Heat energy requirements in commercial mushroom production in Ireland

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Introduction

Heat energy is a crucial element of the mushroom growing process. Energy consumption in mushroom production can be expressed in kWh per kg of mushrooms produced. Currently there are 41 mushroom production units in Ireland producing Agaricus mushrooms. The majority of these units are producing mushrooms in a polytunnel structure (plastic covered insulated tunnels) with only two farms growing in a modern facility as can be seen in the pictures below.

*Traditional Polytunnel Structure*

*Modern Mushroom Facility Structure*
**Benchmark**

Based on detailed analysis of mushroom farms heat energy requirements, Teagasc estimate the heat requirements on mushroom farms at **0.85 kwh/kg** of production based on an assessment across different farm types. This figure was calculated using estimates taken from current mushroom production facilities and is based on mushroom growing best practices being implemented which include crop sterilisation (cookout).

The estimate benchmark figure used takes into consideration the variety of different characteristics on mushroom farms in Ireland. These characteristics are categorised in the table below:

<table>
<thead>
<tr>
<th>Mushroom Farm Types</th>
<th>Mushroom type</th>
<th>White</th>
<th>Brown</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm Size (tons of compost filled per week)</td>
<td>0 - 100 ton</td>
<td>100 – 200 ton</td>
<td>200 ton +</td>
<td></td>
</tr>
<tr>
<td>Production Cycle</td>
<td>5 week (2 flushes)</td>
<td>6 week (3 flushes)</td>
<td>7 week (4 flushes)</td>
<td></td>
</tr>
<tr>
<td>Product Mix</td>
<td>Close cup</td>
<td>Flats</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heating requirements on mushroom units are for the following purposes:

- **Mushroom growth:** Growing mushrooms in tunnels/rooms within a 5-7 week growing cycle. During this period, air temperature will range from 16-22°C depending on the stage of the crop.

- **Cookout:** At the end of the growing cycle crops are steam sterilised to prevent cross contamination of viruses and diseases. This process takes up to 18 hours where by the room temperature is brought up to 60-70°C. Once the compost reaches the optimum temperature, the room temperature is maintained to ensure the compost is fully cookout. After cookout the tunnels are emptied, washed and disinfected. Growers may also cookout empty tunnels for 3-4 hours before filling the next crop to ensure the tunnel is adequately sterilised.