EPA Green Enterprise

Project: SymbioBeer

Organisation: Irish Manufacturing Research • Reference: 2019-ET-CP-102

Project Objective: Facilitating an industrial symbiosis innovation demonstration pilot where waste bread is utilised as a substitute for virgin malted grain to create a new beer.

Amount Of Grant Aid Awarded: €99,451

Background:

SymbioBeer is an EPA industrial symbiosis demonstration pilot, facilitated by Irish Manufacturing Research (IMR), between St. Mel's Independent Brewing Company and Panelto Foods, both in Longford town. In industrial symbiosis the production residues from one business become the raw materials for another business.

Project activities:

During the project, both partners explored the use of different residues as substitutes for a proportion of their key ingredients.

St. Mel's Brewery experimented with multiple types of surplus breads from Panelto Foods seeking to find a substitute for malted barley which had a neutral impact on taste – enabling them to test the feasibility of using cooked dough as a substitute across their portfolio of beers.

St. Mel's Brewery's pilot batches identified a new "bread to beer" recipe which they were able to produce at industrial scale – launching SymbioBeer Project No.1, a Belgian Style Golden Ale in December 2020.

Panelto Foods initially experimented with using yeast from St. Mel's beer production for its bread production. The beer yeast fell short of leavening the bread proving incompatible with product development specifications and ultimately their production line. Next, Panelto Foods explored possibilities of using Brewers Spent Grains (BSG) as a potential high nutritional value ingredient.

Several attempts were made to create a new bread recipe aligned with their product parameters using BSG in its wet form. All these experiments failed however, as the gluten network deteriorated, not allowing for completion of the fermentation process. Panelto Foods concluded the only feasible way to incorporate BSG would be as a flour form of spent grains. This would require dehydrating and milling.

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Project Outcomes:

1) St. Mel's Brewery developed a new recipe that replaced 15% of malt with surplus bread from Panelto Foods.

2) Panelto Foods experimented with BSG, a by-product from St. Mel's, as a new high nutritional value ingredient for their bread. While neither St Mel's or Panelto Foods encountered any additional production costs, the additional residue transformation costs raised the estimated cost of the final products disproportionately making it not viable economically.

However, both St Mel's and Panelto Foods believe that improved efficiencies associated with transforming larger volumes of production residues can make the industrial synergy commercially viable. Moreover, even a small material substitution of imported ingredients was deemed to be strategically important due to Brexit increasing costs.

IF COOKED DOUGH AS A MALTED GRAIN SUBSTITUTE WAS ROLLED OUT ACROSS ST MEL'S PORTFOLIO OF BEERS, IT COULD DELIVER A POTENTIAL ANNUAL REDUCTION OF 3% IN CO_2 EMISSIONS.

Next steps needed:

The barriers and enablers to take this work further have been identified by the pilot project. A sectoral approach is recommended to create economies of scale. As part of this project, Irish Manufacturing Research also developed policy recommendations to inform the scaling up of industrial symbiosis in Ireland.

For more on the EPA's Green Enterprise programme visit here
For more on the project see here