



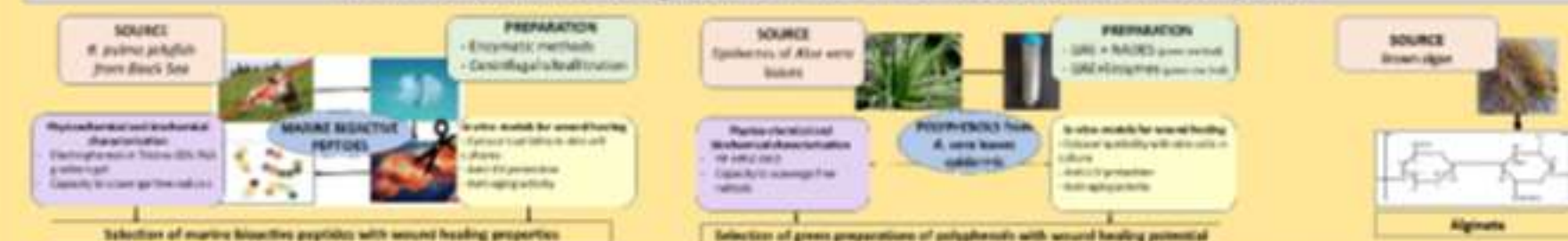
Patent application A/00200/2025 - PROCESS FOR OBTAINING A CROSS-LINKED BIOACTIVE TERNARY COMPOSITION FOR ACCELERATED SKIN WOUND HEALING

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The main objective of this work is to establish novel lab biotechnologies for obtaining natural bioactive compounds for innovative biocompatible biomaterials with improved properties useful in the healing and regeneration of skin wounds.

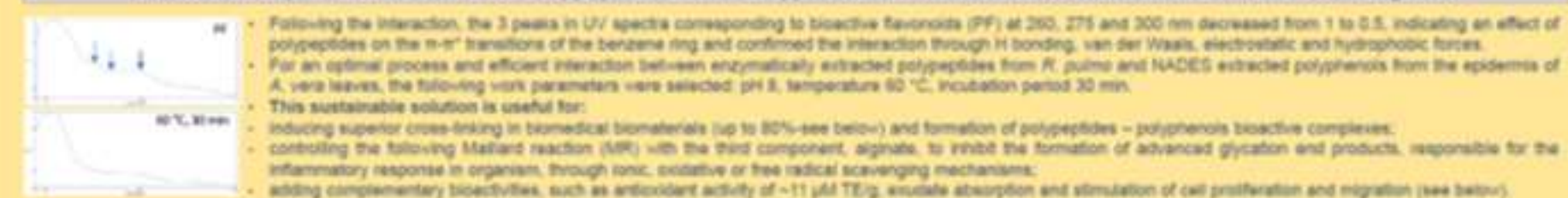
The present invention relates to a process for obtaining a cross-linked bioactive ternary composition, based on natural protein and polysaccharide polymers of marine origin and flavonoid extract from the epidermis of *Aloe vera* leaves, in well-established proportions, for use in biomedicine to accelerate the skin wound healing.

Valorisation of Marine and Agriculture Wastes into Value-Added Bioactive Compounds

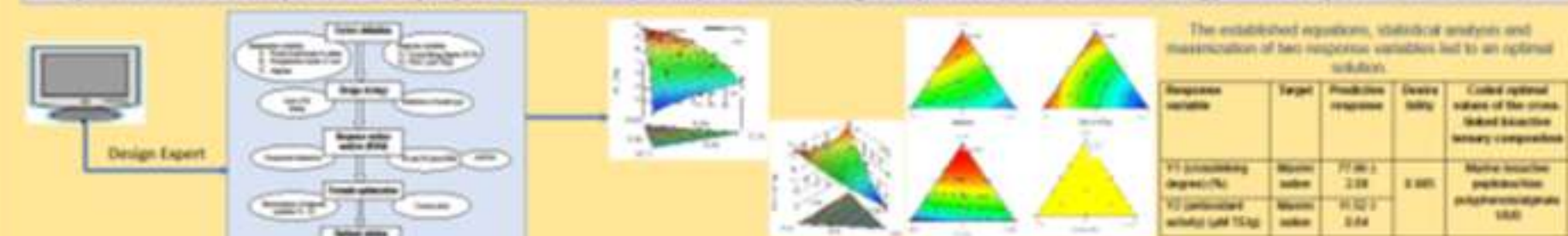


Technical issues: (i) Dressings based on natural polymers (alginate, collagen) have low mechanical properties, high biodegradation rate, limited efficiency for skin chronic wounds, which have a long healing period; (ii) Covalent cross-linking uses chemical agents that can increase the cytotoxicity of the dressing; (iii) Enzymatic cross-linking has limited specificity and is expensive; (iv) Polymers cross-linking using natural compounds (genipin, tannic acid) is limited due to high costs; (v) Protein/ polysaccharide cross-linking through Maillard reaction, usually applied in food industry, can improve the dressing stability, but also it leads to formation of advanced glycation end products, responsible for the inflammatory response in the body, development of degenerative diseases and aging.

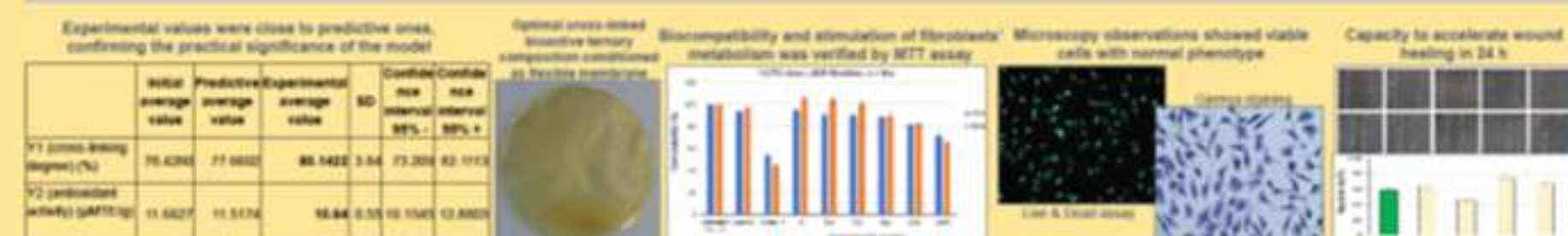
Innovation: Optimisation of Marine Polypeptides - Aloe Polyphenols Interaction in view of Maillard reaction with Alginate



Optimisation of composition vs. properties of ternary compositions using Response Surface Methodology on 16 experimental variants



Model validation and in vitro experimental testing of the optimal formulation



CONCLUSIONS

- The novel solution brings several advantages:
- Increased cross-linking efficiency in ternary compositions due to optimization of work parameters, ordering the process stages, limiting previously used long-term reactions, at high temperatures;
- superior biocompatibility with the integumentary system due to limited formation of advanced glycation end products;
- optimized selection of an original composition of polymers of marine origin and small molecules of plant origin, in well-established proportions, devoid of toxicity and antigenicity, to accelerate the wound healing;
- novel membranes from natural polymers cross-linked with flavonoids for the controlled release of 3 types of bioactive compounds acting complementary at the lesion situs;
- potential to increase the efficiency of skin wound treatment protocols, reducing patient discomfort and the hospitalization duration;
- novel process for valorizing marine resources and food industry by-products;
- The process is feasible, uses non-toxic compounds, requires basic equipment and has a short completion time.

SOCIO-ECONOMIC IMPACT

