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## Development of treatment to prevent the algal biofouling

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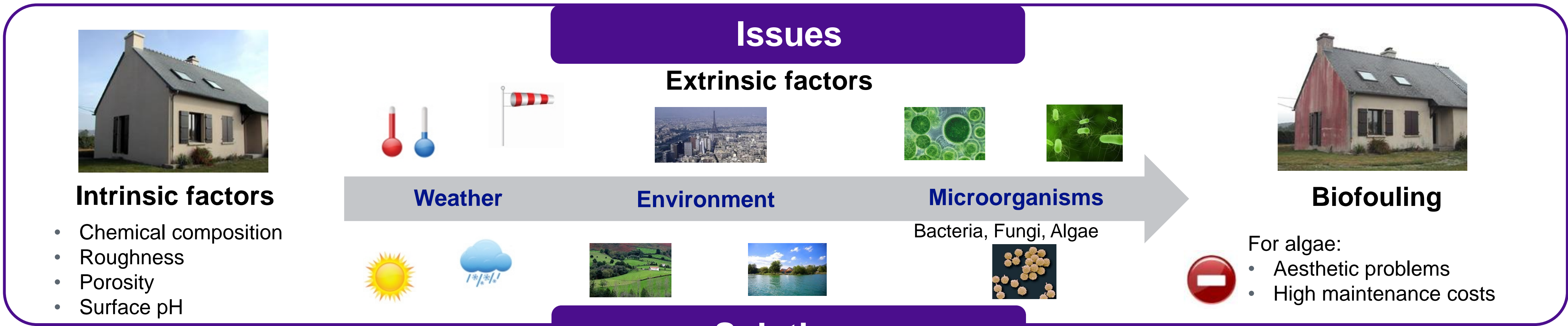
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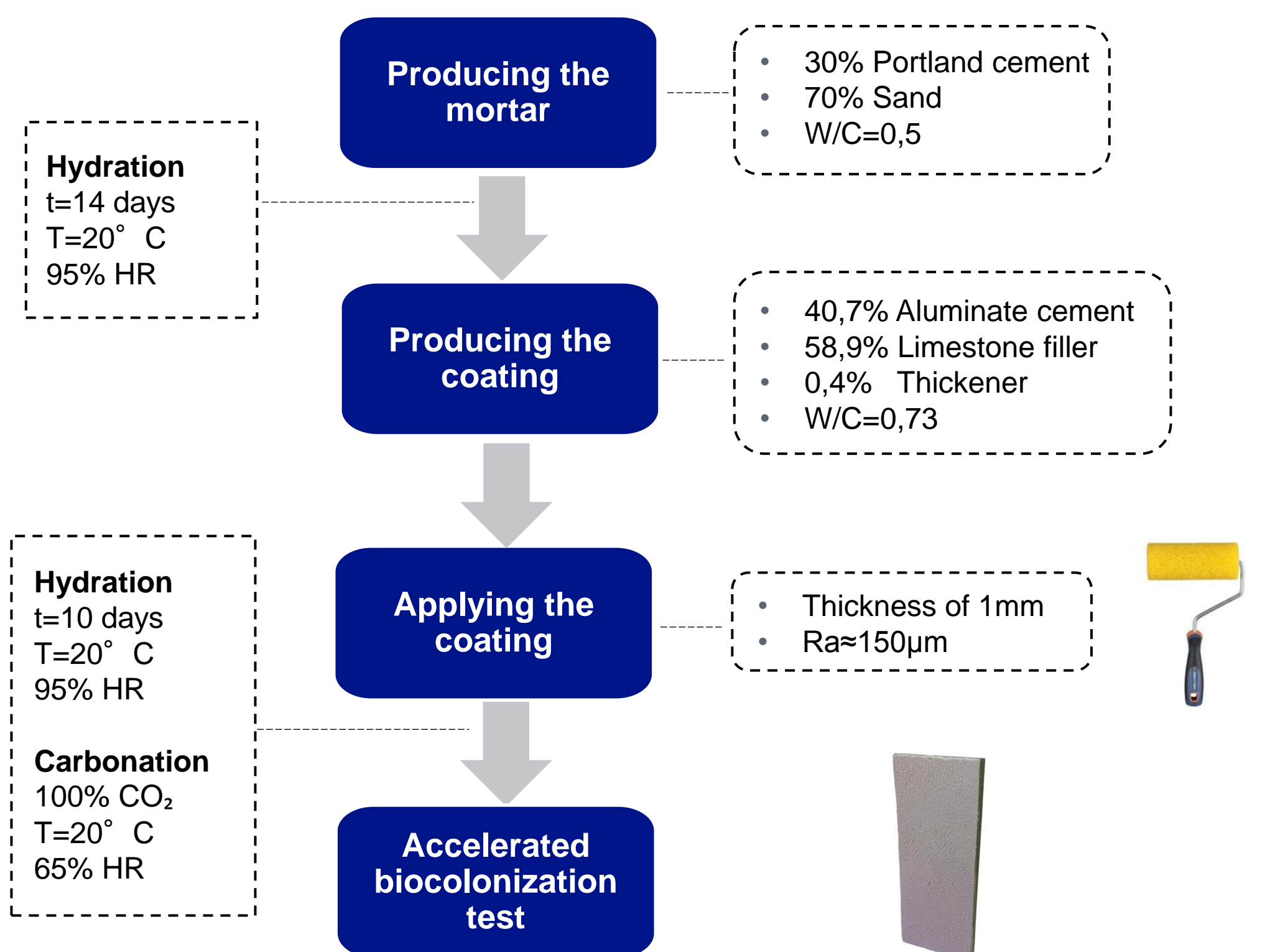


## Solutions

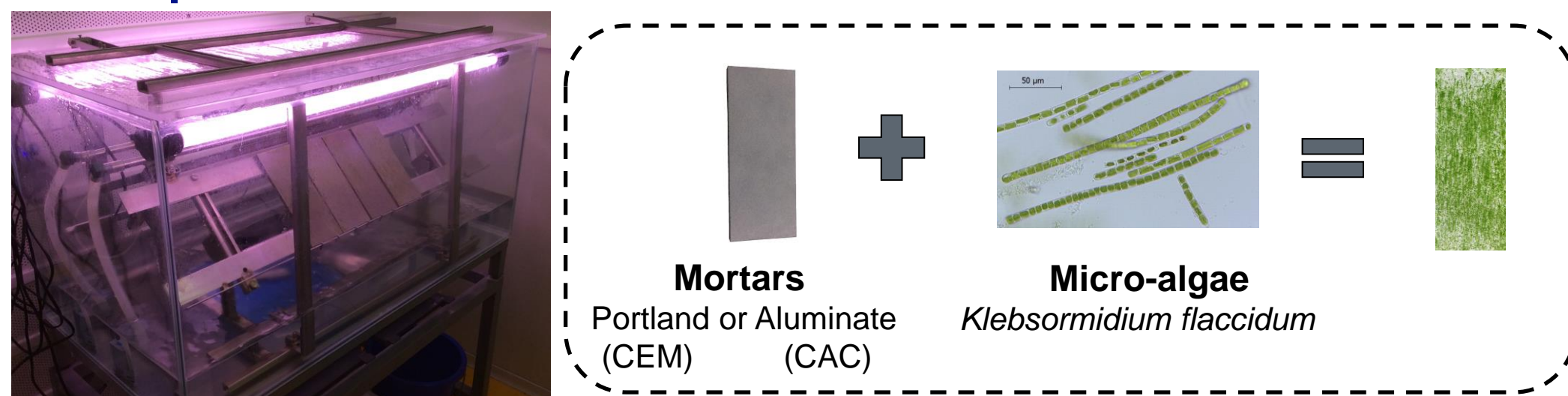
### Development of preventive treatment against biocolonization without adverse effects on the environment

#### Experimental approach

Development of a calcium aluminate cement (CAC) based coating applied in a thin layer of 1mm. A Portland cement based coating is used as reference.



#### Experimental device

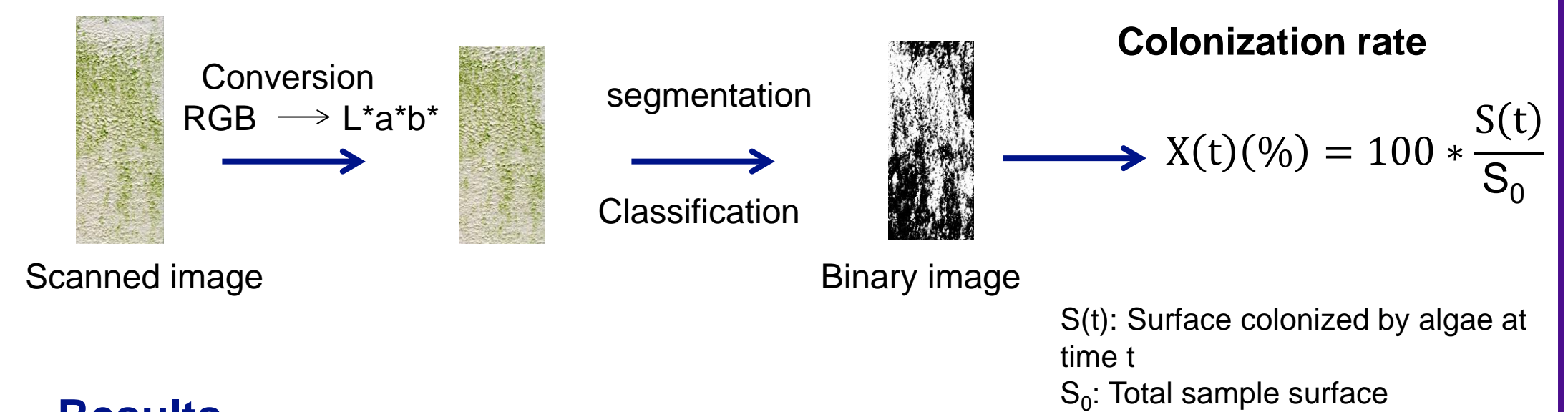
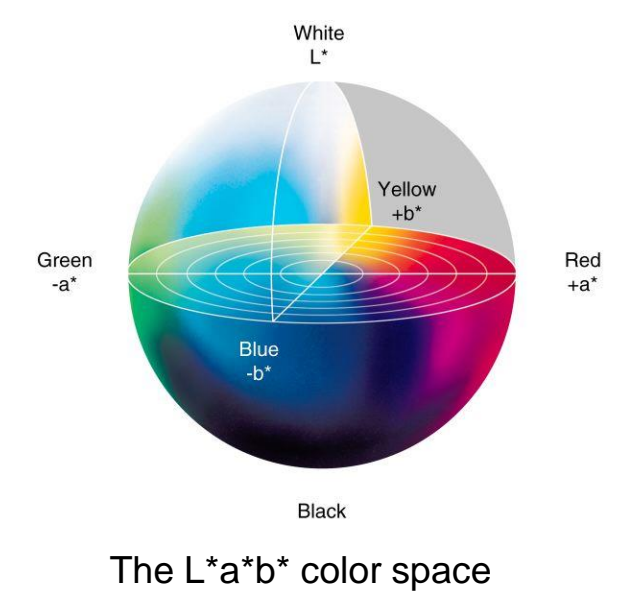


**Principle:** Sprinkling an algal suspension on top of mortar samples

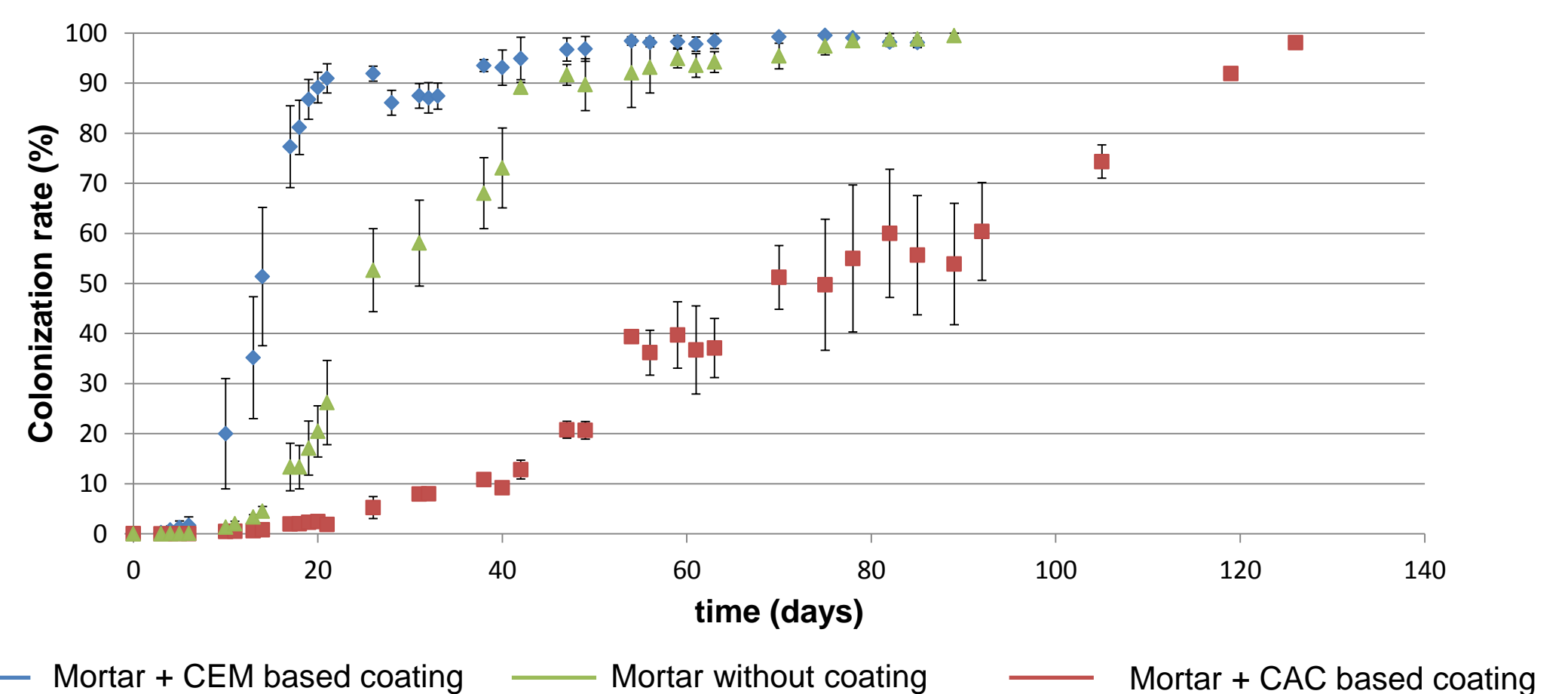
- Conditions:**
- T=24° C
  - Photoperiod of 12h
  - Stirring synchronized with lighting
  - Sprinkling cycle: 1h30 every 12h, flow of 24 L/h

#### Image analysis (Matlab)

Development of a self-learning algorithm to analyze the microbial growth. Identification of areas colonized by algae in the L\*a\*b\* color space.



#### Results



	Mortar without coating	Mortar + CAC based coating	Mortar + CEM based coating
Initial surface pH	9,7 ± 0,2	9,3 ± 0,1	9,2 ± 0,1
Surface roughness (µm)	146 ± 56	155 ± 23	163 ± 29
Latency time (days)	7,5 ± 0,5	11,6 ± 4,2	4,7 ± 1,6
Time for X(t)=40% (days)	22,7 ± 1,5	53,2 ± 0,5	12,4 ± 1,6

Retarding effect of the CAC based coating

## Conclusions / Prospects

- Observation of a retarding effect of the calcium aluminate cement based coating
- Development of an algorithm on Matlab for image analysis
- Accelerated biocolonization tests in laboratory with mortars samples covered by sulfo aluminate cement based coating
- *in situ* tests with the samples previously tested in laboratory
- Incorporation of TiO<sub>2</sub>, Ag or Cu nanoparticles into the coating
- Kinetic modeling of colonization of the mortars surface