

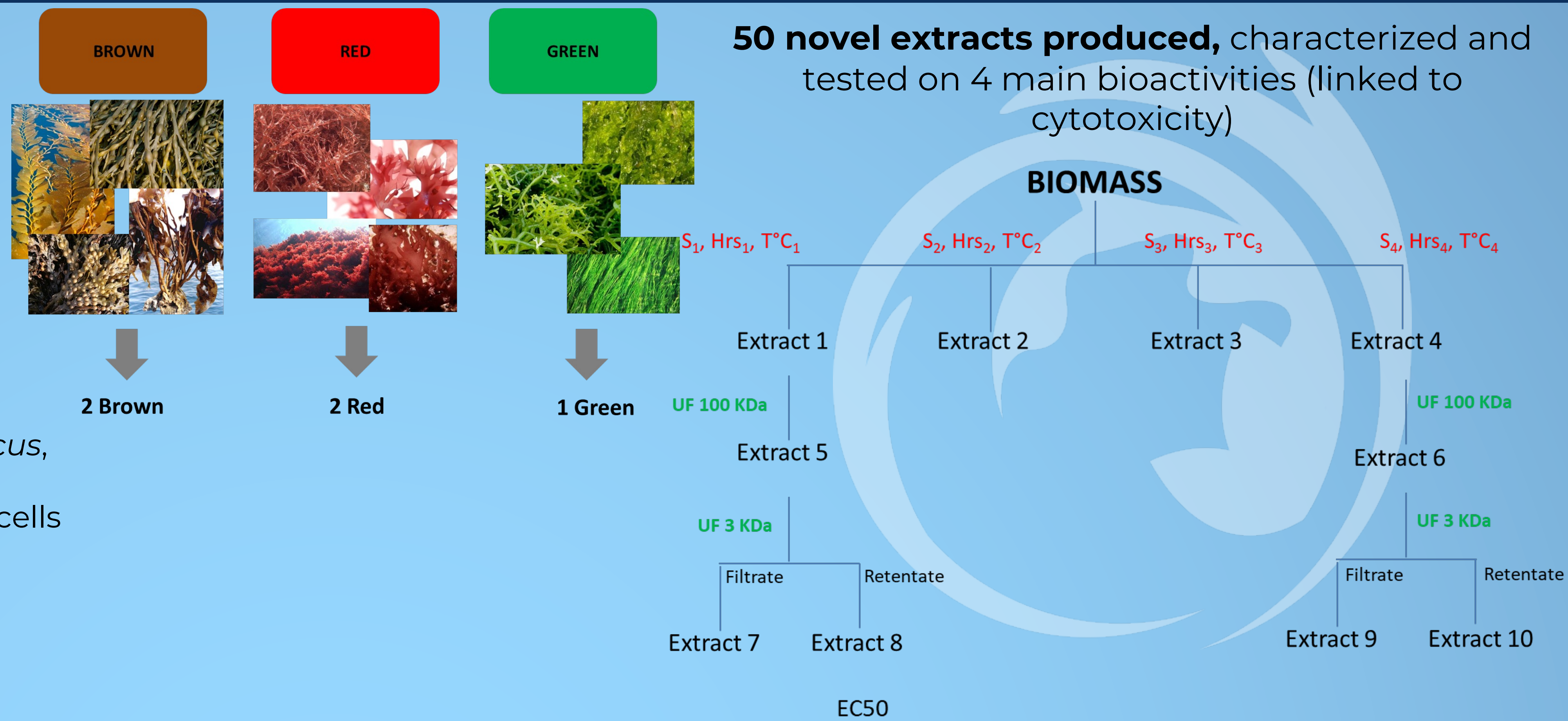
Links between composition and **functionality of SEAWEED extracts** – a practical case on **cosmetic applications**

Objectives and context

With an increasing demand from customers regarding naturality, security and performance of cosmetics solutions, “Laboratoires Gilbert” looks to enrich its portfolio of natural products based on marine molecules, to further develop cosmetics and health applications. SEAWEED represent a huge reservoir of bioactive compounds including primary and secondary metabolites. Indeed, in a marine environment seaweed endure stress conditions (light, salinity, dehydration, grazing...) similar to skin aggressions. At least, in most of the cases, seaweed extracts lead to an excellent biocompatibility with the skin and represent high innovation potential for cosmetic formulation and applications. The aims of project were to expand the study to a large screening of brown, green and red seaweeds, to identify new extracts with clear composition and related effects.

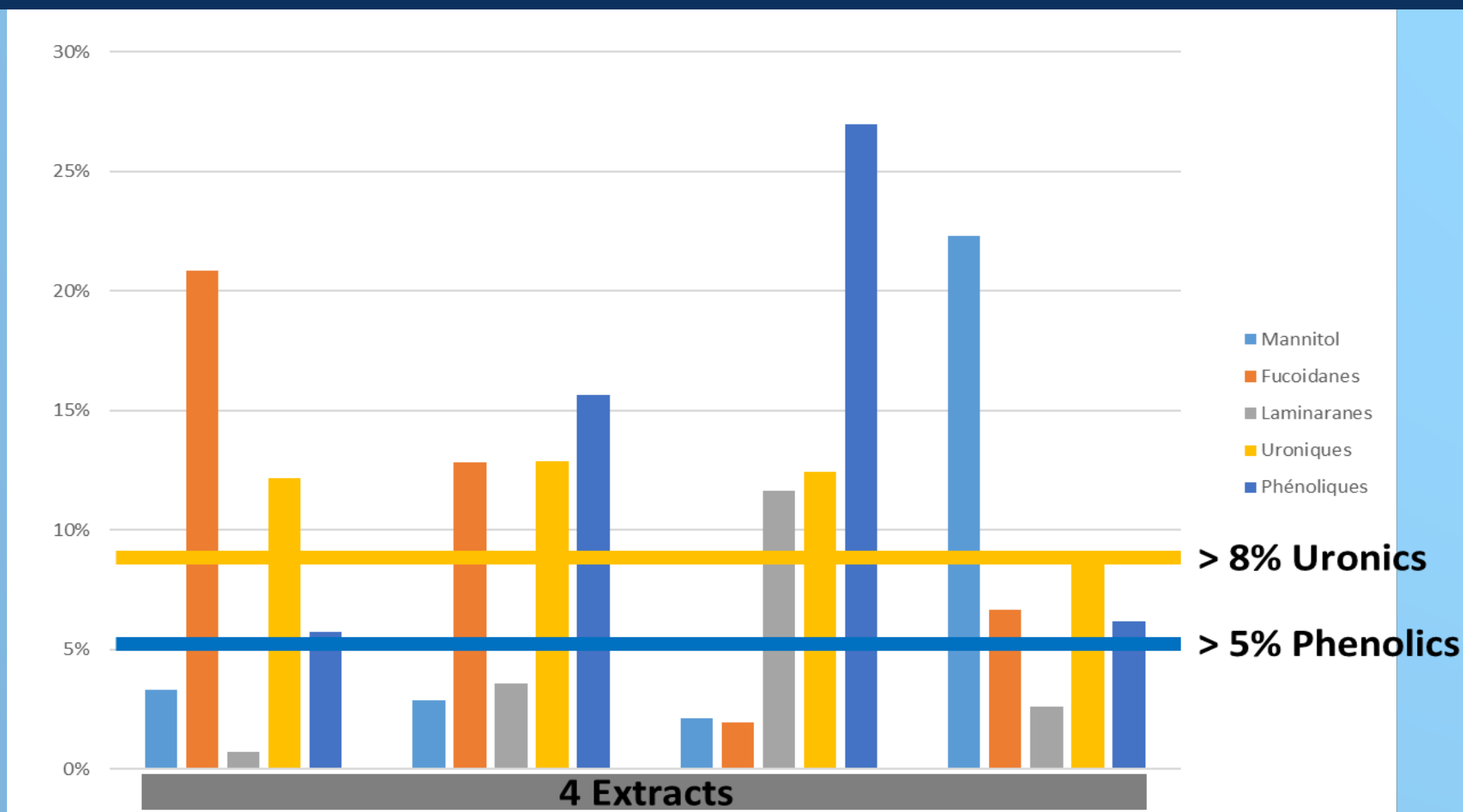
Methodology

- Choice of biomass** : sustainable, wild stock or cultivation, local biomasses
- Characterization** of the biomass
- Extraction (and) purification** steps for each biomass following workplan
- Characterization of all extracts** : dried matter, mannitol, polysaccharide fractions, uronic acids fraction, phenolics
- Bioactivities** :
 - Anti inflammatory (inhibition of lipoxigenase),
 - Anti histaminic (cells culture of basophile *Rattus norvegicus*, ELISA detection of histamine reduction)
 - Wound healing (wound on fibroblasts and keratinocytes cells culture and migration cells observation for recovery)
 - Antibacterial (4 strains tested)



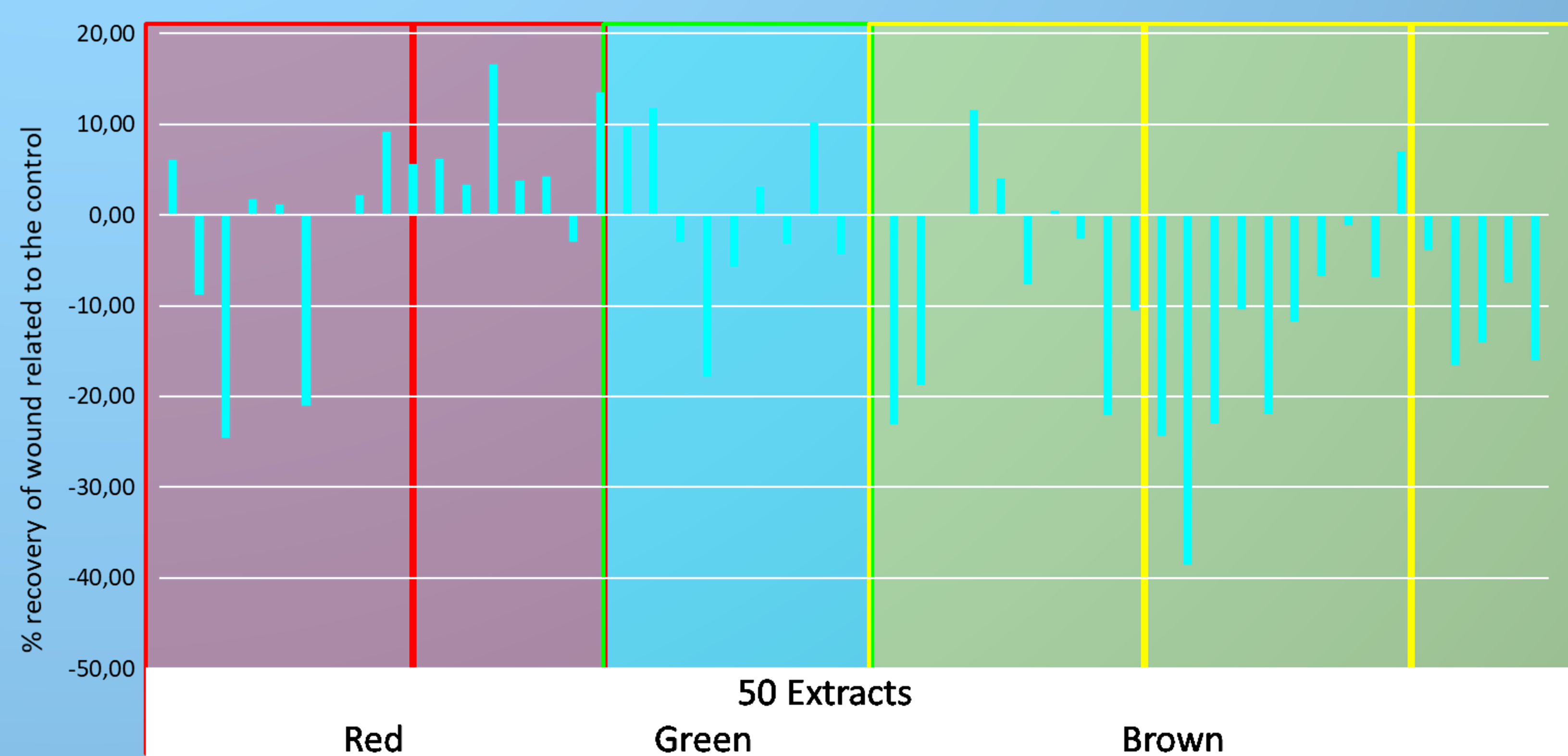
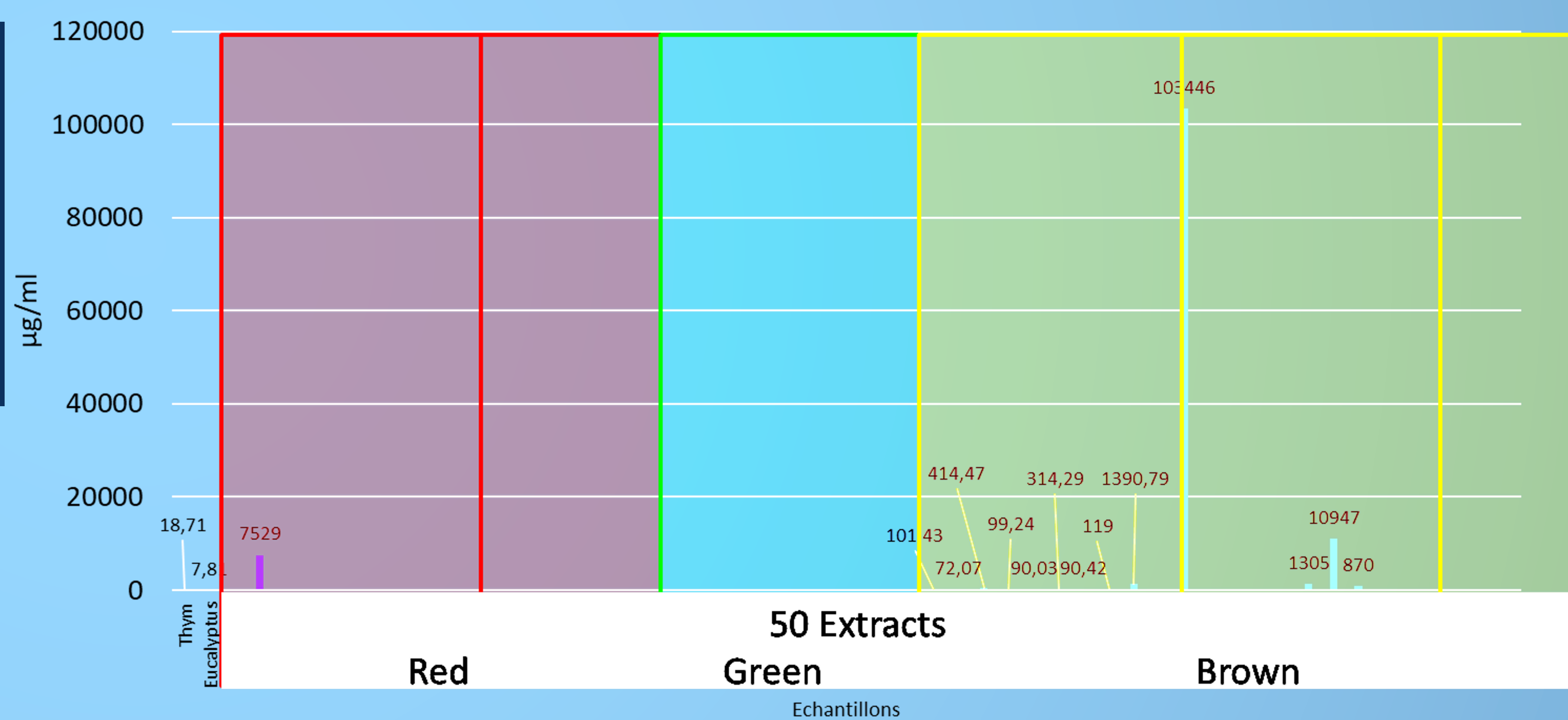
Selected Results

- **Anti inflammatory** trials present positive EC50 results for brown seaweed extracts (Maximum EC50 1390). Positive control known as active, used are Thym and Eucalyptus Oil (EC50 7,81 and 18,71). Regarding composition, the fourth main active fractions extracts from brown seaweed contain high molecular weight, with important phenolics and uronic acid range content. (Kang 2001, Kim 2009)



- **Wound healing** trials show interesting results for red seaweed extracts, with a recovery percentage higher than control (obtained at 80% recovery). Active red extracts are obtained with warm temperature extraction conditions. In those conditions, sulphated polysaccharides were probably extract, and linked to activity (Pereira 2013).

- **Anti-histaminic** trials show the highest reduction of histamine liberation obtained for green seaweed extract. Positive control used is quercetin. Some brown and red seaweed extracts present also positive results. In literature, some anionic polysaccharides present such activity (Asada 2014).



References : Asada et al (2014) Biosc. Biotech. and biochemistry, Kang et al. (2011) Carbohydrates polymer, Kim et al. (2009) Journal of agriculture and food chemistry, Pereira et al (2013) International journal of biological macromolecules.

Conclusion and future work

A systematic approach in production of 50 extracts from 5 seaweed species linked to a deep chemical characterization allowed to highlight key bioactives compounds per extracts. The composition is by nature different but also the extracted compounds vary also by their yields and size, depending on the extraction process used. In consequence, in our study, the results on each bioactivity tested show different levels and scope of action upon the extract that has been tested.

ALGAIA is collaborating with Laboratoire Gilbert for the validation of this bioactivities in others models and scale up of extraction and purification steps, at semi-industrial scale.

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