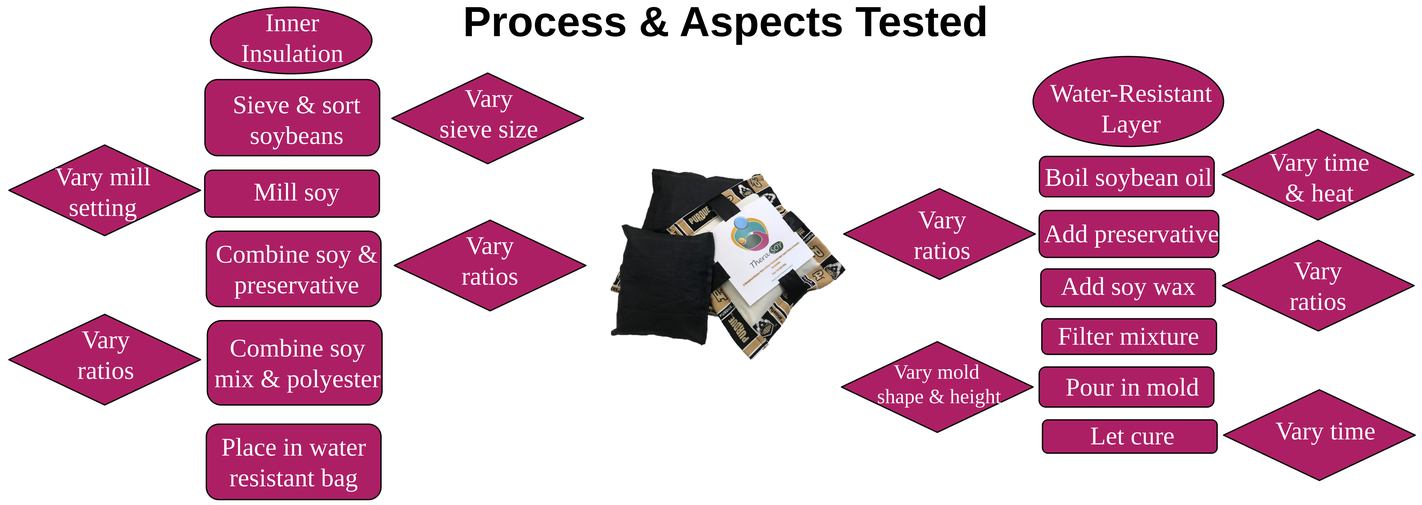
TheraSOY

Agricultural & Biological ENGINEERING

Problem & Background

- Student Soybean Innovation Competition develops novel soy-based products that can be competitive on the market, help increase the demand for soybeans, and promote environmental stewardship
- 40 million adults in the US suffer from anxiety disorders, 70 million Americans suffer from sleep disorders, and 3.5 million Americans live with autism
- Weighted blankets are proven to release hormones (oxytocin, serotonin, and melatonin) that reduce anxiety and promote improved sleep cycles
- Current weighted blanket average cost is $194
- Soybean properties taken advantage of
    - Antimicrobial
    - Hypoallergenic (when not consumed)
    - Non-conductive and can withstand high temperatures

Process & Aspects Tested

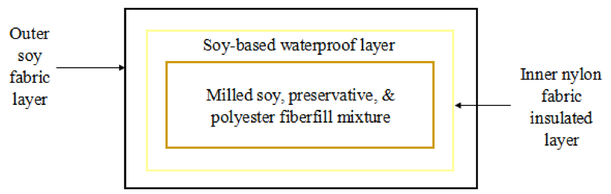


Alternative Solutions Considered

Alternative	Novel	Complexity	Mass Producibility	Feasibility	Unsaturated Market	Product Improvement	Total
Weight	5	3	3	4	4	5	N/A
Soy Putty	2	1	1	1	3	5	57
Soy Water Repellant	3	4	4	4	4	3	86
Soy Insulation For Blankets	4	5	5	5	2	4	98

Product Final Design

- Water-resistant weighted blanket
- Inner weighted layer (nylon)
    - Soy-based waterproof layer
    - Finely milled soy
    - Recycled Polyester Fiberfill
    - Preservative
- Outer duvet cover (soy fabric)



Impact & Sustainability

- Increase soybean demand by ~25,000 bu./yr
- Recycled polyester fiberfill
- Biodegradable insulation
- Improved quality of life
- Improved sleep cycles

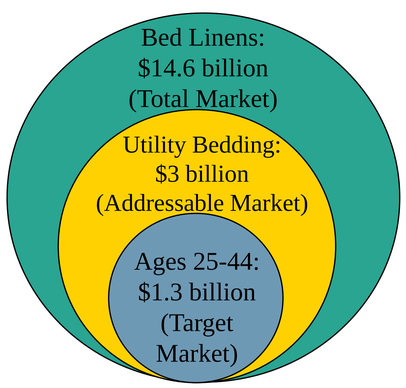
Risk & Hazard Mitigation

Citric acid
- Natural preservative
- No potential for allergic reactions

Water-Resistant Layer
- Protects soy within the inner layer from liquids

Soy Allergies
- All soy is contained, which reduces risk of consumption

Economic Analysis

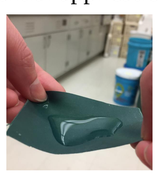


Final Assessment

High Heat Holding Capacity	• 14% more efficient at holding heat • Holds body heat of user 45 minutes longer
Environmentally Friendly	• Soy is a renewable resource • Soy within biodegrades • Soy is non-toxic
Low Cost	• Retail for ~ $123 • 35 % cheaper than average weighted blanket
Antimicrobial	• Soy peptides proven to inhibit bacterial growth

Moving Forward

- Heating tests under different conditions
- Verify longevity of soy-citric insulation
- Washing machine safe water-repellent
- Testing the market for other potential applications



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