Hydrotectives

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Purpose: To conserve water in space, scientists have come up with an efficient way to recycle it. While studying this, I wondered how the water would be conserved once we find a planet fit for human settlement. I researched different substances that help retain the water under extreme temperatures/evaporation. Hypothesis: Hydrogels made of the polymer HEC can efficiently entrap water in physical conditions observed in outer space explorations. Procedure: Collect powders of Hydroxyethyl Cellulose (HEC), Carboxymethyl Cellulose (CMC) , Agar Agar, and Citric Acid. Mix 1g of Citric Acid and 50g of demineralized water with 4g of HEC. Repeat this step by replacing HEC with CMC and Agar Agar, respectively. Create three more mixtures (1) 2g of Agar Agar and 2g of HEC (2) 2g of Agar Agar and 2g of CMC (3) 2g of HEC and 2g of CMC. Each combination was cured in a covered Petri dish overnight. The physical traits of the mixtures were studied while making them and once they had set. Mixtures were evaluated for water evaporation at 70°F. Physical characteristics were assessed in exposure to freezing (and torrid temperatures (170°F-260°F). Observations: Mixtures with Agar Agar were weaker in retaining water compared to the others. Mixtures with HEC maintained structural integrity and water content when exposed to extreme temperatures. Conclusion: HEC had the best characteristics for water conservation in my testing. Future project: I hope to test HEC and other polymers in a lab, simulating space-like conditions.

Awards Won: