Conclusions from the "Gels in conservation" conference

→ The "Gels in conservation" conference was more than simply a presentation on the latest research in the application of gels for the conservation and restoration of heritage objects. The meeting, attended by around 550 people from 39 different countries, revealed the current situation of the field of conservation-restoration of cultural assets and the direction in which its professionals would like it to go. The discussion on gels was really nothing more than an excuse to talk about where we are coming from and where we want to go.

These words, in our opinion, express the culmination of the aqueous-based cleaning methodology developed by Dr Wolbers, in which gels obviously play a role. But let's not kid ourselves, the discussion about gels is anecdotal. It's just a word that sells, the "hook" to get more than 500 people together to talk about the future of conservation-restoration. The underlying issue is something else, strongly linked to some words he spoke behind the scenes during the courses organized last March by the College of Conservation and Restoration of Cultural Assets of Catalonia (known by its Catalan initials ESCRBCC) and the Centre for the Restoration of Artefacts of Catalonia (CRBMC): "knowledge is freedom".

At the conference.
Photo: Aleix Barberà

The words during the opening session by Dr Richard Wolbers, who clearly advocates a change in professional perspective, help to illustrate this: "Looking backwards in the last thirty years, we've seen a slow exponential rise in the use of more developed cleaning systems, explorations of aqueous-based cleaners for painted surfaces, things like that. It has been a lot of hard work but I think it's actually worth it. I think we're engineers. I think we actually, the people who are at the front line of working on these kinds of fine arts surfaces, whenever we have a problem, whenever we look at the materials available to us, the information available to us, we try to work out a solution. We're problem solvers. And that's what the engineers do". You can see the entire speech at: https://www.youtube.com/watch?v=RGpOYaU6owE [from 16 April 2018].

We believe that this is really the point of the "Gels in conservation" conference organizers wanted to get to. To the empowerment of conservation-restoration professionals, which comes with this change in cleaning systems of all types of cultural assets, not just painted surfaces. The paradigm shift is obvious: the application of cleaning tests is now obsolete. Now we employ analyses of the pH and the conductivity of the objects, knowledge of the constituent materials; we start from our "unicum" to develop, as engineers, cleaning solutions that fit the circumstances and needs. This is freedom of knowledge and where we stand today.

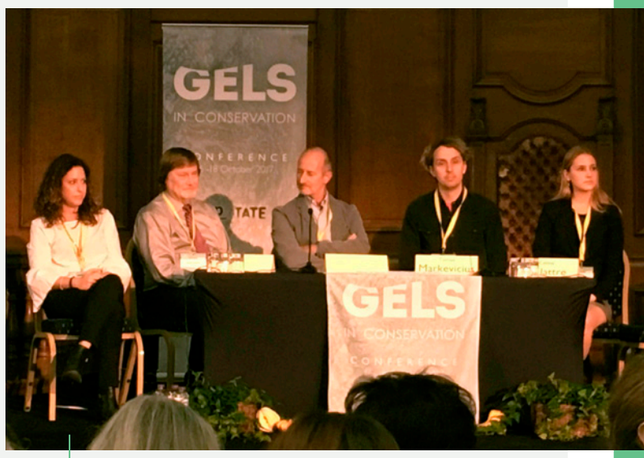
But as well as analysing the current situation, during the "Gels in conservation" conference, Dr Richard Wolbers also pointed out the direction in which we want to move professionally. The path we need to follow, the research of the future is presented in "Gels, green chemistry, gurus and guides", in which he highlights the need to apply the 12 principles of "green chemistry"[1] to conservation-restoration and the benefits this can provide, which he summarizes as follows[2]:

Minimizing waste at source: The use of solvent gels, for example, is much more efficient than working with liquid solvents. This can minimize the evaporation of solvents while enabling more controlled work and using less of the product.
Using catalysts instead of reagents: The use of enzymes may in future be one of the key tools used in the cleaning of painted surfaces. In many cases they will allow us to work in a much more selective way during the removal of surface layers, while replacing the traditional use of solvents with wholly aqueous-based preparations.
Improving atomic efficiency: The use of products that fulfill more than one need, as is the case of xanthan gum, which can be used to create a buffer gel and at the same time an emulsion with a solvent without the need for any type of surfactant.
Using non-toxic or less toxic reagents: A paradigm shift occurs when we start to remove varnishes from natural resins using aqueous emulsions that contain tiny amounts of solvent, around 3%. Knowledge about the ageing and the behaviour of materials means we are able to use more efficient cleaning systems which are also less toxic since they are wholly aqueous-based preparations.
Using renewable materials: The inclusion or organic products that can be grown and regenerated in a relatively simple way, such as agar-agar, xanthan gum or enzymes, is something to consider when choosing new products in the future.
Avoiding the use of solvents or using those that are recyclable and more environmentally friendly: Following the example of the cosmetics industry, which has gradually replaced more toxic products with biodegradable alternatives, can help when choosing new solvents, in the relatively near future, to replace those that are traditionally used.

Moreover, the presentations, posters and professional discussions that accompanied the "Gels in conservation conference" also raised a series of issues that combine green chemistry with the application of gels in conservation-restoration. These are the basic principles and benefits which should encourages us to revert to gel cleaning systems whenever possible:

- They increase the moisture capacity of the solution or solvent that we want to apply.
- They improve the contact between this solution or solvent and the surface.
- They deliver the solution or solvent in a precise manner: cleaning is more selective and stratified.
- They reduce the possibility of the solutions penetrating the object (vertical diffusion) and reduce the amount of moisture or solvents getting inside it.
- They delay the evaporation of the solvents and therefore prolong their action.
- They prevent much of the evaporation of the solvents, making the task less toxic for the restorer and for the environment.
- They create emulsions without the need to add a surfactant.

Let's finish with an abstract from Dr Wolbers' article in the "Gels in conservation" minute book, where he presents his perspective on connecting the past, present and future. "There is no end to the challenges that we face in the cleaning of painted surfaces [...]. Our principles will not change —we want to continue to preserve heritage objects and their artistic and cultural significance for as long as possible. But our tools will become more sustainable. We need to consider green or sustainable chemistry whenever we address new materials and their problems. As in other sectors, we must replace or minimize the use of solvents wherever possible. Gels are one way, but we have to be ready to constantly review and update our treatments when new products become available to us". ⬟



At the conference.
Photo: Aleix Barberà

1. Anastas, P.; Warner, J. 1998. *Chemistry: theory and practice*. Oxford: Oxford University Press.

2. Angelova, Lora; Ormsby, Bronwyn, Townsend, Joyce H., Wolbers, Richard (eds.). 2017. *Gels in the conservation of art*. London: Archetype Publications. Pages 3-8.