SUSTAINABILITY AND ENVIRONMENTAL IMPACTS OF FEED ADDITIVES

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You are feeding the world successfully
Humans are winning the battle for food security

- People in chronic hunger conditions decreased from 25% (in 1992) to 12% (in 2015)
- Life expectancy went up from 52 (1960) to 71 years (2014).
- More population, more food and a higher life expectancy

Urban population requires more efficient food production

Source: http://www.unicef.org/sowc2012/urbanmap/
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2030
2050 global demands & constraints

Demand

+70% Agricultural production

+110% cereals
+140% soybeans
+135% meat

Source: Rabobank, 2012; Mensbrugghe, D. van der, et al., 2009; FAO 2006
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Water unevenly distributed around the world

Biofuels versus feedstock conflict

Soil productivity decrease affecting yields

Crop yields grow at slower rates

Limited carrying capacity of vital ecosystems

Emissions from agriculture & need to reduce

Land availability & fertilizers

Urbanization & rising incomes & more demand for meat & cereals

Achieving the genetic potential of crops & animals

Animal & crop diseases & impact on productivity

Source: Rabobank, 2012; Mensbrugghe, D. van der, et al., 2009; FAO 2006
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Protein consumption is linked to GDP

Strong correlation between protein consumption and GDP; growth in protein comes from emerging markets

Source: USDA 1990-2013, EIU, BCG analysis
We should act now:

- Good quality nutrition is a human right and ending hunger and malnutrition within planetary boundaries is the next step in our civilization.
- So consumption has to change.
We should act now:

- But we have to change the way we produce food as well.
A sustainable food production system...

- has to have a positive impact in the wellbeing of People
- has to be able to generate Profit for the producer
- has to have a low impact on the ecology of the Planet
Animal proteins are important in a healthy, nutritious diet

- A healthy, nutritious diet is fundamental to our physical, mental and economic wellbeing.
- Protein is a key part of a healthy, nutritious diet, and should account for approximately 10-15% of our daily intake.
- The food we get from animals (meat, fish, eggs and dairy) usually has a more complete amino acid profile, and they are seen as ‘high-quality proteins’.
Animal proteins are important in a healthy, nutritious diet

- Animal food sources supply all of the essential amino acids and are an important source of micronutrients (vitamins and minerals) and omega-3 poly-unsaturated fatty acids.

- Animal food sources have been an essential part of food cultures globally for a long time and many people enjoy the texture, the taste and the culture around it.

- Today, the amount of meat, eggs, milk, and fish that the average consumer eats has never been higher.
Feed additives contribute directly to 6 of the 17 sustainable development goals of the UN

1. No Poverty
2. Zero Hunger
3. Good Health and Well-being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reduced Inequalities
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land
16. Peace, Justice and Strong Institutions
17. Partnerships for the Goals

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What are feed additives:

EU: ‘feed additives’ means substances, micro-organisms or preparations, other than feed material and premixtures, which are intentionally added to feed or water in order to perform a specific function related to a particular target.
1. Complementing feed formulations, correcting inadequacies

Productivity & drive to reduce FCR

Industry is focused on reducing FCR via feed technology, improved husbandry, improved digestive health and improved bio-security

Vitamins Trace minerals Aminoacids B-Carotene

Reduction of feed and food production cost and increased availability

Improvement of the welfare and life span of productive animals

Higher efficiency in the use of resources

Reduction on the arable land needed per unit of animal protein
2. Improved digestibility and reduced nutrient excretion

Use of enzymes reduces FCR, feed cost and environmental impact
Protease use not only reduces the level of dietary protein needed, but also reduces digestive issues and leads to improved welfare

**Phytase Carbohydrase Proteinases Emulsifiers**
Protease use not only reduces the level of dietary protein needed, but also reduces digestive issues and leads to improved welfare

Phosphorus is a finite resource. Unlocking plant bound phosphorus through the use of phytase has reduced feed costs and environmental impact of animal production

What would happen if we replaced Mono Calcium Phosphate (MCP) with RONOZYME® HiPhos in the 200 million tons of pig feed consumed each year?
- It would decrease CO₂ emissions by 1.3 million tons per year, that’s like taking approximately 500,000 cars off the road
- It would reduce consumption of scarce rock phosphate resources
- It would reduce algae bloom by reducing phosphorous emissions from manure into lakes and rivers
- It would reduce energy consumption in production

Increase efficiency in the use of resources like energy, water, grains and vegetable proteins
Reduction of CO₂ and NH₃
Reduce the risk of over-fishing by increasing the availability of responsibly produced nutritious fish. Reduction of P pollution in fresh water sources
Reduction on the arable land needed per unit of animal protein
3. Improved gut function

**Eubiotics Acidifiers**
Increased animal productivity, digestibility and reduced use of antibiotics

- Essential oil compounds interact with cell wall receptors in the pancreas and stimulate increased secretion of key digestive enzymes including lipase, amylase and trypsin
- Other essential oils attack the cell walls of specific classes of bacteria, making the cell wall more permeable, making it easier for benzoic acid to enter the cell
- Benzoic acid enters the bacterial cell and disrupts cell function by reducing the pH in the cell, depleting cell energy reserves

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**Reduction in the use of antibiotic growth promoters**

**Healthier animals and therefore increased welfare**

**Reduce the risk of overfishing by increasing the availability of responsibly produced nutritious fish, lower mortality.**

**Reduction on the arable land needed per unit of animal protein due to increased nutrient utilization**

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**DSM**
**BRIGHT SCIENCE. BRIGHTER LIVING.**
4. Reduction of green house gasses

Reducing emissions through Clean Cow technology

Methane Reducing agents

A cow emits 500l of methane per day, which is equivalent to 10% of the energy she would otherwise use for performance and milk production.

95% methane

Feed 20kg/day

CH₄ (Methane) → CO₂ + H₂ → Acetate → Propionate → Butyrate

5% methane

Energy for milk and performance

Reduction on the use of resources needed to produce milk

Reduction of green house gas emissions by unit of milk produced

Reduction on the arable land needed per unit of animal protein due to increased feed efficiency

Methane Reducing agents

Feed 20kg/day
5. Precision feeding to achieve a particular food product characteristic

Vitamins Trace minerals Carotenoids Ω3 and DHA

Sustainable Animal Production
Closing the resource gap sustainably

- Project Green Ocean - addresses the shortfall in the availability of EPA & DHA from the planet’s finite fish oil resources.
- Replaces finite natural resources
- Marine algal EPA + DHA oil
- Enables continued growth of aquaculture
- Maintains health benefits of oily fish

The leading solution to:
- Solving the issue of finite fish oil resources
- Support the growth of global aquaculture
- Maintain the consumer health benefits of salmon

Enriched animal (milk, eggs and fish) for a better nutrition

Increase shelf life of meat, eggs and fish, attractiveness

Reduce the risk of overfishing by increasing the availability of responsibly produced nutritious fish
We should act, measure and communicate to farmers, consumers and agencies!

Over the last 50 years:
- 50% increase egg production
- 50% smaller environmental footprint

Source: eggfarmers.ca
So what can you do?

Keep providing a nutritious diet to the world population. Produce food using the proper feed additives:

- It generates **Profit** for you
- It has a low impact on the ecology of the **Planet**
- It will have a positive impact in the wellbeing of **People**