ISSN: 2155-952X

Assessing Non-Conventional Yeasts for Bioethanol Production: Meyerozyma and Lodderomyces Bio-Prospecting Potential

Division of Microbiology, ICAR-Indian Agricultural Research Institute, New Delhi, India

Sachharomyces cerevisiae
Saccharomyces cerevisiae

its inability to utilize xylose is a limiting factor for the overall e f ciency of the process. Henceforth, we look forward to

Meyerozyma *Lodderomyces*, as were identi f ed by ITS sequencing. Fermentation of mixed sugar

Meyerozyma
Lodderomyces respectively with an e f ciency of about 65%. Strains were tolerant to inhibitors like 5-hydroxymethyl furfural and furfural at concentrations commonly found in pre-treated hydrolysates. This is the f rst report elucidating *Meyerozyma* *Lodderomyces*

Keywords: Non-conventional; Mixed sugar; Fermentation process

Introduction

e ever surging costs of fossil fuels and the resulting greenhouse e ects have necessitated the need to search for alternative cheaper and eco-friendly biofuel resources as an approach to reduce global warming [1, 2]. One such method for the low-cost production of bio-ethanol is to make use of the lignocellulose biomass as they contain carbohydrates that must be rst hydrolysed into simple sugars and then fermented into ethanol . e derivation of higher value added products like ne chemicals or bio-fuel from lignocellulose biomass generally requires a multi-step processing that includes (i) pre-treatment (chemical, biological or mechanical etc.) (ii) Enzymatic hydrolysis (iii) fermentation process.

Saccharomyces cerevisiae has undoubtedly been the paradigm for eukaryotic research . e yeast, being the workhorse of fermentation industry, has dominated alcoholic fermentations owing to its high tolerance to ethanol and also to organic acids, complemented with the exceptional ability to ourish even at low pH and limited oxygen availability [3-5]. Production of bioethanol using lignocellulosic biomass cannot be economically feasible if only the glucose present in the hydrolysate is converted to ethanol owing to the fact that lignocellulosic biomass consisting of ~30 to 45% glucan and ~20 to 35% xylan, which on subsequent pre-treatment and enzymatic hydrolysis, is converted to glucose and xylose, respectively . Despite the presence of gene homologs in the genome of *S. cerevisiae* encoding the necessary enzymes for xylose metabolism i.e. xylose reductase (*XR*), xylitol dehydrogenase (*XDH*) and xylulokinase (*XKS*), it cannot natively utilize xylose hydrolysed from plant biomass. Also, during pre-treatment and hydrolysis of lignocellulose biomass, di erent monomeric sugars along with a wide range of inhibitory substances are produced which limit microbial fermentation.

Two possible approaches to overcome this problem could be 1. To genetically engineer S. *cerevisiae, 2.* To use non-conventional microorganisms. Industrial strains of *S. cerevisiae* have been engineered worldwide in di erent ways. However, xylose fermentation in engineered *S. cerevisiae* brings with it the issue of co-factor imbalance followed by low metabolic ux. us, a highly promising alternative to engineering industrial friendly model hosts to e ciently utilize

Anju Arora, Division of Microbiology, ICAR-Indian Agricultural Research Institute, New Delhi, Tel: 011-25848431, E-mail: anjudev@

A [illegible]