

Melina Avery

## Heated Gellan Gum for Hide Glue Removal

Gellan gum is a plant-based gel poultice material that can be used to introduce moisture, absorb stains and gently humidify. It is often used in book conservation to soften the adhesive and spine linings of a textblock, in order to remove linings for rebinding (*Figure 1*).

In 2018, the University of Chicago Library conservation lab started a project that required removal of a thick layer of buckram fabric and hide glue from a parchment textblock spine. Parchment is very moisture-sensitive, so using a wet gel poultice like methyl cellulose was risky. A 2% gellan gum poultice is slower to release moisture and is controllable in size. The gellan gum was first used cold, held against the spine of the textblock with plastic wrap and soft weights to improve contact (*Figure 2*). Even after hours, this method did not soften the adhesive. This was expected; typically, heat is necessary to soften hide glue. Using hot water directly, given the moisture-sensitive parchment, was not possible. A gently heated poultice was the proposed solution.

Conservators wanted to heat the gellan gum to 140 degrees Fahrenheit (F), the temperature at which hide glue softens. Ann Lindsey, the head of conservation at UChicago Library, found a method to heat the gellan gum in a hot water bath in the microwave. The water bath should be heated first, to a warm but not near-boiling temperature. Then, the gellan gum poultice is placed in the bath and microwaved again for approximately 20 seconds (it will depend on the microwave). A probe thermometer was used to measure the internal temperature of the gellan gum. 140 degrees F was near the upper limit before the gellan gum started melting (*Figure 3*).

The next challenge was retaining heat while the poultice was placed against the spine. First, the poultice was placed against the spine, under plastic, with weights to press it for better contact. This method failed; the gellan gum cooled down too quickly. A heating pad was employed as a solution. The heating pad is for home use and only provides a gentle heat. It is warm enough to keep the poultice warm, but not hot enough to be a danger to the textblock. The heating pad was placed over the plastic wrap and poultice. It was held in place by soft weights, for better contact between the poultice, textblock spine and heating pad (*Figure 4*).

This system was effective, if slow. The gellan gum poultice was about five inches wide and required one to three hours against the spine before the adhesive would start to soften. Conservators tried a several methods to increase efficiency. A beaker warmer, which advertised precise control, was tried to increase and control the level of heat. The beaker warmer, set at 140 degrees F, would occasionally heat up above the set temperature, almost burning conservators as well as endangering the book. Longer pieces of gellan gum were also tried, to soften more adhesive at once, but the glue re-hardened too fast to work on more than a few inches at a time (*Figure 5*).

Ultimately, the smaller gellan gum poultice and gentle heating pad were proved to be the safe, effective solution. This technique was successful for separating the sections. The adhesive layer was reduced, and the buckram fabric spine liner was fully removed. There was no moisture penetration to the textblock, and no damage to the parchment (*Figure 6*).

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Sources of materials:  
Gellan Gum from Talas:  
<https://www.talasonline.com/Gellan-Gum>

Probe thermometer from Cole Parmer:  
<https://www.coleparmer.com/i/digi-sense-traceable-water-resistant-remote-probe-thermometer-with-calibration-1-c-accuracy-20-to-100-c/9020522?searchterm=EW-90205-22>

Figures:

Figure 1: Gellan gum poultice

Figure 2: Gellan gum poultice on spine under plastic wraps and weights

Figure 3: Taking the internal temperature of the gellan gum poultice with a probe thermometer

Figure 4: The heating pad in use over the gellan gum poultice

Figure 5: The glue stretching between sections as they are separated

Figure 6: The separated sections of the parchment textblock