Isolation and Characterization of Cultivable Amylolytic Bioprospects from Rice Field

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Abstract

The brewing industry is in constant dependence of microbial enzymes capable of degrading raw material. Currently, the emergence of new craft beers made from various grains, such as rice, has increased the search for new enzymes capable of converting starch to fermentable carbohydrates. The objective of this research is to find cultivable bioprospects capable of degrading starch from rice fields at the Lajas Agricultural Experiment Station (LAES). The isolation of the cultivable bioprospects was carried out by an analysis of the fluctuations in temperature of the LAES rice field and using three culture media: a differential culture medium, a minimal culture medium supplemented with starch and a natural culture medium supplemented with starch. The predominant temperatures in the soil were 25˚C and 30˚C which were used for the isolation of cultivable bioprospects. A total of 320 cultivable bioprospects capable of degrading starch were isolated. It was observed that 32% of the microbial flora isolated at 25˚C had the ability to degrade starch, while 45% of the microbial flora isolated at 30˚C had the ability to degrade starch. The predominant morphology among the 320 cultivable bioprospects was spore-forming bacilli. On the other hand, the ability to degrade starch among bioprospects was variable due to the fact that strong to weak degraders were observed. The discovery of new amylases capable of degrading various sources of starch, such as rice, could allow the development of new products at an industrial level.

Introduction

- Beer elaborations
- Adjuncts
- Microbial amylase

Objective

- Isolation and purification of microorganism in soil from Lajas Agricultural Experiment Station (LAES).
- Characterization of cultivable bioprospects capable of degrading starch.

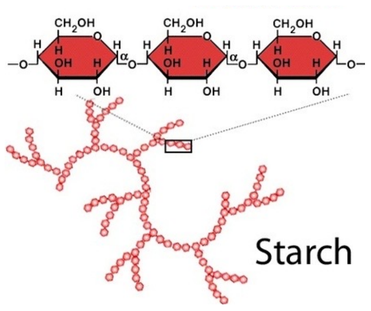


Figure 1: Composition of the starch molecule (amylose and amylopectin) and its monomers (glucose).

Methods

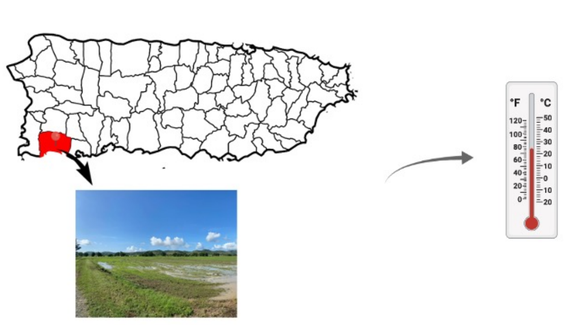


Figure 2: Temperature monitoring of the sampling area.

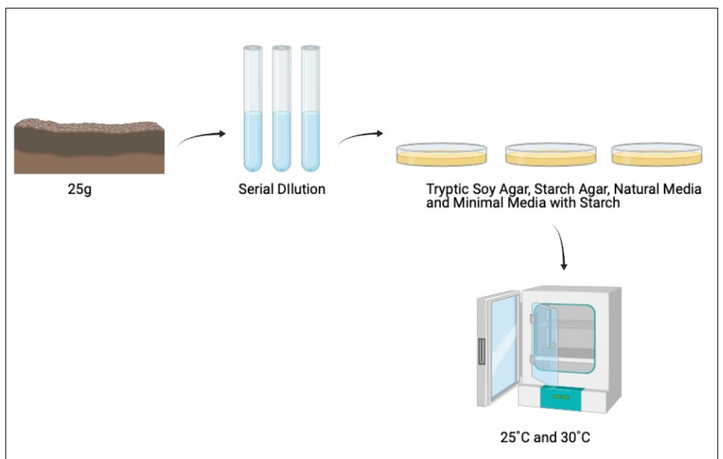


Figure 3: Isolation of cultivable bioprospects capable of degrading starch.

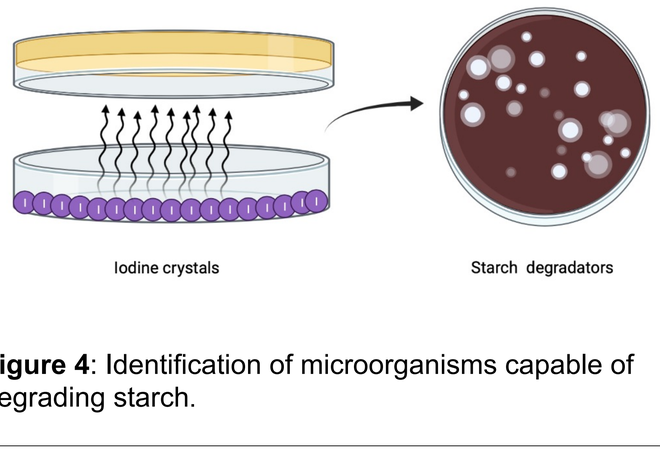


Figure 4: Identification of microorganisms capable of degrading starch.

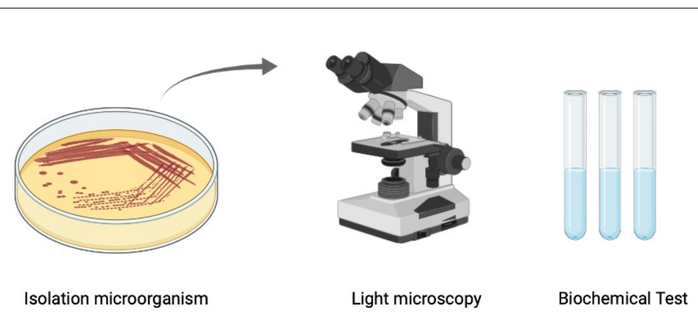
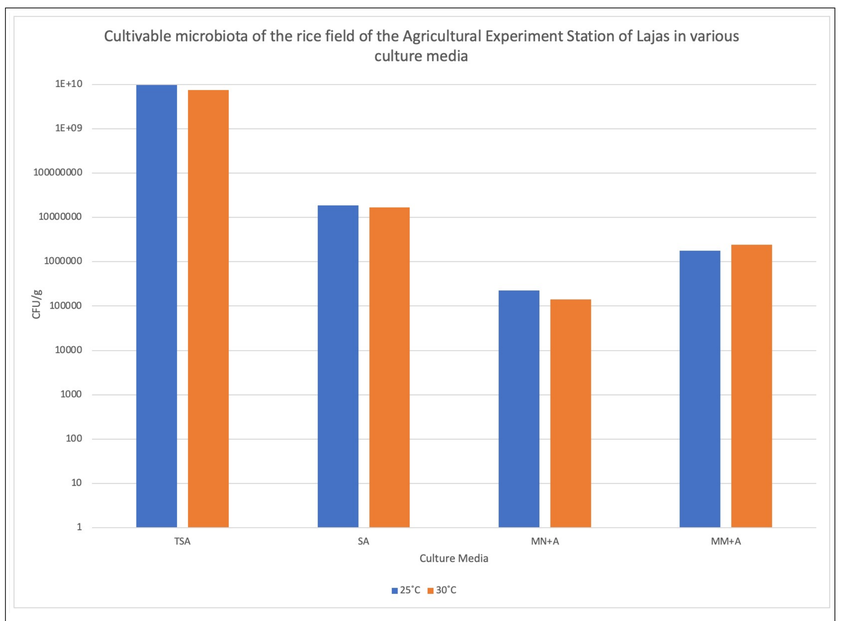
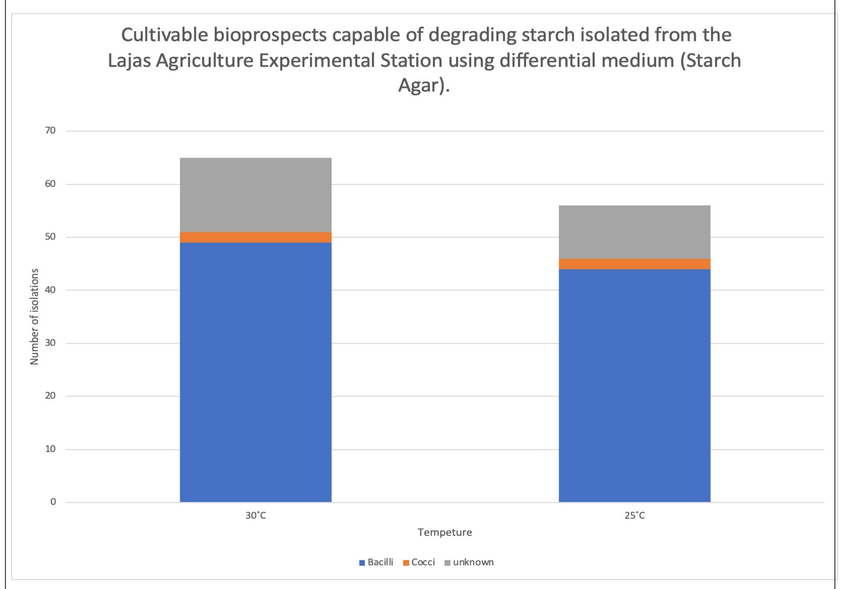


Figure 5: Characterization of bioprospects

Results





Summary and Conclusions

- Microbiota of soil
- Ability to degrade starch
- Strong and weak starch degraders

Future Directions

- Characterization of microorganism in genera and species
- Classify bioprospects into strong and weak starch degradations with quantitative and qualitative methods
- Determine the ability of bioprospects to degrade rice

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