



BCIL

Biotech Consortium India Limited

A robust stress tolerant *Saccharomyces cerevisiae* strain with increased efficiency of ethanol production

UNMET NEED AND OPPORTUNITY

Commercial yeast strains face several challenges during ethanol production from molasses including osmotic stress from high sugar concentrations, inhibition from toxic compounds, ethanol toxicity, among others. Additionally, in India's tropical climate, temperatures reach 40-45°C during summers. The heat generated during fermentation further contributes to keeping the fermenter's temperature high. Addressing these challenges is crucial for optimal growth of yeast and subsequent ethanol production.

ABOUT THE NOVEL STRAIN

A *Saccharomyces cerevisiae* strain NGY10 having ~90% efficiency of ethanol production from molasses.

- NGY10 is **thermotolerant** compared to the conventional commercial strains.
- NGY10 shows >15% improved **growth and ethanol production** in presence of fermentation inhibitors and high concentration of ethanol compared to the commercial strains.

Comparison of NGY10 with commercial strains, **Angel yeast** and *S. cerevisiae* CEN-PK-122 are as follows -

		NGY10	Yeast CEN-PK-122	Angel Yeast	
% increase in doubling time (T _d) at 40°C versus at 30°C		3.84	9.72	8.53	
% Growth in presence of inhibitors	1g/l furfural	91.08	82.58	89.63	
	3g/l HMF	98.44	74.90	92.07	
	0.3% v/v acetic acid	81.21	69.01	72.32	
	10% v/v ethanol	99.50	92.57	99.34	
Ethanol Production efficiency (%)	30°C	97.37	95.5	95.69	
	40°C	93.54	84.14	92.17	
	42°C	79.40	72.49	-	
	High sugar concentration	30°C	86.3	81.24	83.6
		40°C	81.49	71.52	74.38

- NGY10 has an efficiency of ~91% at 30°C with a small reduction by 3.8% at 40°C. **It fares better than the commercial strains at 40°C.**
- At high sugar concentrations, NGY10 **outperforms commercial strains** at both 30°C and 40°C.

Comparison of NGY10 with commercial strains -

	Ethanol Production Efficiency	
	35°C	40°C
NGY10	90.19	58.82
A001	74.50	49.01
F001	86.27	50.98

A001 and F001 - yeast strains from current supplier of active dry yeast in India

UNIQUE FEATURES

- Thermotolerant and inhibitor tolerant yeast with superior fermentation performance.
- The strain can be integrated seamlessly into the existing ethanol production process.
- Higher ethanol yield and titres.

STAGE OF DEVELOPMENT

Technology is validated at laboratory scale and ready for scale up.

LICENSING OPPORTUNITY

BCIL is looking for suitable licensees for transfer of the strain.

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