Keynote Address

Dr. Pearse Lyons
Alltech
Dr. T. Pearse Lyons is the founder and president of Alltech, a leading animal health company, employing more than 5,000 people in 120-plus countries. Founded in 1980 with $10,000 capital, the company has grown to annual sales of $2.1 billion.

Dr. Lyons is widely recognized as an innovative industry leader. His scientific expertise and acute business sense helped revolutionize the animal feed industry through the introduction of natural ingredients to feed.

Now in its fourth decade of business, Alltech improves the health and performance of people, animals and plants through natural nutrition and scientific innovation.

An native of Ireland, Dr. Lyons recently opened Pearse Lyons Distillery at St. James in Dublin with his wife, Deirdre. He has two children, Mark and Aoife.
We know the facts

It is a
• world of openness
• world of community
• world of shifting population
China
- End of one child policy

India
- Soon to be the most populous country

Decreasing birth rates
- Japan
- Europe
World of uncertainty

EU
Migrant issue
Tax harmonization

US
Trump: challenges
UN Trade Agreement

Korea
“Rocket Man”

Global warming
Water shortages
Shortages of resources
Yet
People still have to be fed
We must not waste
What source of protein is most efficient?
## Animal production

<table>
<thead>
<tr>
<th>Animal</th>
<th>Protein retention</th>
<th>Energy Retention</th>
<th>Edible Yield</th>
<th>Feed Conversion Ratio (FCR)</th>
<th>Edible Meat pr 100 kg fed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken</td>
<td>21%</td>
<td>10%</td>
<td>46%</td>
<td>2.2</td>
<td>21 kg</td>
</tr>
<tr>
<td>Pig</td>
<td>18%</td>
<td>14%</td>
<td>52%</td>
<td>3.0</td>
<td>17 kg</td>
</tr>
<tr>
<td>Cow</td>
<td>15%</td>
<td>27%</td>
<td>41%</td>
<td>4-10</td>
<td>4-10 kg</td>
</tr>
</tbody>
</table>

Dr. Oynind Fylling-Jensen, CEO, Nofima AS
Aquaculture production is highly resource efficient

<table>
<thead>
<tr>
<th>Metric</th>
<th>Chicken</th>
<th>Fish</th>
<th>Pig</th>
<th>Cattle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein retention</td>
<td>21%</td>
<td>31%</td>
<td>18%</td>
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</tr>
<tr>
<td>Energy Retention</td>
<td>10%</td>
<td>23%</td>
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</tr>
<tr>
<td>Edible Yield</td>
<td>46%</td>
<td>68%</td>
<td>52%</td>
<td>41%</td>
</tr>
<tr>
<td>Feed Conversion Ratio (FCR)</td>
<td>2.2</td>
<td>1.1</td>
<td>3.0</td>
<td>4-10</td>
</tr>
<tr>
<td>Edible Meat pr 100 kg fed</td>
<td>21 kg</td>
<td><strong>61 kg</strong></td>
<td>17 kg</td>
<td>4-10 kg</td>
</tr>
</tbody>
</table>
So, we are in the right business!
Where is aquaculture growing?
Right Area?
Where are the aquaculture regions?

88.8% in Asia/China
Aquaculture

74M tonnes aqua business

Captured fish: 94M tonnes
Aquaculture is growing

But...
Is it sustainable?
Problems facing aquaculture and captured fish

- DHA levels dropping
- Fish mislabeled
- Safety of fish
- Plastics & Dioxins
- Transparency
- Marketing
Confusion
Salmon
$5 kilo vs. $15 kilo

Smoked Scottish Salmon vs. Scottish Smoked Salmon
Are we transparent?
Is it really sea bass?
Are we truthful
Others using what was “your unfair advantage”
NUMBER OF SERVINGS TO MEET RECOMMENDED WEEKLY DHA INTAKE

Impact of sustainable feeds on Omega-3 long chain fatty acid levels in farmed Atlantic Salmon, Sprague et al, Scientific reports Feb 2016

Twice as much!
Have we missed the point?
Functional Foods Enriched with DHA
DHA consumption and cognitive function

Dr. Mongkol Kaewasutas
# Reaction Time

## Effect of Consumption of 2 DHA Eggs for 8 weeks

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Experiment DHA Egg</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHA consumed mg/day</td>
<td>51.8</td>
<td>278</td>
</tr>
<tr>
<td>Reaction Time (milli sec)</td>
<td>486</td>
<td>380</td>
</tr>
</tbody>
</table>

Dr. Mongkol Kaewasutas 2017
why?
Trends in Modern Salmon Feed Formulation

After Tacon & Metian

2010
2015
2020

Vit & Min
(Always 0.5%)

Starch

Fish Meal

Alternative Protein

Fish Oil

Vegetable Oil

26%FO / 74%VO

2008
The fish are changing
Opportunities

Pollution
More efficiency
Safer
Transparent
Diseases (sea lice)