

Development of phosphorylated cellulose as a biobased fire-retardant additive for textile in the frame of HALO-TEX project

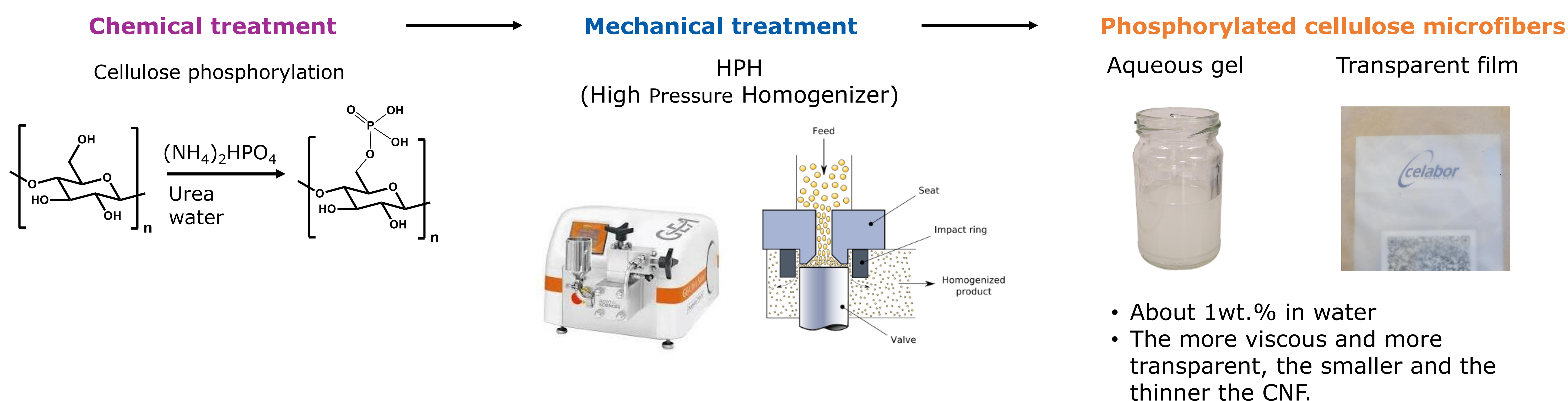
Caroline Piffet^{1*}, Julien Spronck¹, Lara Gumusboga¹, Jean-Michel Thomassin¹
¹Celabor SRL, Material Department, Avenue du Parc 38, 4650 Chainieux, Belgium
 *caroline.piffet@celabor.be

INTRODUCTION

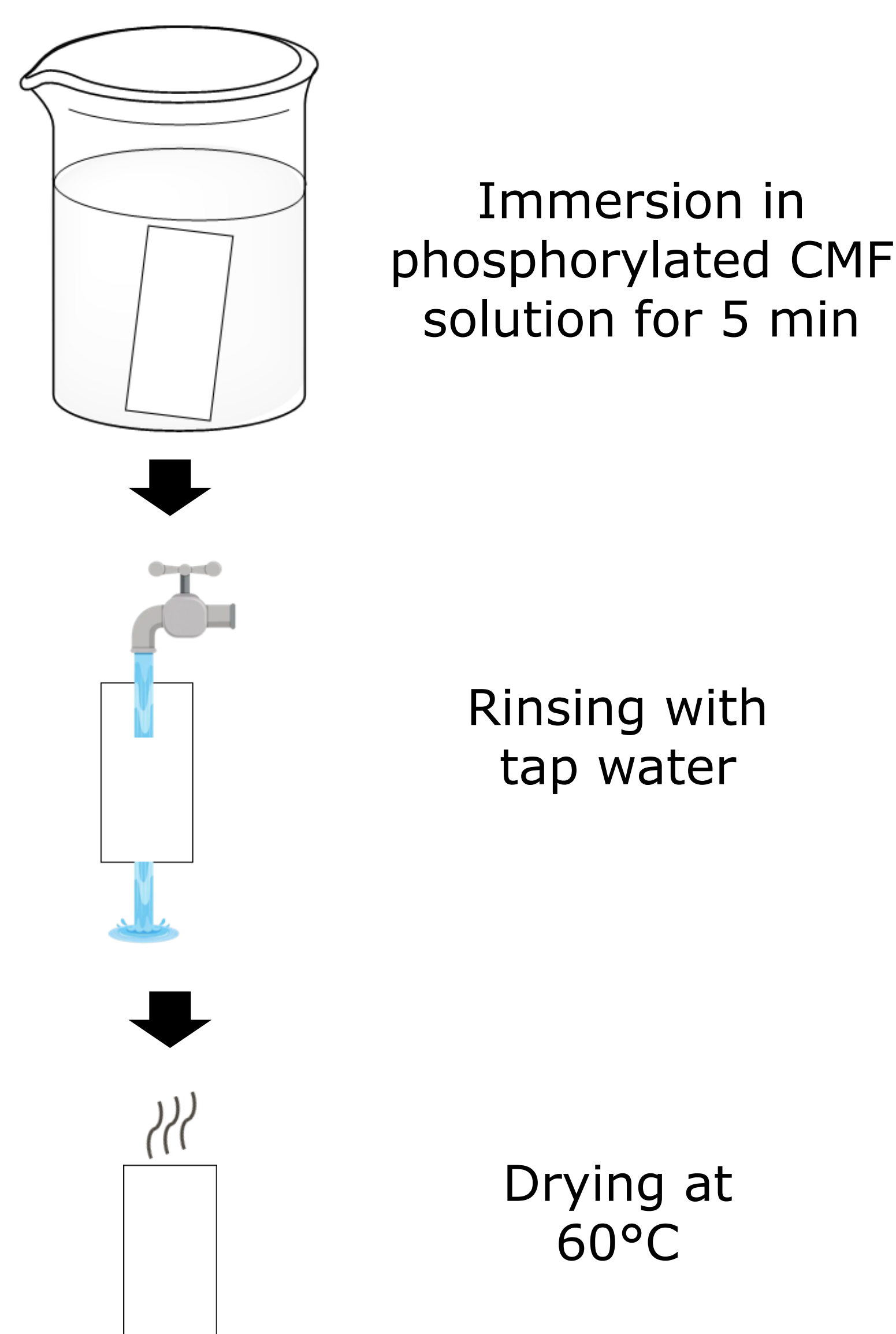
HALO-TEX project aims to demonstrate a novel, sustainable, and circular bioproduct manufacturing system based on the biorefinery of salt-tolerant plant biomass (halophytes). It seeks to establish an innovative value chain and a sustainable model for bioproduct manufacturing to advance transitions towards a circular bioeconomy. This project proposes an attractive approach for circular multi-product processing for textile industry from a complete resource valorization perspective towards high-value applications: production of cellulose fibers for textiles and production of functional ingredients and additives for textiles.

METHODS & RESULTS

1. Preparation of the cellulosic additives

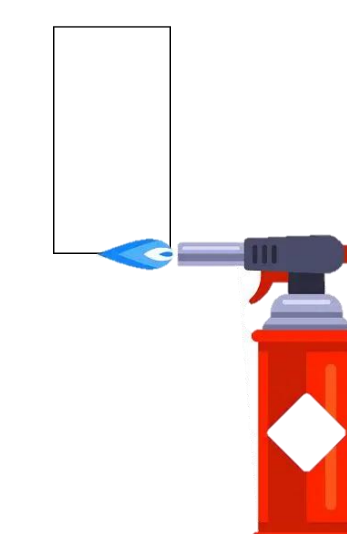


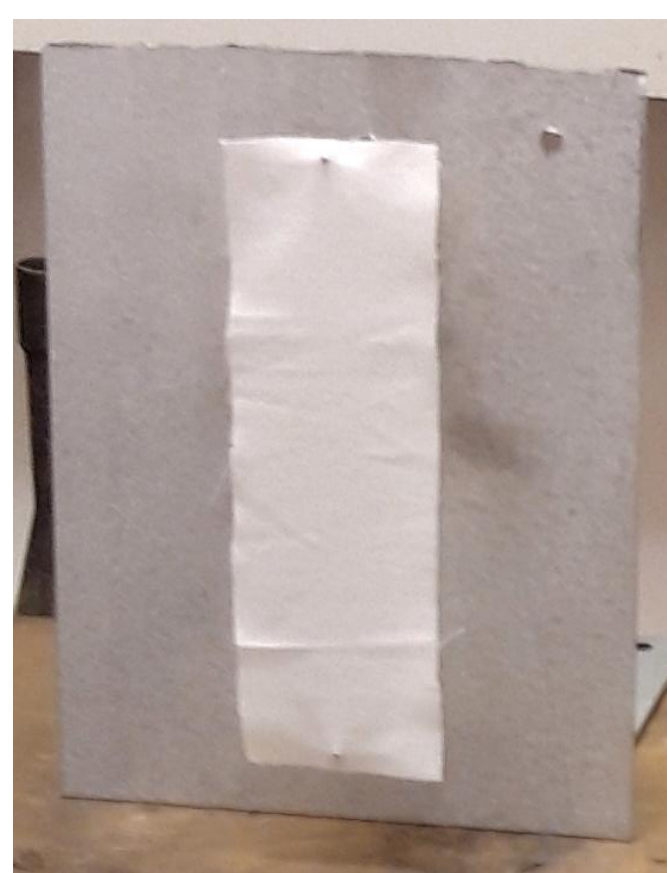
2. Coating on textile



3. Flammability test

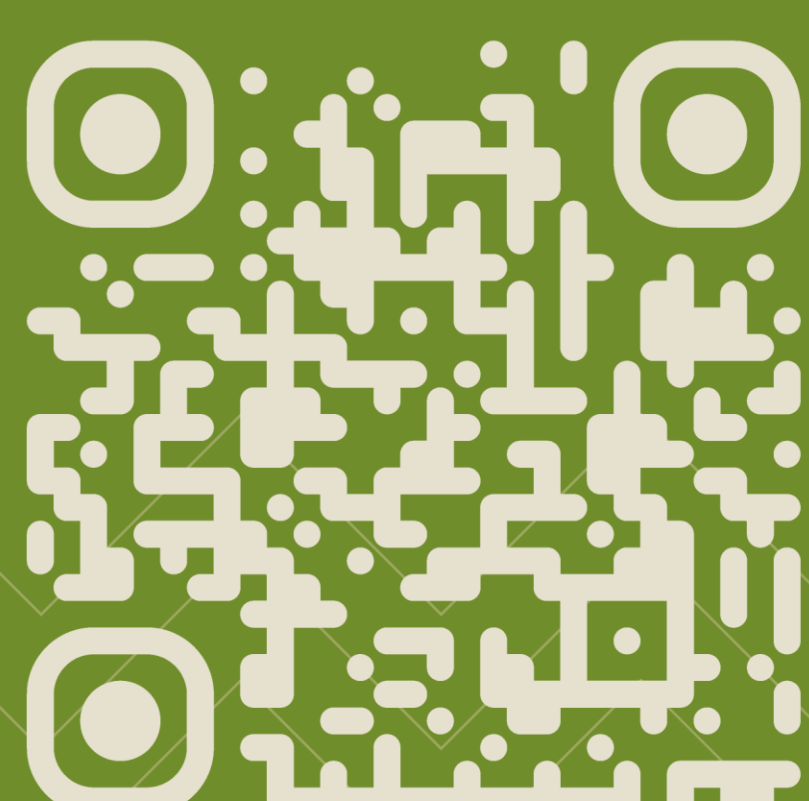
- Sample type: white cotton, 4 x 12cm
- Flame exposure for 5 s at the bottom of the sample
- Result: burning time until complete extinction



	Before fire test	Without any treatment	Phosphorylated CMF (1)	Phosphorylated CMF (2)
Sample & type of grafting				
P grafted on CMF		0%	65%	55%
P grafted on textile		0 ppm	210 ppm	2430 ppm
Results after fire test		Totally burned 17.46s	Fire stopped 11.62s	Fire stopped 9.53s

CONCLUSION & FUTURE WORK

The cellulose was successfully phosphorylated using a simple method, followed by a defibrillation step. Two types of phosphorylated CMF were grafted on textiles by an immersion method. Those CMF allowed to decrease significantly the burning time and to increase residues. In the future, this method will be transposed to the purified cellulose from halophytes. In parallel, in order to valorize the lignin fraction of the halophytes plant source, lignin nanoparticles will be added in the coating solution for anti-UV properties.



www.halo-tex.eu/



info@halo-tex.eu



halo-tex



Funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or REA. Neither the European Union nor the granting authority can be held responsible for them.