SymbioBeer —

How Industrial Symbiosis Transformed Bread into Beer

SymbioBeer Pilot Impacts

Industrial Symbiosis Demonstration between St Mel's Brewery & Panelto Foods, facilitated by IMR

- Limited edition beer "SymbioBeer Project#1" - Belgian Style Golden Ale - launched December 2020
- Estimated c.15 tons of virgin ingredients saved per year*
- Brewers Spent Grains (BSG) identified as a potential high value nutritional flour substitute
- Potential to divert 1000 tons of food residue annually to higher value applications**
- Estimated annual reduction potential of 3% CO_2e*

**if proportion of malted barley is substituted with cooked dough across St Mel's portfolio of beers*

***if substitution of malted barley is rolled out across St Mel's portfolio of beers and BSG is utilized as a partial substitute by Panelto Foods*

Barriers & Enablers identified in SymbioBeer Pilot

Barriers

Economics
- High-Volume By-Product with Low-Value
- Sectoral approach required to create economies of scale

Infrastructure
New equipment to transform by-products or new value chain partners required

Lack of Data
- Related to production requirements (quality required and quantity needed)
- Visibility of production residuals and availability in regions (demand and supply)

Standards & Regulatory Requirements
- BRC Global Standard for Food Safety
- Requirement to submit EPA By-Product Notification
- Traceability of Material Substitutes

Enablers

Geography
Close proximity enables collaboration & lower logistics costs

Operations
- High Technology Readiness Level
- Replication of international best practice

Agile Coordination
- Industrial Symbiosis Facilitation
- Tailored instruments & tools to support synergies

Scalable Substitutions
- Higher value applications to valorise by-products
- Mainstream substitution of by-products

Ireland's Brewing Sector (2019)

Significant sectoral opportunities exist to valorise BSG

- A market size of 2 Billions euros [1]
- 134 businesses [1]
- Job to 3076 people [1]
- 9322000HL/hectoliters [2]

Ireland's Bakery Sector (2019)

Significant sectoral opportunities exist to valorise cooked dough

- Market size 908 million euros [3]
- 903 businesses [3]
- A job to 6570 employees [3]

Circular Economy opportunity for Europe

- Potential to create c. 2 million jobs [4]
- 2-4% reduction in total GHG emissions annually [4]
- €700 billion in material cost savings [5]

Industrial Symbiosis Opportunity for Europe

- Potential for c.€73 billion in cost savings [6]
- Industrial symbiosis is a key part of a circular economy

Industrial Symbiosis Opportunities for Ireland

- **Dairy:** 538,000 tonnes of whey not currently being valorised [7].
- **Cement:** potential for alternative materials to substitute up to 85% of fossil fuel use in cement production [8].
- **Bioactives:** market estimated to be worth €7.9 billion by 2023 from €5.9 billion in 2018 [9].
- **Biobased chemicals:** EU market expected to reach €50 billion by 2030 [9].
- **Bioethanol:** Global Market expected to be worth €8 million by 2022 from €4.7 million in 2015 [9].

[1] Ibis World (2019) Irish beer production industry

[2] Statista (2019) Irish beer production

[3] Ibis World (2019) Irish bread and bakery goods production

[4] EREP (2014) European Resource Efficiency Platform: Manifesto and Policy recommendations

[5] EMF (2013) Toward the Circular Economy

[6] Domenech (2018) Cooperation fostering Industrial Symbiosis

[7] IFA (2020) Factsheet on Irish dairying

[8] Cement Manufacturers Ireland (2020) Alternative fuels

[9] Bio-Tic. (2015) A roadmap to a thriving industrial biotechnology sector in Europe

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More Info: https://imr.ie/pages/symbiobeer