Protein Fibers Cleaning Process Sustainability
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Purpose
To promote the consideration of animals and the wool cleaning process in conversations regarding textile sustainability, and to further connect the fashion and agriculture industries.

Experiment
Washing 4 different protein fibers and analyzing the differences in resources and processes required.

Materials
- Corriedale/Merino Lambswool
- Adult Merino Wool
- Alpaca Fiber
- Mohair Fiber
- Triton X-100 Surfactant
- Eucalan Unscented Wool Detergent

Methods
1. 4 oz. wool sample, 10 mL Eucalan, 2 drops Triton-X 100 added to vat of water
2. Vat heated to 65°C
3. Washed for 30 minutes
4. Rinsed
5. Process repeated until fiber thoroughly cleaned

Hypothesis
Lanolin-heavy fibers will require the most washing apart from natural soiling due to the oily nature.

Observations
- Dirt and sediment proved easiest pollutant to remove
- Vegetative matter easily matted into fibers, difficult to remove - worse in sheep wool
- Alpaca fibers difficult to dry, high water retention
- Lambswool had loftiest structure, dried fastest with pleasant, cottony feel when cleaned
- Lanolin extremely difficult to remove, resulted in unpleasant, tacky texture after 2-3 washes of sheep wool
- Highest content of lanolin in adult merino wool
- Merino wool held hot temperature for markedly longer time periods than other fibers

Fact Points
- Average 200L of water needed to produce 1 kg of textiles (Thangavel & Duraisamy, 2014)
- Consumers and designers in metropolitan areas becoming increasingly distanced from textile production processes
- 69% of Vogue Magazine readers say sustainability affects their fashion purchases (Vogue, May 2021)

Conclusions
As expected, lanolin-heavy fibers required more washing and processing than alternatives. However the resulting product has greater insulatory properties, greater durability, and fluffier handle than mohair and alpaca samples. The amount of sheep’s wool used in textiles compared to alpaca and mohair, as well as the ability to sell lanolin may also balance out excess cleaning costs – although water and chemical consumption are undoubtedly problems for the material’s sustainability.