

Development of the Microbioinspired Method (MBI) for the creation of projects with sustainable practices using microorganisms

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ABSTRACT

The Microbioinspired Method was created with the purpose of assisting in the development of interdisciplinary research between microbiology and creative and projective areas such as art, design, fashion, architecture and engineering, with a sustainable bias. This article shows the development of the microbioinspired method (MBI) and exemplifies, through a real situation of dyeing natural fiber textiles with bacterial pigments, the diverse opportunities that can be found when you have this other look at the microorganisms.

INTRODUCTION

It is very difficult to imagine a world without microorganisms. Everything would be different from what we know, the planet would be different. Although a large portion of the population sees fungi, viruses and bacteria as enemies, it is known that they are of great importance for the maintenance of the life cycle on Earth. This potential is still little explored in creative and projective areas, being an opportunity for the development of researches involving sustainability in an increasingly finite world.

Even the few people who are interested in microorganisms do not know how to use them in interdisciplinary academic research, whether because of their lack of knowledge in microbiology, or even for having difficulty finding partners to work on large projects and with a view to complex systems. A research method called the microbioinspiring method (MBI) was created, with references of biomimicry, biodesign and bioart, to be used by interdisciplinary groups for the creation and execution of projects related to microbes.

RESULTS AND CONCLUSIONS

As a result of the study, the microbioinspired method presents two *Momentums* that can alternate with each other, but classically we start with the *Representative Momentum*, that has a more investigative character, holding a selection of stages as: assortmenting the microorganism, investigating it (morphology, genome, metabolism, evolution, ecology, communication, motility), analysing it through general factors associated with the research (philosophical, social, economical, affective, pathological), and through sensory factors (sight, smell, taste, touch and hearing).

After this first phase, in order to pass to the *Morphological Momentum*, the research needs to begin to be better structured, forming the stage we designate as a *Cytoplasmic Membrane*, which selects ideas, promotes connections, establishes a woof of knowledge and gives form to the project, but it is still permeable to new discoveries.

Morphological Momentum ends the structuring of the research and executes it, giving it a cellular form. According to the nature of the research, new steps are selected and interlinked, such as choices of techniques, tools, experiments, analysis of results, problem solving, discussions and establishment of perspectives. (see Figure 1).

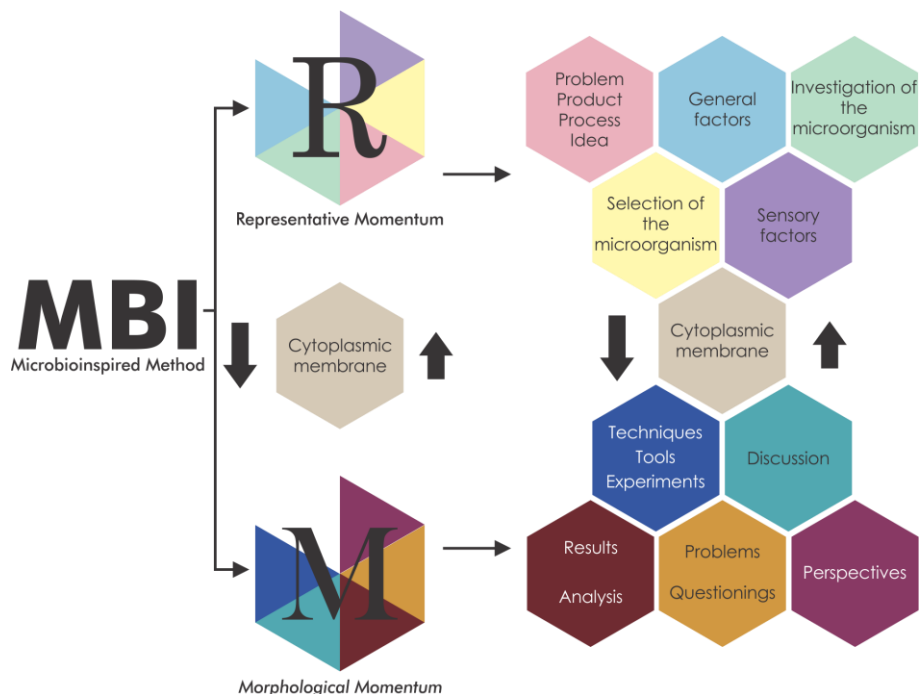


Fig.1 Microbioinspired Method (MBI) diagram.

When the method was applied to a previously performed experiment of dyeing natural fiber textiles using actinobacteria (ABREU, 2015), we observed that the research could have been broader and achieved better results. By applying the MBI Method, we expanded knowledge and saw that it could have been investigated if the antibiotic production by the bacteria could add some antimicrobial complement to the textile; if the result could have been better if it were performed on the natural fiber and not in the textile; if growing different species of actinobacteria together could alter the color of the pigment; and if any intervention could have reduced the oxidation of the pigment. Having done that, we could have showed, that the scientific studies can be planned, executed and improved using the Microbioinspired Method. More testing and case studies will be analysed for the wider dissemination and possible adjustment of the method.

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