EXTRA SCIENTIFIC ISSUES OF HYDROCOLI

The importance of philosophical and economic issues for our project was immediately apparent to our team, so we decided to examine these issues through a research paper. Our purpose is to render the content of IGEM competition accessible to anyone who is interested, particularly to biotechnologies concern everyone. We've examined the ethical, philosophical, humanitarian, ecological and economic consequences of hydrocoli. We think that a complete analysis of the project is a useful tool for our team if we hope to see our research applied one day. We tried to show what could be the real progress for society about reducing pollution while producing hydrogen thanks to waste water. Beside the ecological advantages we showed advantages that hydrocoli could bring to humanitarian help and economic development and we also completed a philosophical analysis of the project. We concluded that, under the right circumstances, hydrocoli could be hugely beneficial to both society and science.

QUORUM ADDITION

Out of the orange treatment plant

ABSTRACT

In this ever more energy-dependent world, where fossil fuel resources become scarce and raise environmental issues, the search for green energy sources is a growing concern in both civil and scientific communities. In this context, hydrogen turns out to be an interesting alternative. However, current hydrogen production relies mostly on chemical processes, such as petroleum cracking or water electrolysis. In order to develop greener and more energy-efficient processes, the use of microorganisms as bio catalysts for hydrogen production has been studied for many years. While no practical application has yet been achieved, nowadays the scientific and technological advances allow further developments and opportunities in this field.

The actual use of dark fermentation to produce hydrogen attains very low yields, compared to other fermentative biofuel synthesis, e.g., methane or ethanol. We propose to design a genetically engineered E. coli with an improved natural hydrogen production pathway, using the organic compounds found in waste waters as substrate. In addition, we will implement various features to enable the strain to perform other tasks related to wastewater treatment, such as signaling metallic contamination, eliminating nitrogen compounds, or hindering hydrogen consumption by methanogenic bacteria. We will also set up a planned death system in order to prevent its proliferation outside the wastewater treatment plant.