

Aquafarm Italy 2020

Evolution of feed evaluation for aquaculture, towards net energy and the 4th P, Planet.



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The 3 P's



Palatability

- Taste
- Max feed intake
- Feed properties



Performance

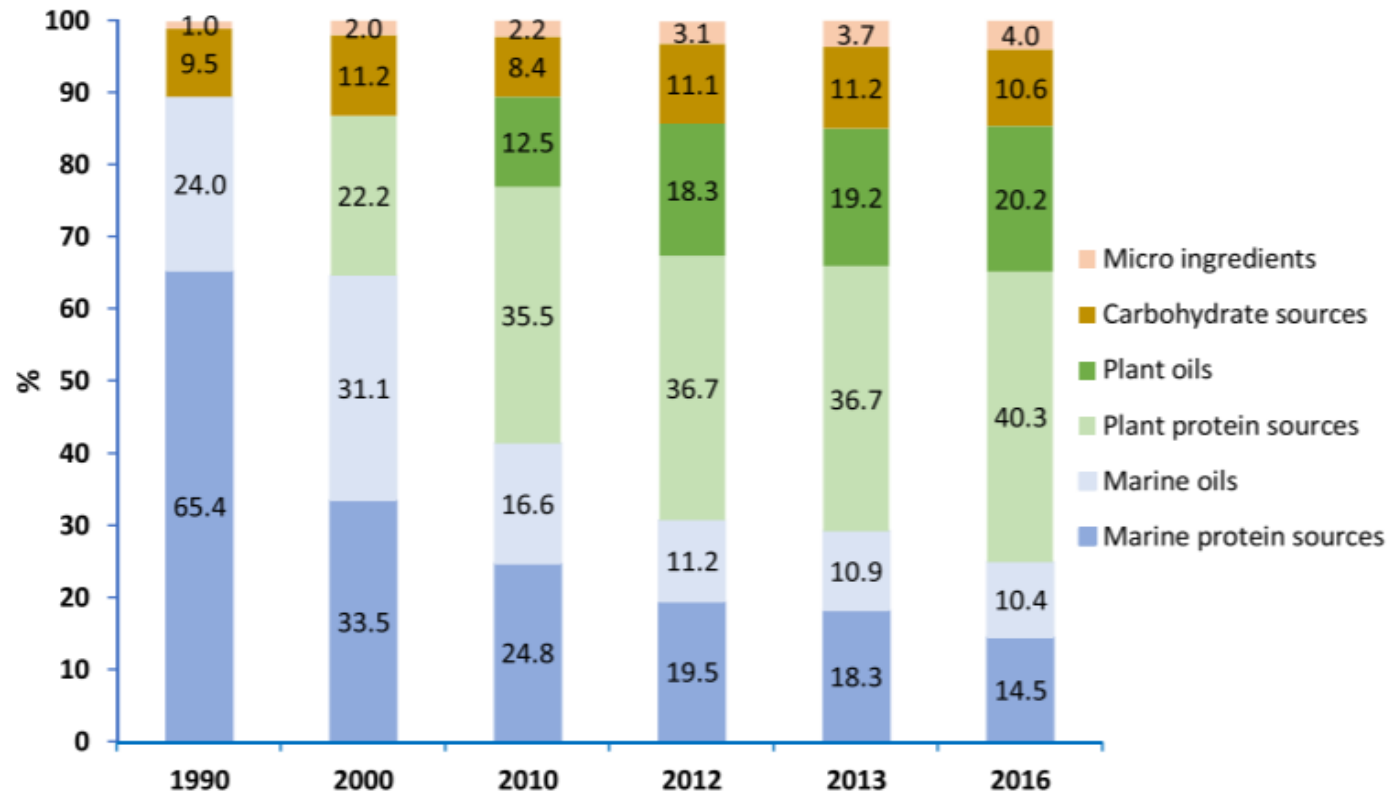
- Protein
- Energy



Pollution

- Feaces quality
- Discharge
(Nitrogen and phosphorus)

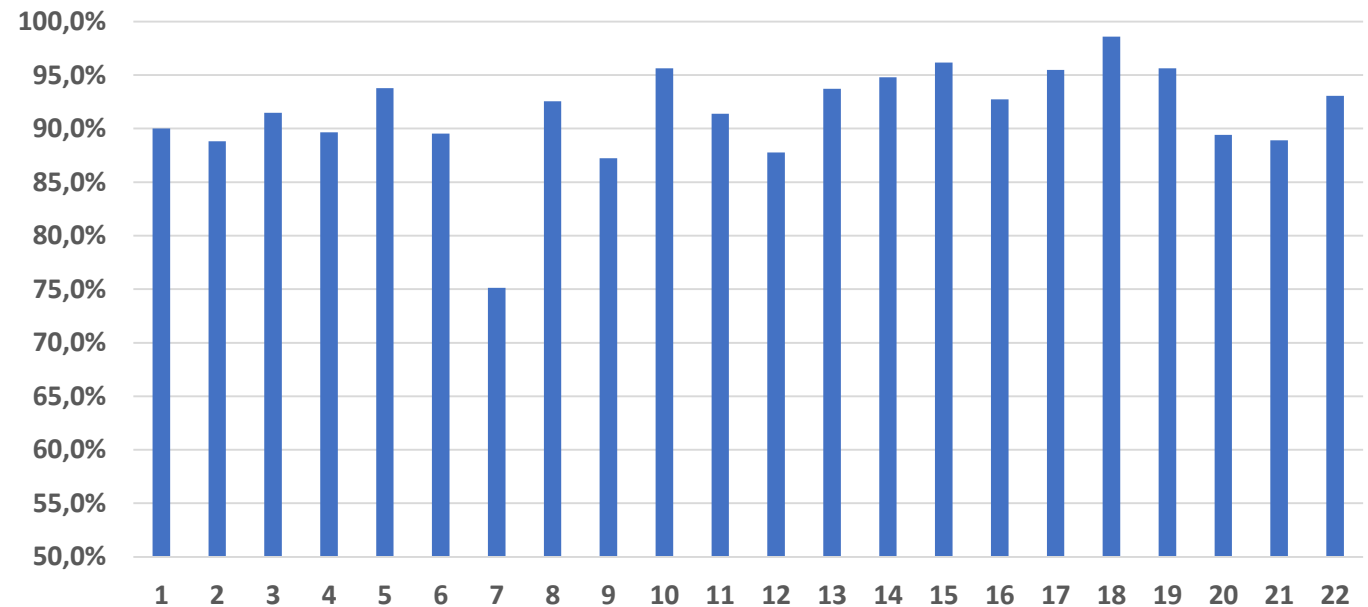
Evolution of raw materials used for feed in aquaculture



Differences in digestibility of raw materials



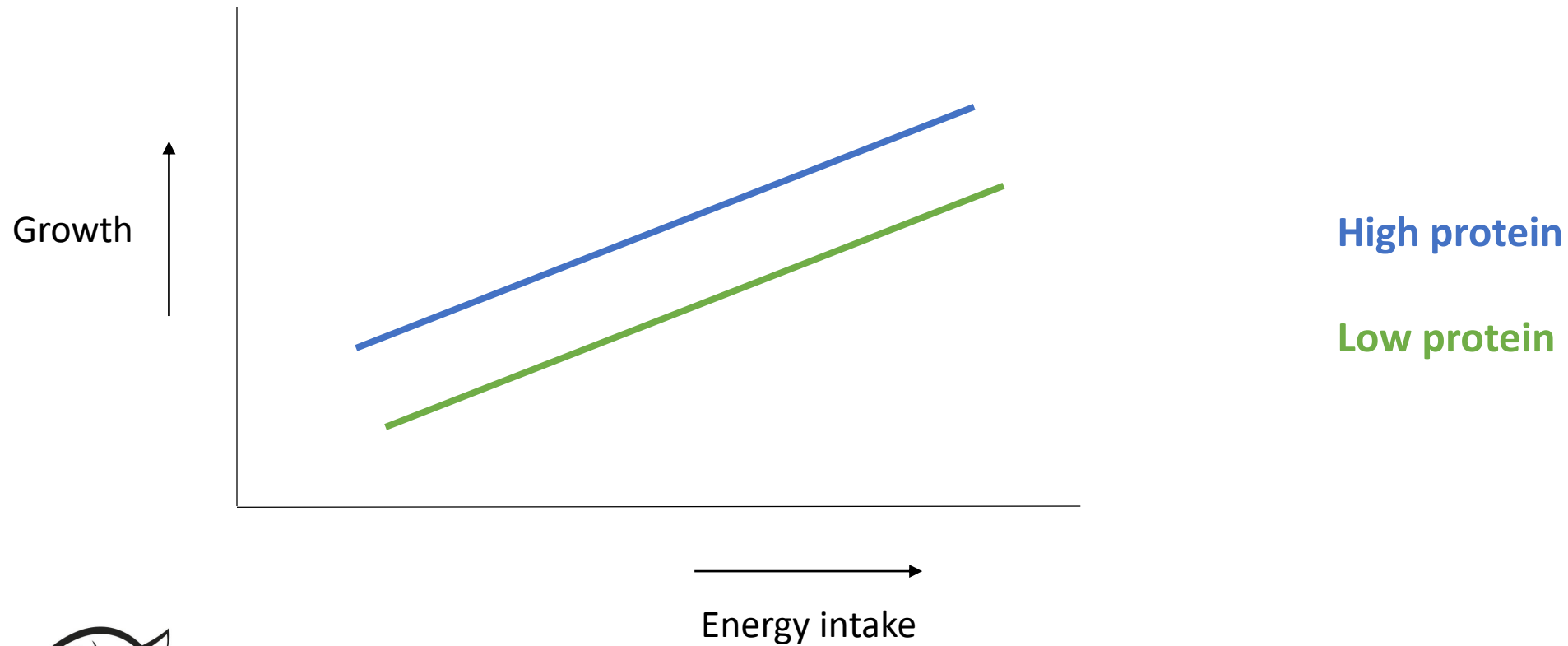
Protein digestibility of different raw materials



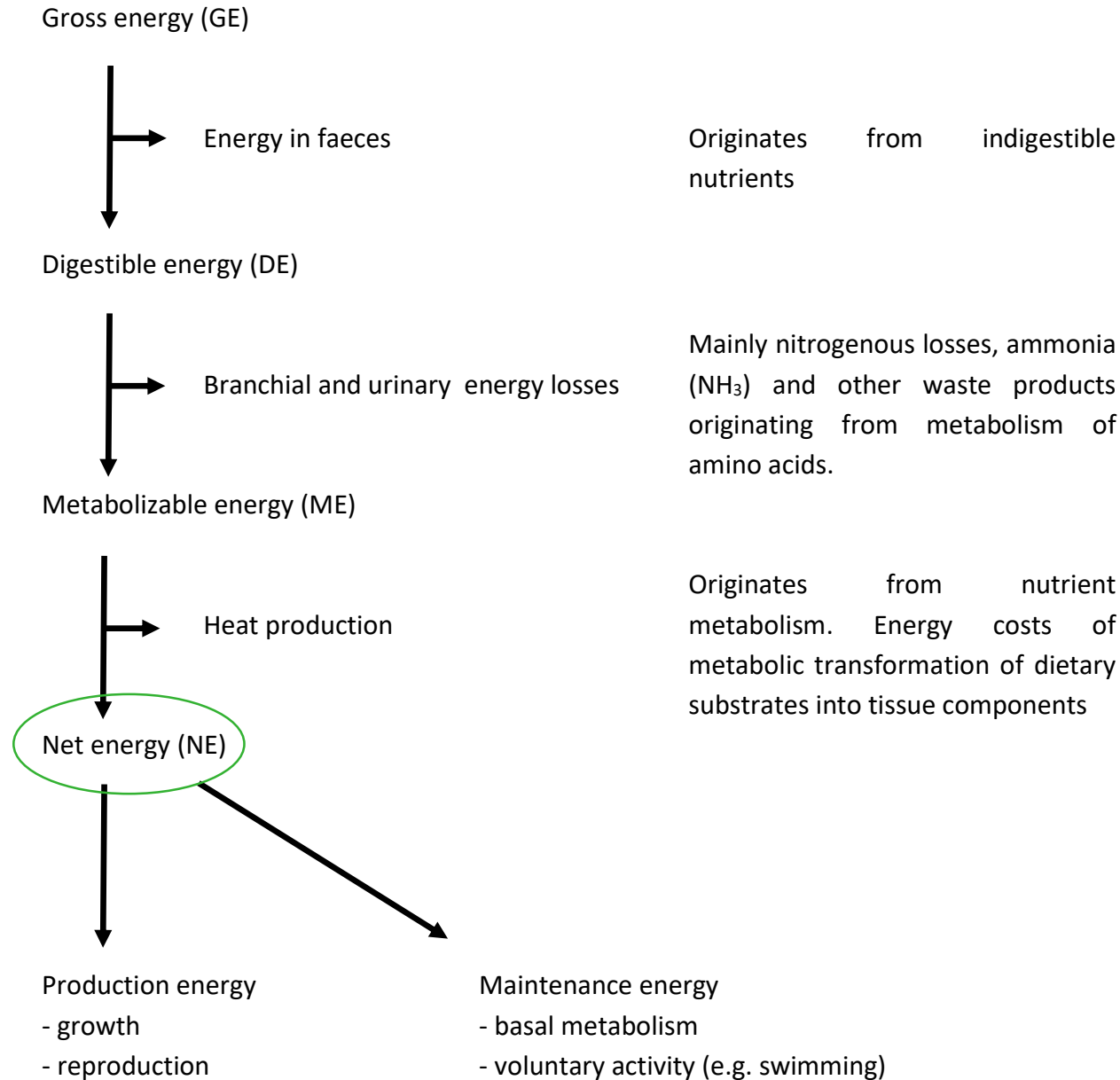
Change on view on the use of raw materials

In the past
Protein
fat
fishmeal
fishoil

Performance is based on available protein and energy



Flow of energy



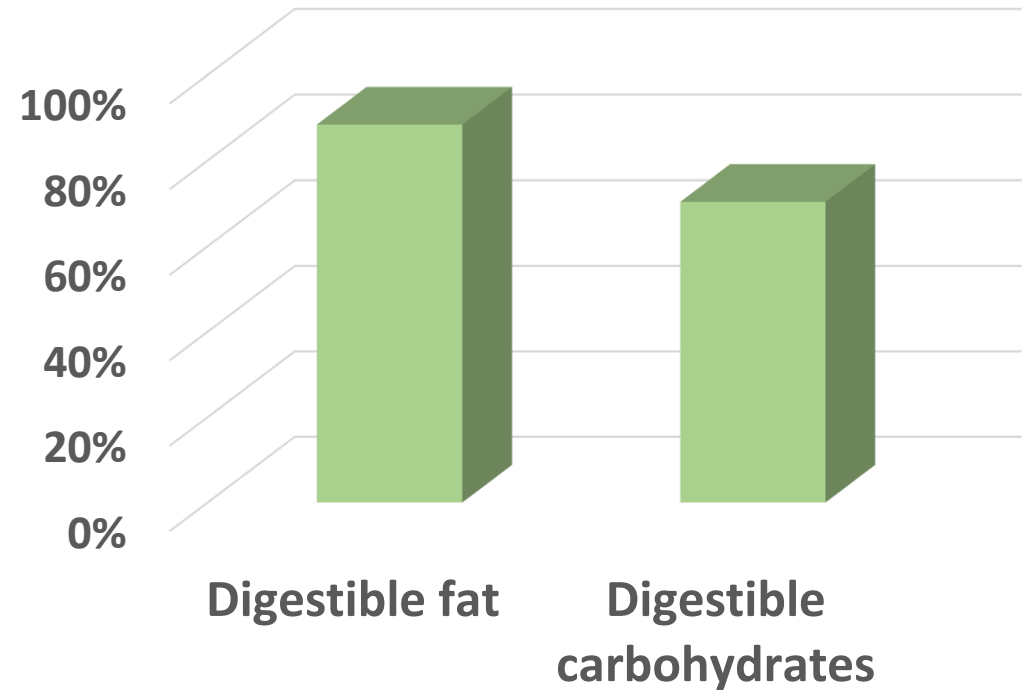
Digestible versus Net energy

Energy comes from

- Protein
- Fat
- Carbohydrates

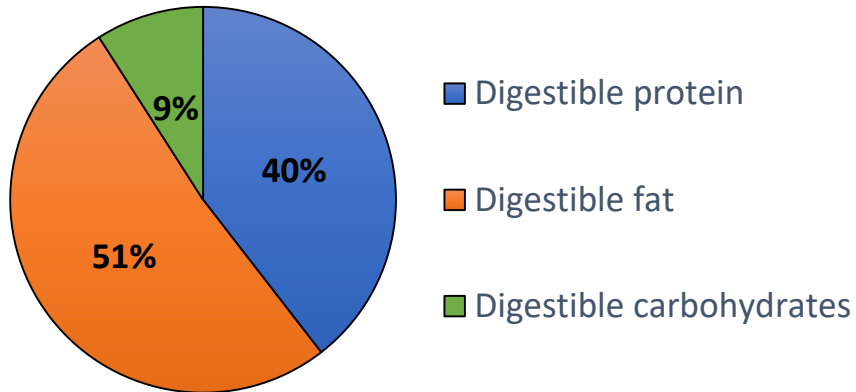
But the utilisation of these macronutrients differs

Utilisation of different digestible macronutrients in %

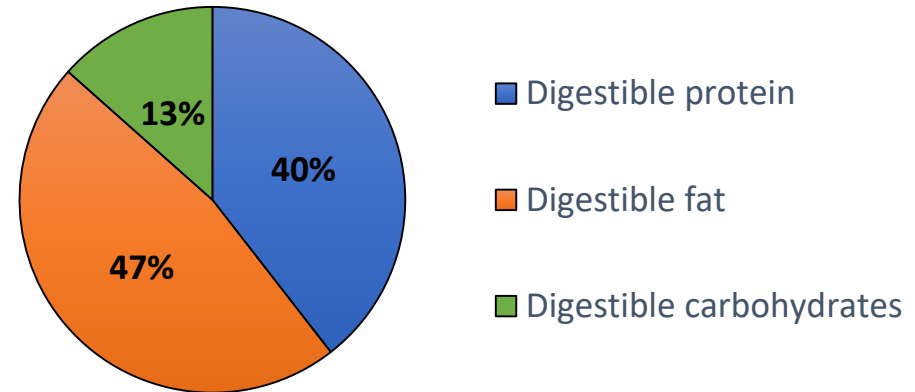


Proportion of energy can affect available energy

Proportion of energy in a high energy fish diet 1



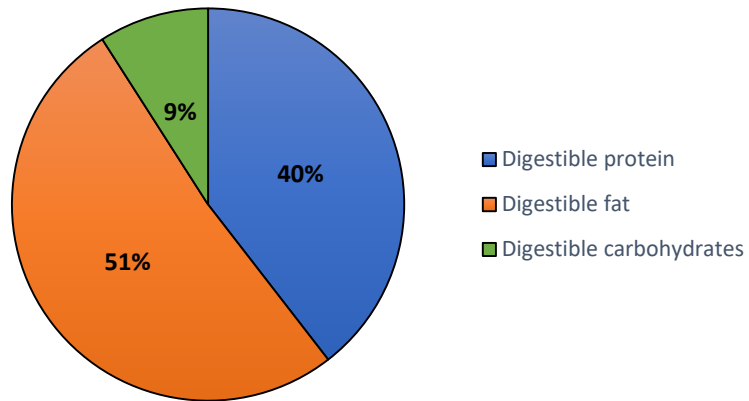
Proportion of energy in a high energy fish diet 2



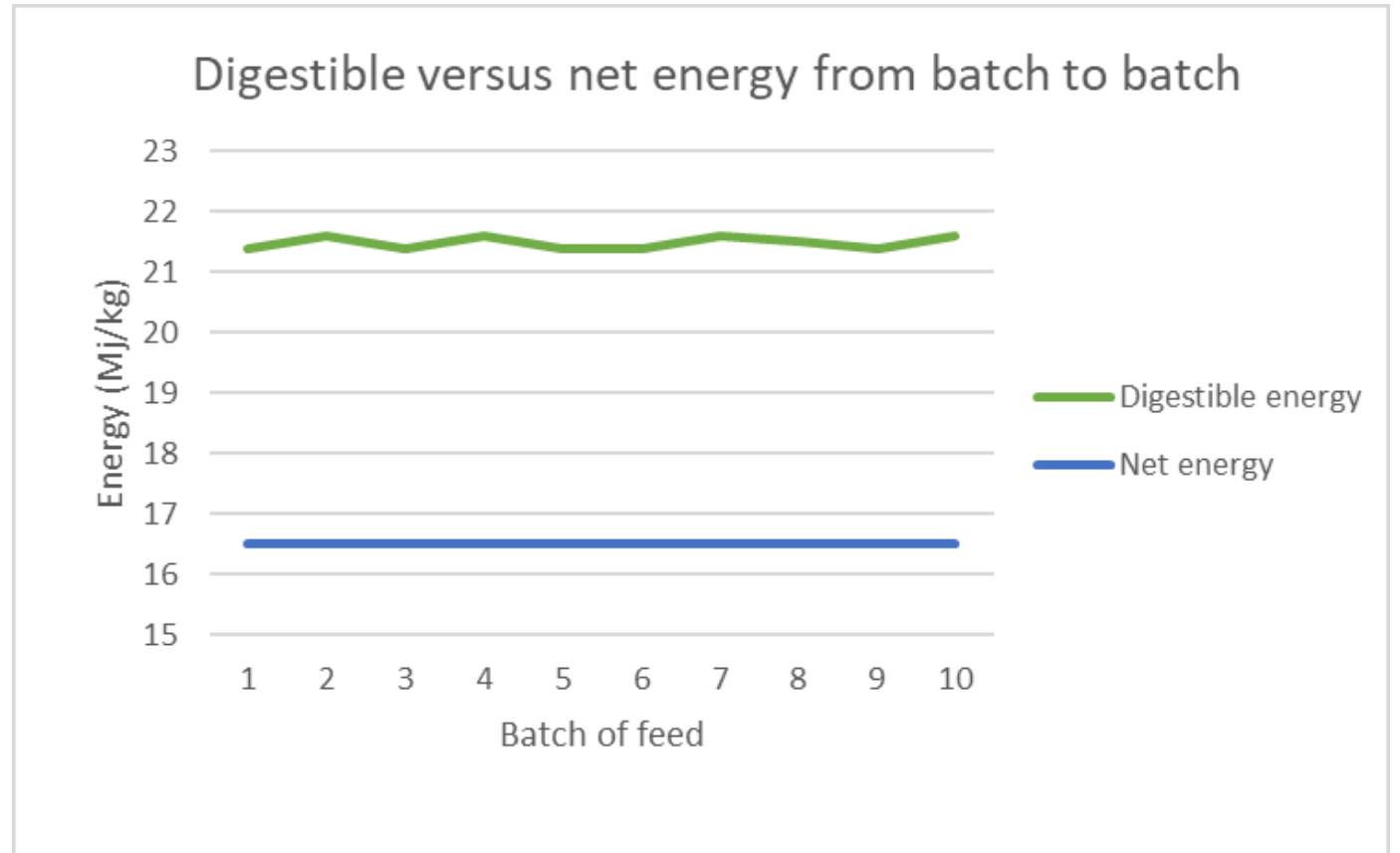
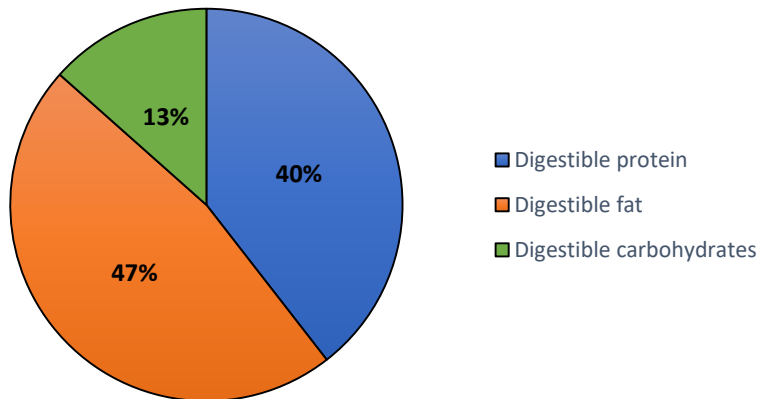
	Diet 1	Diet 2
Digestible energy (MJ/kg)	21,6	21,6
DP/DE ratio	17,7	17,7
Net energy (MJ/kg)	16,5	16,3
DP/NE ratio	23,2	23,4

Proportion of energy can affect available energy

Proportion of energy in a high energy fish diet 1

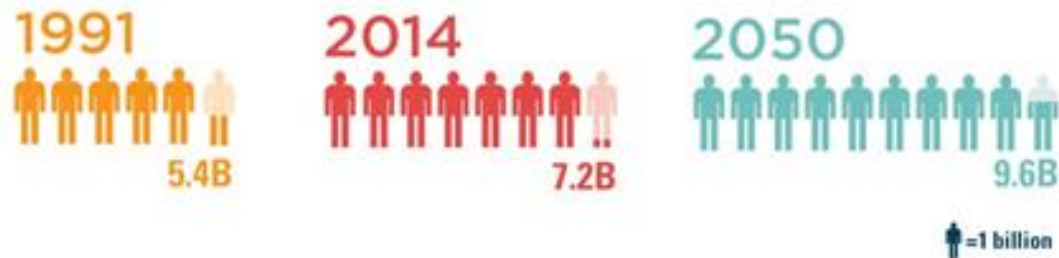


Proportion of energy in a high energy fish diet 2



“It will become a necessity not a luxury”

Global food production must
INCREASE 100% BY 2050
to meet our growing needs



Animal protein production responsible for:

- 15 % Greenhouse gasses
- 33 % Land use
- 33 % Nitrogen and Phosphorus
- 8 % Drinking water

Planet

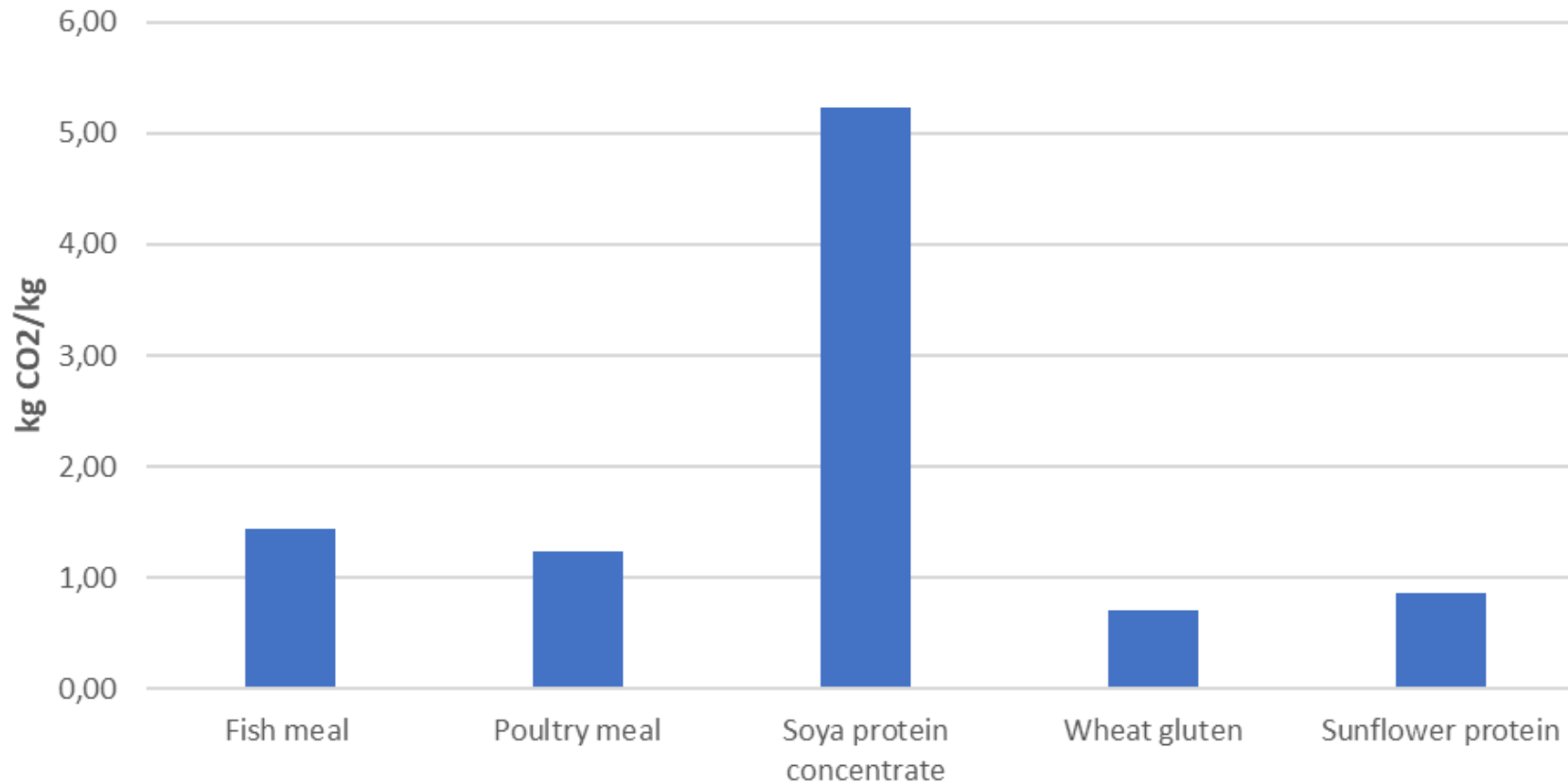
Carbon footprint

Life Cycle Assessment (LCA)

- Material input
- Energy input
- Emission
- Land use
- Co-products
- Waste



kg CO2/kg from different raw materials



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Sustainability is more than carbon footprint





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Planet of Plenty™

helping farmers to feed the world, raise healthy animals, and protect the environment through nutritional innovation.



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Performance

- Digestible protein
- Net energy



Pollution

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- Discharge (Nitrogen and phosphorus)



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