



Rearing system (RAS) based feeds: aquaculture nutrition and beyond

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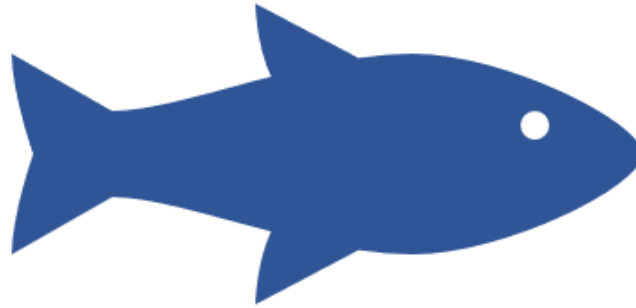
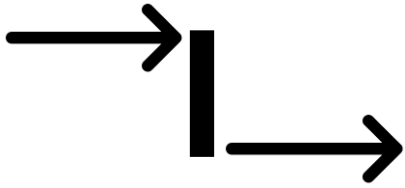
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Why we need specialised feeds for RAS?

Feed is the common input affecting both fish production and system performance

Flow-through system



Re-circulation system



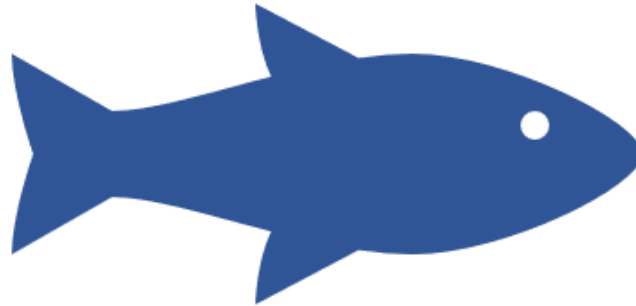
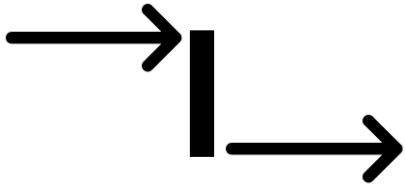
Does the **REARING SYSTEM** change,

-> the nutrient requirement of a fish species?

-> nutrient supply through feed?

No

Flow-through system



Re-circulation system



Does the **FEED** change,

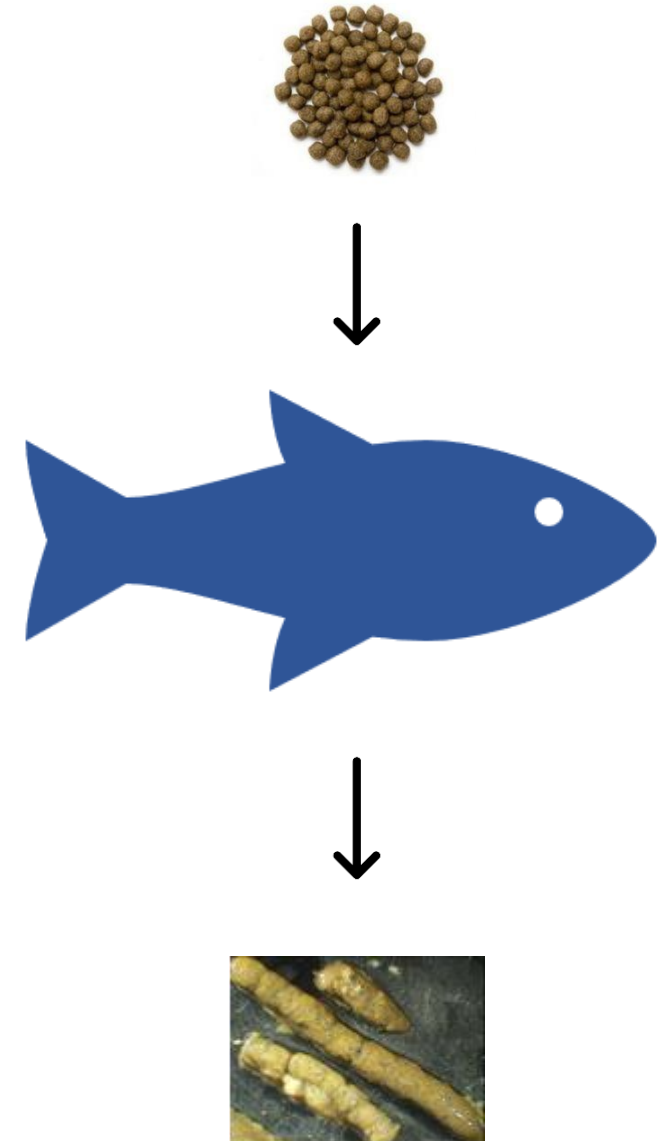
-> the dynamics of a rearing system?

-> operational efficiency of a re-circulation system?

Yes

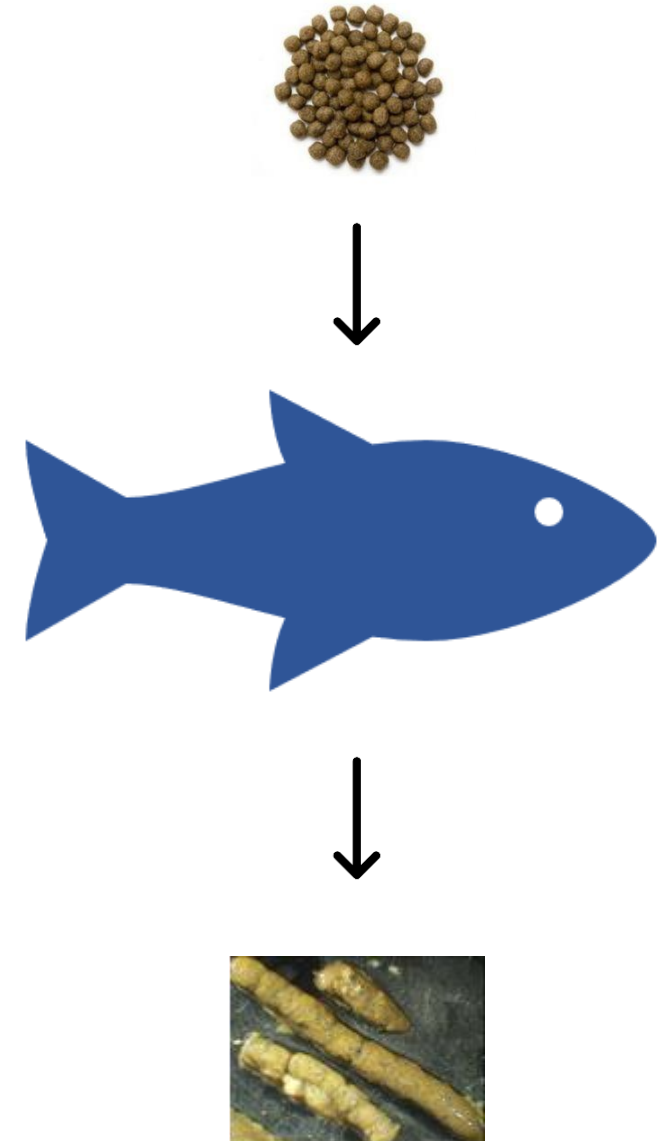
more than just fish production...

the role of feed extends beyond fish production and interacts with system management by affecting faecal production and characteristics

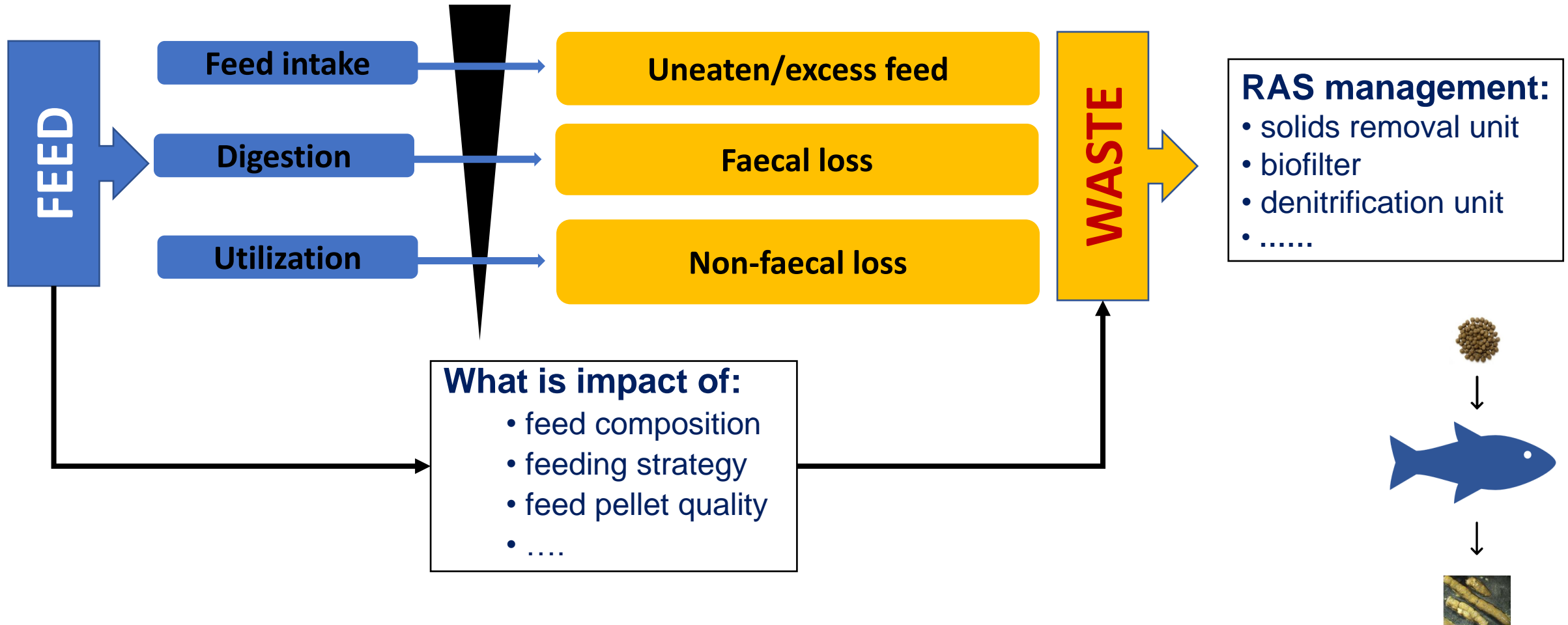


Feed-Fish-Faeces axis

It is therefore important to understand 'FFF' axis to formulate appropriate feeds and better manage a re-circulation aquaculture system.



Feed-Fish-Faeces axis



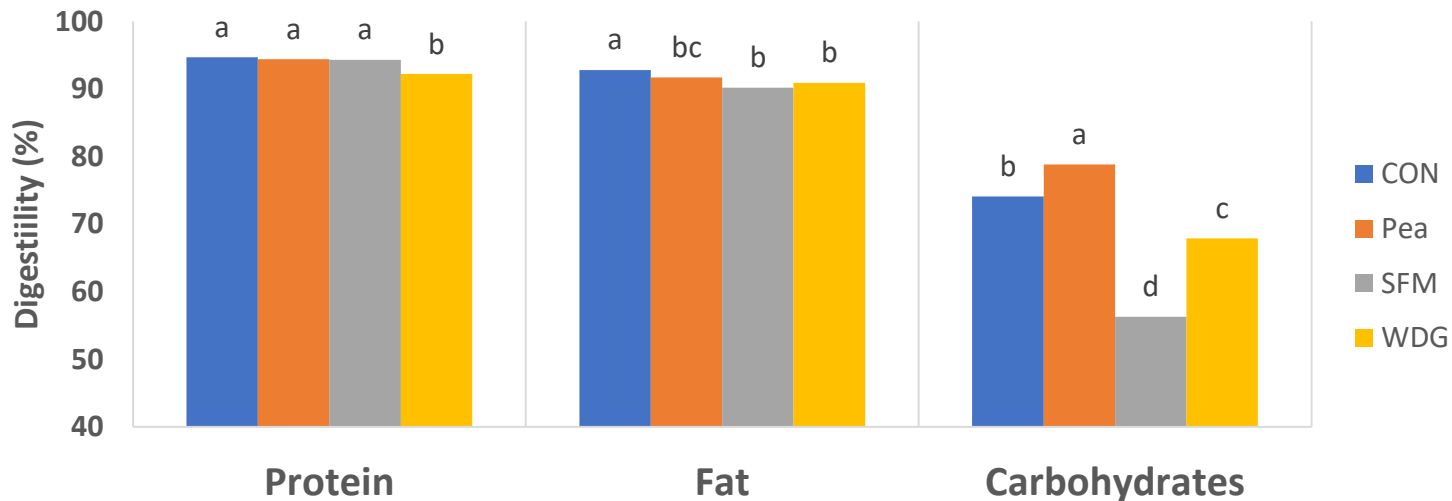
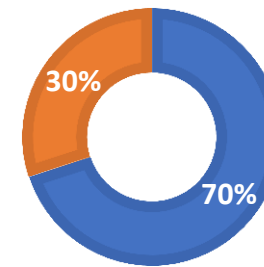
Feed composition – digestibility – solids removal in RAS

- Every feed ingredient has specific properties which can alter the characteristics of fish faeces
- Generally not taken into consideration during feed formulations
- Changing a single ingredient to a basal mix can bring about major changes in system operation

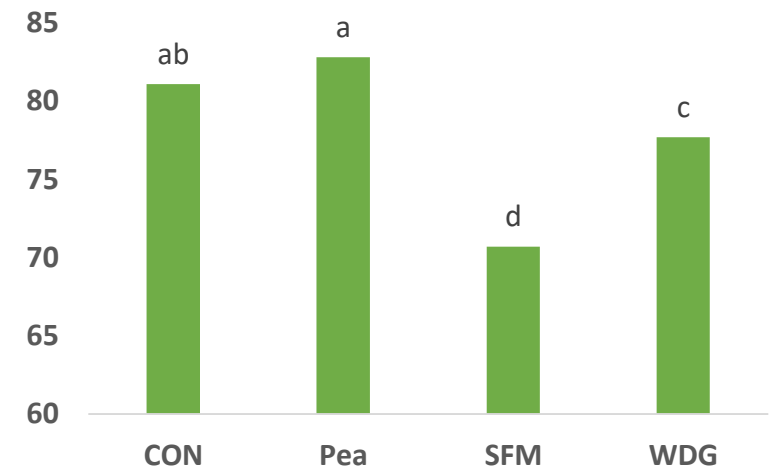
Feed composition – digestibility – solids removal in RAS

1. Control (basal mix)
2. Starch (field peas, PEA);
3. Insoluble non-starch polysaccharides, NSP (sunflower meal, SFM);
4. Soluble NSP (wheat dried distillers grain with solubles, WDG)

■ Basal mix ■ Test ingredient

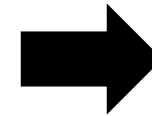
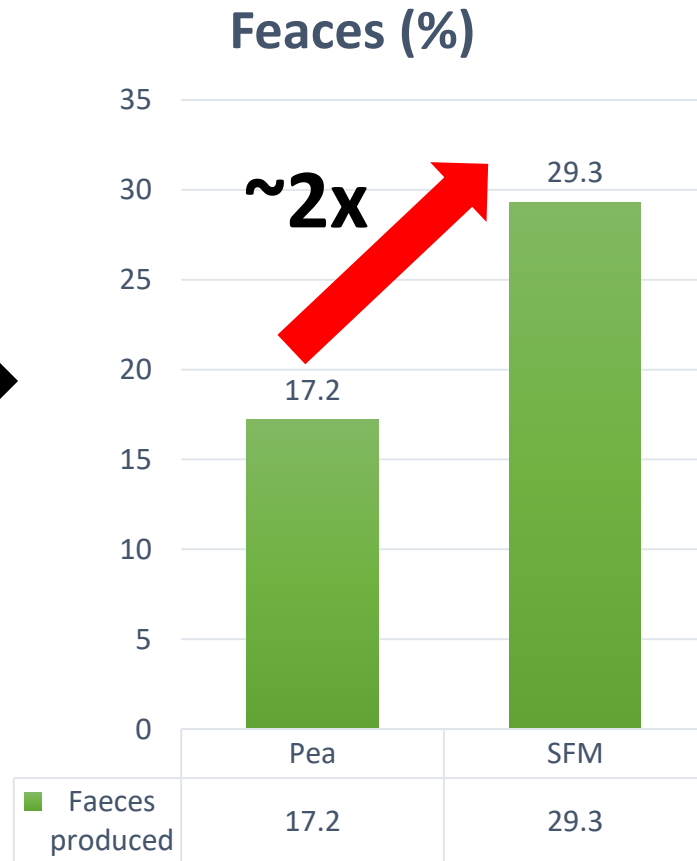
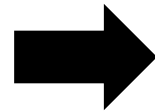
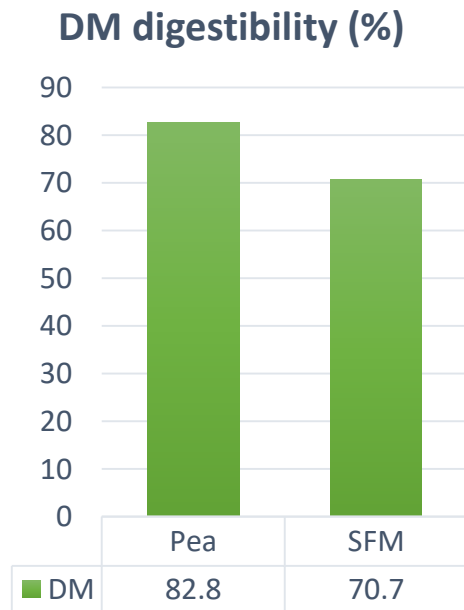


Dry matter digestibility (%)

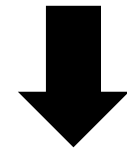


Pooled SEM, 0.41; ANOVA, P<0.001.

What does a decrease in DM digestibility mean to the RAS system?

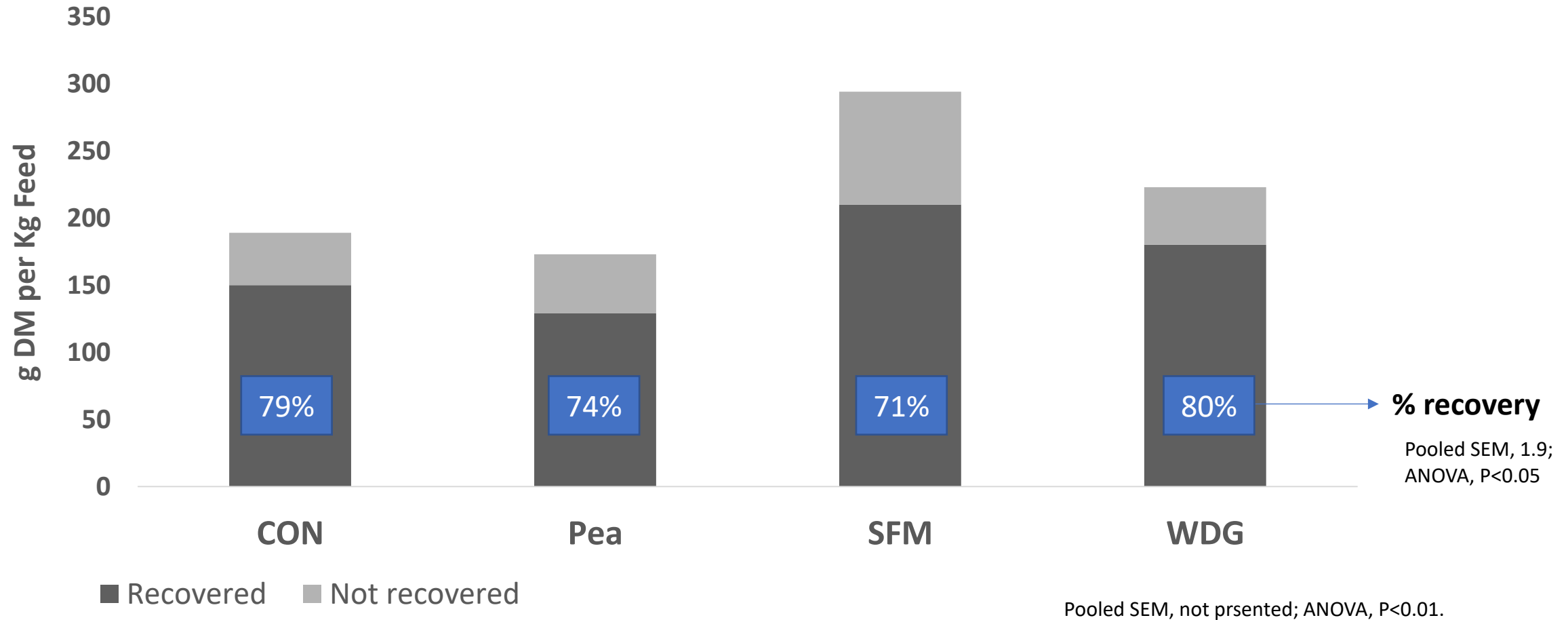


Nearly two-fold increase in solid waste to be removed at the drum filter

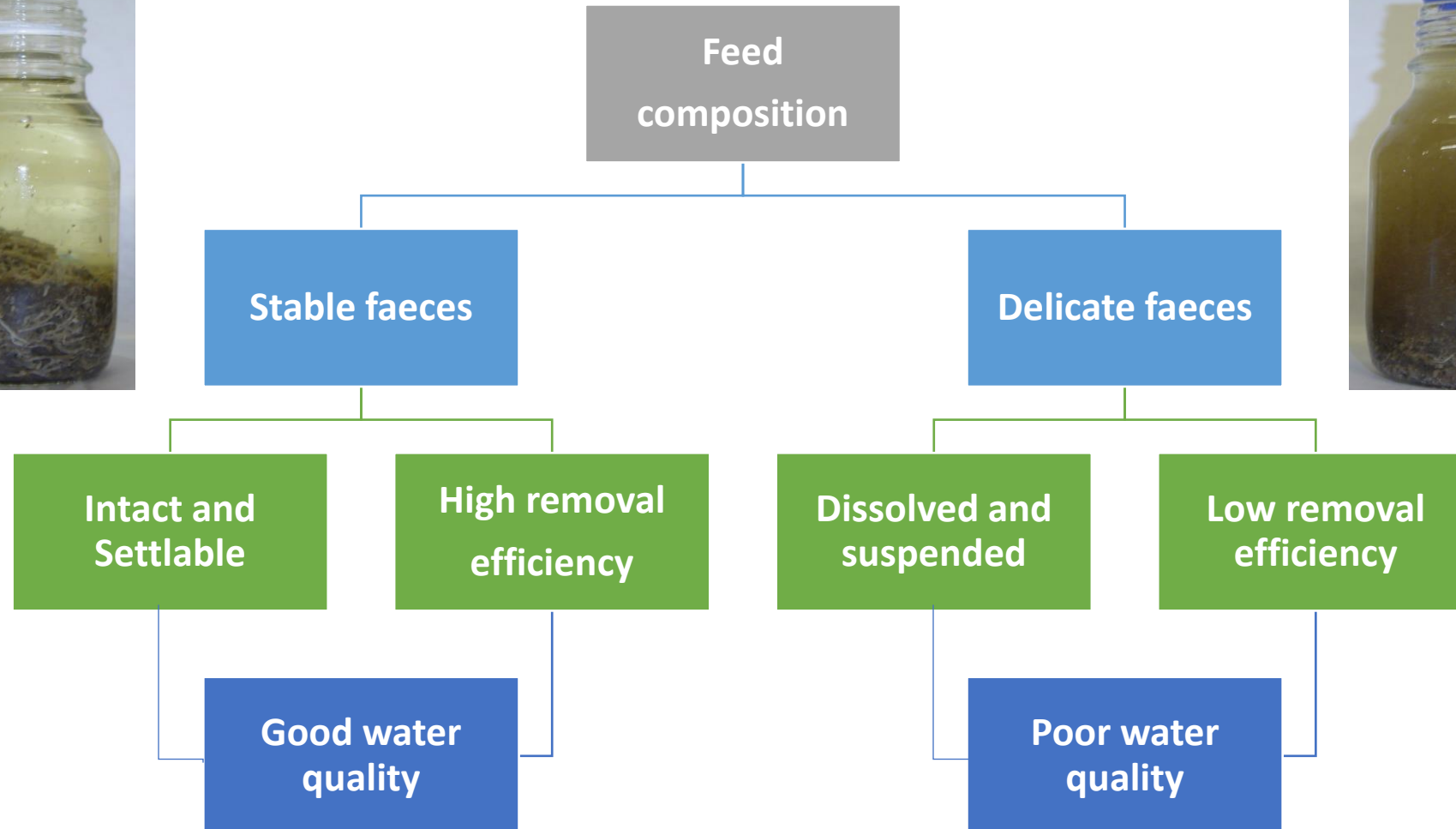


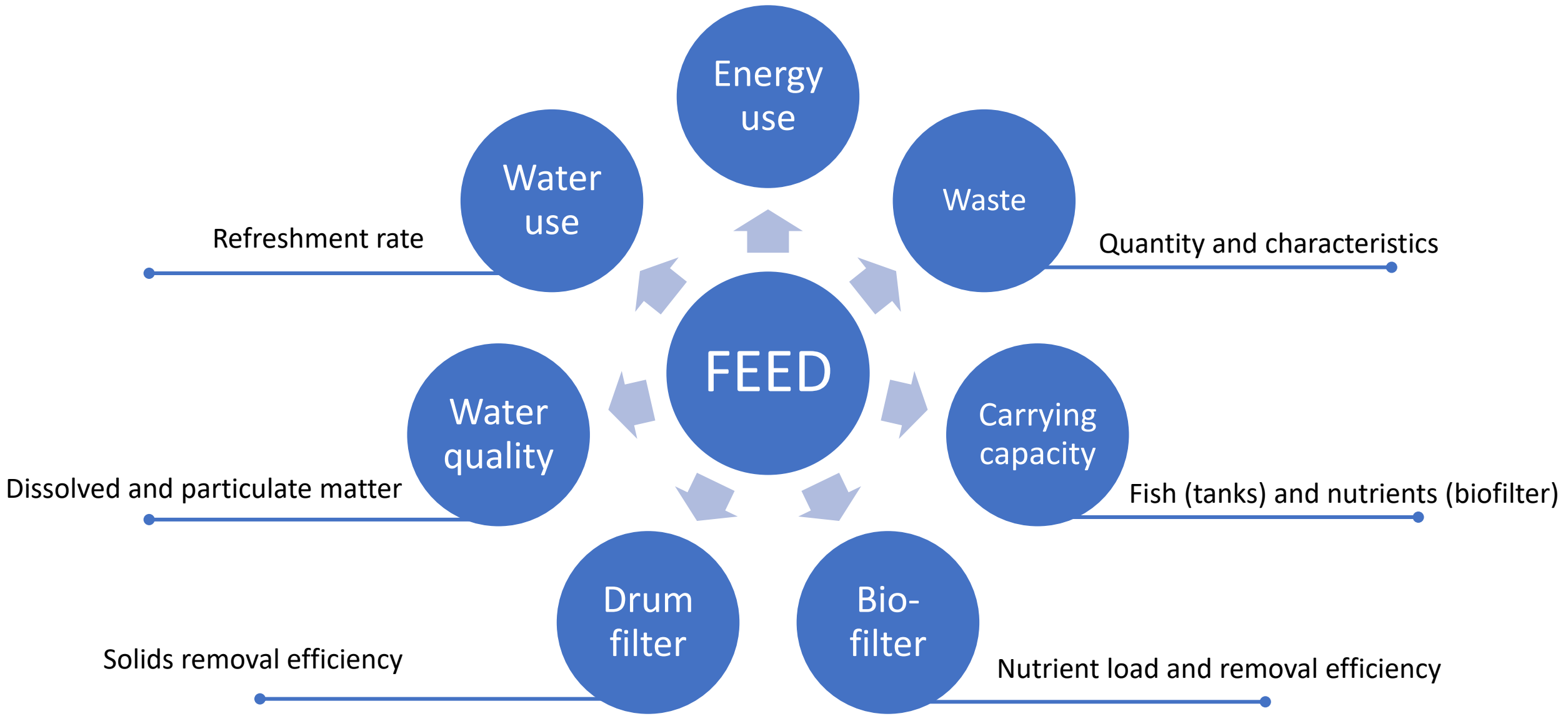
affects system performance and increases energy consumption

Faecal load and recovery



Faecal characteristics & water quality





Take home points

1. Changing a single feed ingredient altered the physical characteristics and properties of the faeces
2. Chopping and changing feed ingredients will greatly affect system performance
3. RAS feeds require consistent feed formulations backed by waste prediction models

Acknowledgements

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