Mussel meal manufacturing using a lysis process
or
Baltic mussel meal – a technical presentation

Odd Lindahl
The Royal Swedish Academy of Sciences
The possible uses of mussels

- Market
- Food
- Feed
- Biogas?
- Fertilizer
- and energy

Illustration: Maj Persson
The possible uses of mussels

**Market**
- Very small market for Baltic seafood mussels

**Food**
- Food

**Feed**
- Feed

**Fertilizer and energy**
- Fertilizer
- Biogas?

The use of mussels as fertilizer or for energy is a waste of valuable marine protein.

Illustration: Maj Persson
Steamed and pealed mussel meat is a high quality product for mussel meal production, but is expensive and energy demanding to produce. Consequently, the mussel meal will be too expensive on the feed market.
An alternative method to steaming has been developed. This method which is more suitable for making mussel feed liquifies the mussel meat. Further, it is cheaper and less energy consuming compared to steaming. The possibility of competing with fish meal is therefore greater.
Pilot plant for manufacturing mussel meal

Location: Ellös, Sweden
Project period: 2009 – 2013
Capacity: ca 500 kg fresh mussels per 24 h
Technique: rotating drum dryer
The products will, besides the meal, contain a certain amount of crushed mussel shells. The content of shell pieces will be large when fragile Baltic mussels are processed.
Mussel meal manufacturing using a drum dryer

Input

Drying through heating and agitation

Dry meat and shells

Sorting and separation

Dry shells with some dry meat

Mussel meal with shell pieces
After two years Baltic mussels are small and fragile.
Processing Baltic (Åland) blue mussels

Åland mussels before being processed

Åland mussels after being processed - a lot of shells
Mussel meal manufacturing using a lysis process (patent pending)

- Cracking
- Lysis through heating and agitation
- Draining of suspension
- Heating and drying
- Mussel meal of high quality
- Dewatering and separation

Inventor: Odd Lindahl
odd@kva.se
Pilot mussel farm at Kämpinge, Åland, October 2012
Kumlinge mussels, december 2012

Size distribution (n = 7)

<table>
<thead>
<tr>
<th>5-10</th>
<th>10-15</th>
<th>15-20</th>
<th>20-25</th>
<th>25-30</th>
<th>&gt;30</th>
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<td>10</td>
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<td>30</td>
<td>10</td>
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<table>
<thead>
<tr>
<th>After cooking</th>
<th>After drying</th>
<th>After burning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat %</td>
<td>Shell %</td>
<td>Meat %</td>
</tr>
<tr>
<td>17,3</td>
<td>35,3</td>
<td>4,0</td>
</tr>
</tbody>
</table>

Ca content in dry shells = 35 %
Trials making mussel meal of Zebra mussle (*Dreissena polymorpha*).
Technical summary of mussel feed production:

- Possible to use small and fragile mussels of Baltic origin
- The mussel meal is of high quality
- Mussel meal can be used in feed for a number of mono-gastric animals
- Mussel shells (Ca), astaxanthin and micro-nutrients are added values
Next upward step in producing mussel meal

Next step will be to scale up from pilot scale (0.5 ton/day) to a small factory of e.g. 10 ton/day with a production process based on lysis.

Such a factory will manufacture about 200 kg mussel meal/day (enough for about 10,000 egg-laying hens).

Most likely, this will require that nutrient trading schemes are put in action in order to lower the price of the feed mussels. Otherwise the mussel meal will be too expensive on the market.
Mussel farming – a win-win measure for environment, society and industry.

Thank you for attention!