



Applying New Techniques On A Traditional Adhesive For Book Conservation

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Background and Purpose

Eremurus is a reversible plant based adhesive which easily dissolves in water with an acceptable flexibility, strength, stability over a long period of time, good aging characteristics and does not cause shrinkage on paper. Moreover, due to the absence of organic solvents using this natural adhesive does not affect the cellulosic substrate.



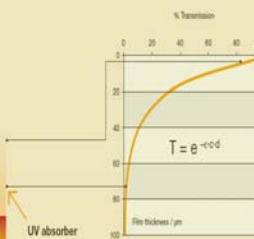
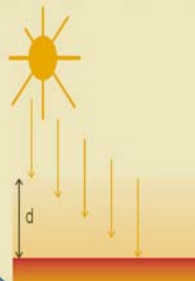
These wonderful characteristics attracted traditional conservators to not reject using this adhesive in their work. Using an adhesive which mimics the properties of the original glue in the paper is another reason for preferring the use of natural adhesives over the synthetic ones. A major disadvantage of using traditional Eremurus glue is that it forms dark amber stains on paper after drying due to its impurities.



Paper discoloration due to glue.

Results

Purification of crude Eremurus resulted in a clear, gel like and transparent adhesive with improved adhesion strength, flexibility and durability with the help of additives that already been used to improve the properties of polysaccharide based adhesives and thickeners.



Special types of UV absorbers have been used in the formulation to brighten the adhesive film and prevent yellowing. The higher the film thickness, the less will be the transmission of UV light which causes yellowing. In addition, anti-oxidants and dry film fungicide have been employed to extend the durability of the adhesive layer.

Experimental

In a typical experiment, crude eremurus (1 g) was treated with 20mL of boiling 80% (v/v) ethanol. The slurry obtained was collected on a glass filter and washed successively with ethanol, acetone and ether. This material was added to 100mL of distilled water and allowed to hydrate for 1 h. It was then mixed and centrifuged at 1500 rpm for 15 min. The supernatant was precipitated in two volumes of cold acetone. After re-dissolving in hot water (80 °C), the polymer solution was centrifuged at room temperature. The supernatant was precipitated with two volumes of ethanol. The precipitate was collected on a glass filter and washed successively with ethanol and acetone and then dried with hot air.



Conclusions

a) Purified Eremurus is able to be used as a promising adhesive for cellulosic substrates and mainly for the main purpose of this work as an adhesive for conservation of books. b) Using additives such as UV stabilizers, dry film fungicide and anti-oxidants improves the durability of the adhesive. c) Using Eremurus as a traditional, natural adhesive mimics the performance of originally used adhesives with similar properties without showing the destructive properties of synthetic adhesives and glues.

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