USE OF GEL POULTICES FOR ADHESIVE REMOVAL

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1. INTRODUCTION

The following describes the application of solid gel poultices for stain and adhesive removal from textiles. The basic poultice consists of Methyl Cellulose in water. After solubility of the stain or adhesive is determined, a poultice is prepared. If the material to be removed is soluble in water, the poultice is used as is without addition of other solvents. If, however, the soil is soluble in some other solvent, it can be added to the poultice, after it is prepared.

MATERIALS NEEDED

- Methyl Cellulose
- Sodium Hydroxyde pellets
- Deionized water

EQUIPMENT

- Hot plate
- pH indicator strips

2. POULTICE PREPARATION

This recipe follows recommendations of the Dow Chemical company as found on their website: http://dow-wolff.custhelp.com.

- 30 g Methyl Cellulose powder
- 60 ml deionized water

One third of the water (in this case 20 ml) is heated to 90° C. All of the Methyl Cellulose powder is added to the hot water and mixed thoroughly ensuring complete wetting of all the powder. Then the rest of the water (40 ml at room temperature) is added to the blend and mixed again.

The resulting concentration of Methyl Cellulose is usually around 50% (weight to volume). However, the proportions do not need to be exact, as the consistency of the gel can be adjusted at any point by either adding more liquid (water or another solvent) to make it “wetter” or by adding Methyl Cellulose to make it “drier”. I usually test the consistency of the poultice by handling it. If it feels too wet or too dry, I remedy the situation as described.

The pH of the resulting poultice is around 5.6-6, which is the usual pH of deionized water. To raise the pH of the poultice Sodium Hydroxyde is added at this point. First, Sodium Hydroxyde pellets are added to deionized water to create a stock solution that has a pH of 13-14. Then the solution of Sodium Hydroxyde is added to the poultice using a pipette until the pH of the poultice is around 8. In my experience 5-10 ml of Sodium Hydroxyde is sufficient.
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It is best to let the poultice “rest” overnight before using it to ensure that all Methyl Cellulose particles have had the chance to fully swell in the liquid. The poultice can be kept at room temperature in a closed jar. If the soil that has to be removed requires a solvent other than water, that solvent can be added to the poultice after it is prepared. If the resulting poultice is too “wet”, the consistency can be brought back to “dry” gel by adding more Methyl Cellulose.

3. APPLICATION

The poultice can be used directly on the object. However, if additional isolation from the object is desired, an interleaving layer of glassine or japanese tissue paper can be used between the object and the poultice. It has to be noted, however, that in some cases the addition of the interleaving layer reduced the effectiveness of the poultice. After unsuccessful application of the poultice with the interleaving layer, the poultice was tried directly on the object and the soil was removed.

Glassine is cut to size and placed on the soiled part of the object. The poultice is manipulated to create a thin layer of dry gel. This can be done with one’s fingers or alternatively, the gel can be spread with a spatula on a piece of Plexiglas. The poultice can be then cut precisely to cover only the soiled area. It is then placed over the glassine and pressed down with another piece of Plexiglas to ensure good contact with the soil. To that end, some light weights can be placed on the Plexiglas. The area is then covered with plastic to allow the solvent some time to work on the soil. Usually when first applying the poultice to a new object, the poultice and glassine are lifted after 10 minutes to assess the effectiveness of the solvent and to see if there is any adverse reaction with the object. This check is performed again at 30 and 60 minutes.

The duration of the application can vary. Sometimes the soil is dissolved quickly; other times poultice has been left in place for 24 and 48 hours. Usually, one application is not enough. After some soil has been removed into the poultice (the change in color is usually very pronounced), a new poultice is applied to the same area. Some cases were successfully done after 2 applications, some needed 5, others 10 and more.

4. ADVANTAGES

This technique is highly localized. If the poultice is sufficiently “dry” and/or the duration of the application is short, the solvent does not spread to the surrounding material at all. If the poultice is slightly “wetter” and/or the time of application is long (24-48 hours), the solvent can spread a little, resulting in a tideline. However, that can be remedied by another (shorter) poultice application to the same area (fig. 1).

The object does not need to be wet-cleaned after the soil removal.

5. POTENTIAL AREAS OF CONCERN

Some concern has been expressed at Methyl Cellulose possibly remaining on the object after the poultice application. In my experience, I have not seen any residue on objects, either visually, or under magnification up to 40x. Nor is there any change in the “hand” of the object; the treated area does not feel stiffer than the material around it. In addition, I want to point to the fact that Methyl Cellulose has been used for decades to size paper (among many other applications) and no adverse effects have been noted on the cellulose fibers. This of course, does not apply to protenatious fibers.
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Figure 1. Before treatment on left and after treatment on right.

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SOURCES OF MATERIALS

Methyl Cellulose, viscosity 1900-2200 cps.
Talas
330 Morgan Ave
Brooklyn, NY 11211
http://www.talasonline.com

Sodium Hydroxide pellets (NaOH)
Fisher Scientific
http://www.fishersci.com

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Consolidating shattered silk has been a long standing difficulty in textile conservation due to the fact that most embrittled silk cannot withstand the stress of mechanical consolidation achieved through hand-stitching. The most traditional option has been using an adhesive treatment, which can be problematic since the drape of the textile is almost certainly affected.

A search of the conservation literature on adhesive treatments for textiles showed that many adhesive treatments could adversely affect the drape of cloth and some required the use of organic solvents to reverse their application. Aquazol, Poly(2-ethyl-2-oxazoline), a synthetic water soluble adhesive, often used in painting conservation, was chosen for experiments due to its physical properties of easy reversibility, water solubility, thermostability, and retention of flexibility. Aquazol is available in four molecular weights: Aquazol 5 (MW 5,000), Aquazol 50 (MW 50,000), Aquazol 200 (MW 200,000) and Aquazol 500 (MW 500,000).

In this study only Aquazol 50, 200, and 500 were tested. The viscosity and adhesion strength increases with the molecular weight, which can be advantageous depending on the adhesion strength required for a given treatment. Aqueous solutions of all three molecular weights were mixed and varying concentrations were tested to determine which would provide sufficient adhesion strength while retaining maximum flexibility. The support fabrics used were silk habutai, silk crepeline, and nylon net. Treatment was carried out on a teal green silk chiffon, beaded dress from the 1920’s. The dress exhibited severe areas of loss and shattering at the upper bodice area.

Aquazol was easily reactivated with low temperatures and provided sufficient bond strength to consolidate the shattered silk. In addition, it is extremely easy to reverse and cleared using water, so mends could be removed with very minimal risk to this textile artifact. However, it was also discovered that during exposure in high humidity situations (approximately 75% RH), Aquazol did stain and penetrate fabrics.

The poster (figs. 1-12) illustrates the experimental procedures and materials used in fabricating Aquazol coated consolidation fabrics. The sample treatment is illustrated, demonstrating the versatility and potential usefulness of Aquazol as a consolidant for shattered silk.

FURTHER READING

