The aim of the study was to highlight the benefits of sustainable practice for the micro-brewing industry, through the deduction of a sustainable, low-cost re-use of spent brewer’s yeast (SBY).

This is with the intention of nullifying the burden the disposal of surplus yeast has on the environment.

The feasibility of reusing spent yeast was investigated by completing a series of small pilot plant studies and the initiating of a network of breweries in the North East.

**OBJECTIVES**

- Optimise the drying of SBY on the prototype rig.
- Establish the suitability of surplus yeast as a by-product. This consists of moisture content, calorific value and cell inactivation analysis.
- Select a feasible area of by-product reuse whilst guaranteeing it’s sustainable, low cost, and has a long-term viability.
- Produce a survey in order to create a local network of microbreweries to share knowledge and best practice.

**METHOD**

A fractional factorial experimental design was made to optimize the prototype rig. After initial testing the factors of interest were temperature, drum speed and blade distance. The calorific value of a dried sample of SBY was found. Yeast was mixed with wort at 28°C to check for cell inactivation.

The moisture content (MC) was deduced for each experiment. This is achieved by weighing the SBY before and after placing it in an oven for 5 hours.

\[
MC = \frac{\text{Mass initial} - \text{Mass dried}}{\text{Mass initial}} \times 100
\]

**SURVEY FINDINGS**

- All the respondents disposed of their yeast waste down the drain.
- 50% of breweries are very concerned about the overall sustainability of their brewery.
- The main aim of improving the sustainability of their brewery would be to save costs.

**RESULTS**

The moisture content of the yeast was reduced from 79% to 55% for the optimised conditions. Table 1 shows the average moisture content found for the operating conditions.

The calorific value for the optimised conditions was 17.3MJ/kg, which is comparable to the soybean meal typically used for animal feed.

**Table 1 – Average moisture content results**

<table>
<thead>
<tr>
<th>Temperature/°C</th>
<th>Drum Speed/rpm</th>
<th>Blade Distance/mm</th>
<th>Average Moisture Content/%</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>0.4</td>
<td>2</td>
<td>56.1 ± 8.2</td>
</tr>
<tr>
<td>80</td>
<td>0.8</td>
<td>1</td>
<td>55.1 ± 6.0</td>
</tr>
<tr>
<td>77.5</td>
<td>0.6</td>
<td>1.5</td>
<td>62.0 ± 10.2</td>
</tr>
<tr>
<td>75</td>
<td>0.8</td>
<td>1</td>
<td>63.0 ± 7.7</td>
</tr>
<tr>
<td>80</td>
<td>0.8</td>
<td>2</td>
<td>60.7 ± 7.5</td>
</tr>
</tbody>
</table>

**REFERENCES**

