Stiftung Tierärztliche Hochschule Hannover
University of Veterinary Medicine Hannover, Foundation

Supply chain vulnerability in protein reduced poultry nutrition: A scenario approach to amino acid supply disruption in broiler production



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77th EAAP Annual Meeting,
07-11 September, Hamburg, Germany

Current amino acid supply

- In modern broiler nutrition:

  low-protein diets common

- But: demand for **amino acids** given

  → need to be **supplemented**

- EU **imports** amino acids nearly completely,

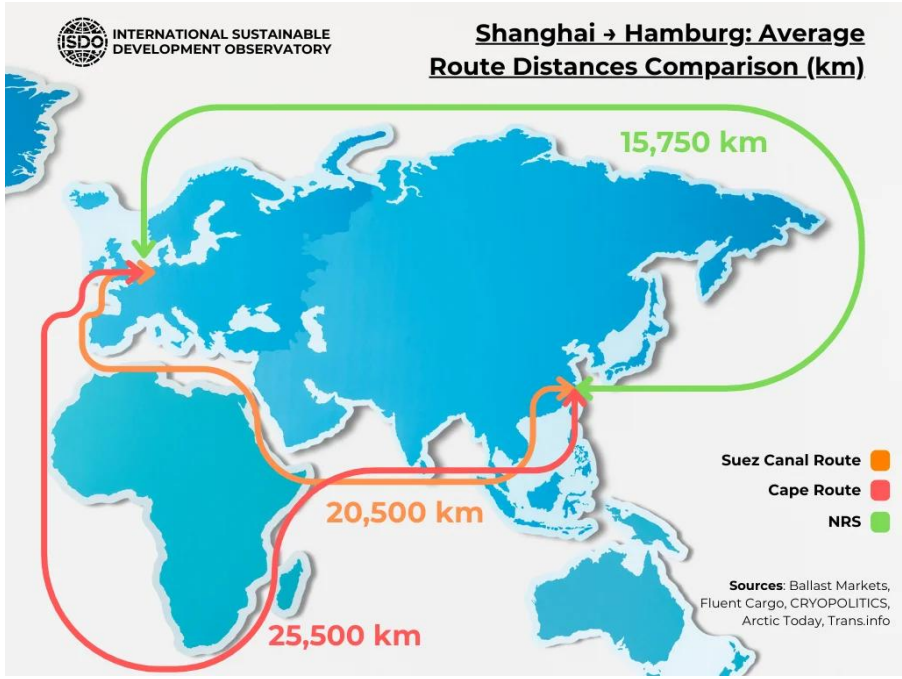
  70-80 % from China (FEFAC, 2025)

  → long shipping route

- EU feed **dependent** from limited import ways



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Vulnerability?



https://www.dallan.com/fr/news/chaine-dapprovisionnement-et-cout-des-matieres-premieres-quel-enseignement-tirer-du-blocage-du-canal-de-suez/

- In case of route blockages **alternatives difficult** to find
- May lead to **shortage** of **amino acid supply**, resulting in **reformulation** of diets, possibly including:
  - Higher protein supply (to reach AA goals)
  - Worse feed efficiency (due to worse AA balance)

What could happen to the broiler production in Germany if amino acid supply is limited ?

Basic production system

- Ross 308 broilers (performance objectives)
- 37-day fattening period
- final liveweight: **2.3 kg**
- Annual broiler production:

  631 million broiler chickens
- Annual feed production:

  6.5 million tonnes of poultry feed per year;

  42% allocated to broilers (BLE, 2025)



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Assumtions for scenario

- Reformulation of diets by all feed mills in Germany
- NEW: 3rd feeding phase (day 21-30) without synthetic AA
- **Crude protein levels increase** through higher proportion of rapeseed meal
- Potential **negative performance effects** in this phase: FCR penalty +2%, +5%, +10%

Ingredients (%); not complete	Normal 3rd feeding phase	NEW 3rd feeding phase
Wheat	55.35 ↘	30.00
Soybean meal	20.00	20.00
Maize	10.00 ↗	25.67
Soybean oil	5.00	5.00
Fatty acid distillates	3.05	2.00
Minerals	2.58	2.33
Rapeseed meal	3.00 ↗	15.00
Amino acids	1.02 ↘	0.00



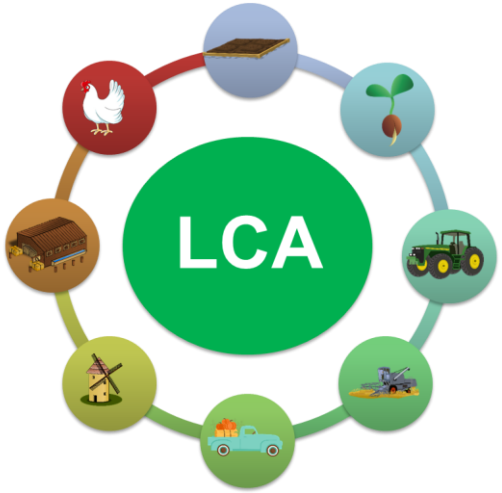
Methods, considered effects

- Days until **additional rapeseed meal need** at the market adds up to:
  - 1% of annual German use → noticeable effect
  - 2% of annual German use → considerable effect

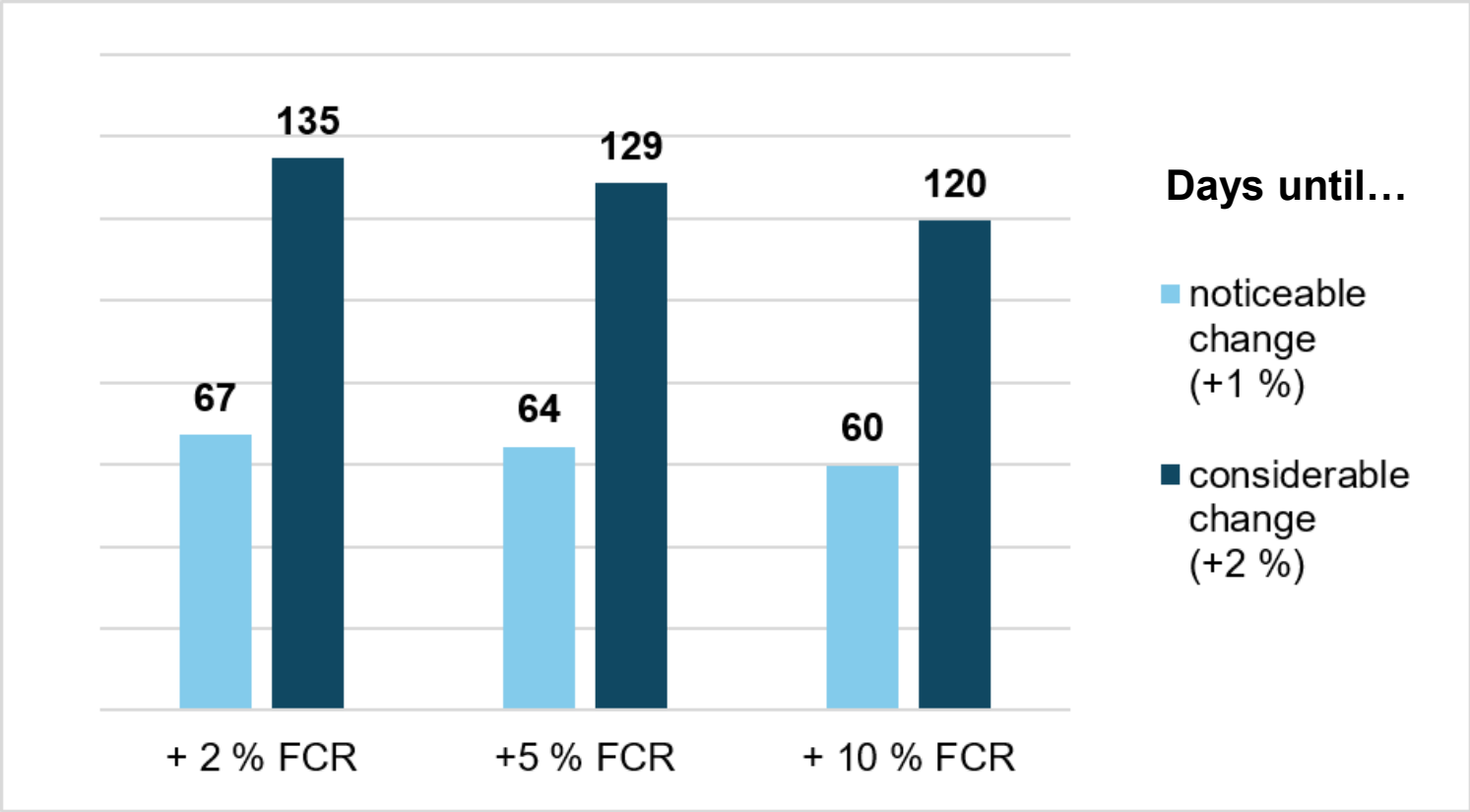


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- Life cycle assessment (**LCA**) to quantify environmental impacts (including GFLI database):
  - Climate change
  - Acidification
  - Eutrophication (freshwater)



Effects on rapeseed meal market



- Noticeable effect reached within 60-67 days
- Considerable effect reached within 120-135 days

Environmental impacts

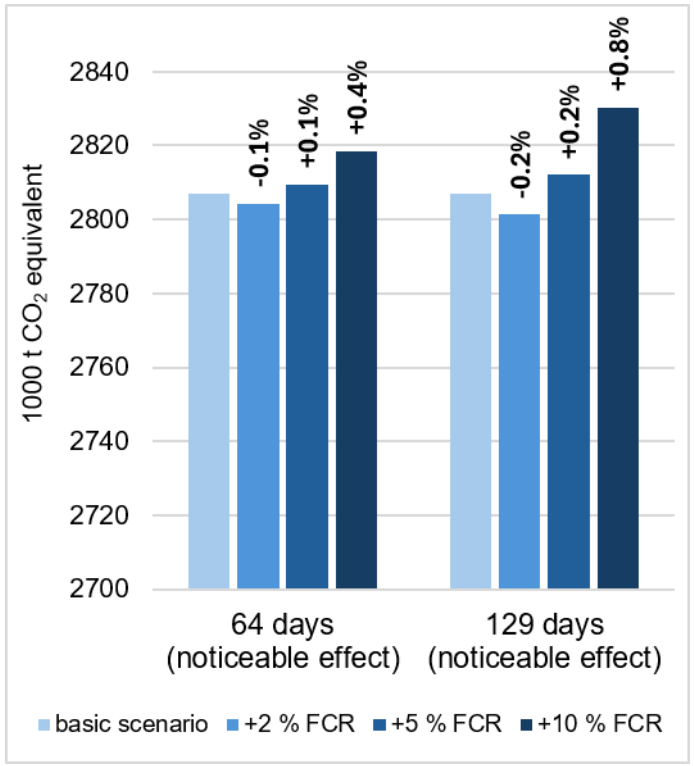
Impact category	Basic scenario	+2 % FCR	+5 % FCR	+10 % FCR
Climate change (kg CO_2 eq per kg live weight[1])	1.94	1.93	1.95	1.98
… compared to basic scenario		**-0.6 %**	**+0.5 %**	**+2.3 %**
Acidification (kg H^+ eq per kg live weight[1])	0.032	0.033	0.034	0.035
… compared to basic scenario		**+4.9 %**	**+7.4 %**	**+11.6 %**
Eutrophication (kg P eq per kg live weight[1])	0.00067	0.00068	0.00069	0.00070
… compared to basic scenario		**+1.9 %**	**+3.0%**	**+4.8 %**

[1] including chick, feed and fattening over 37 days – without slaughtering process

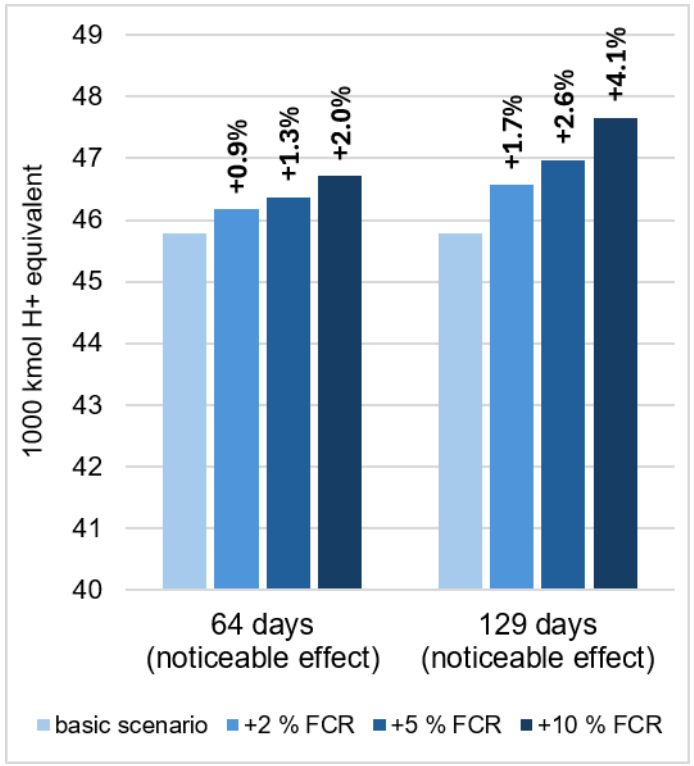
→ Up to 11.6 % higher environmental impacts per kg liveweight

Annual additional environmental impacts

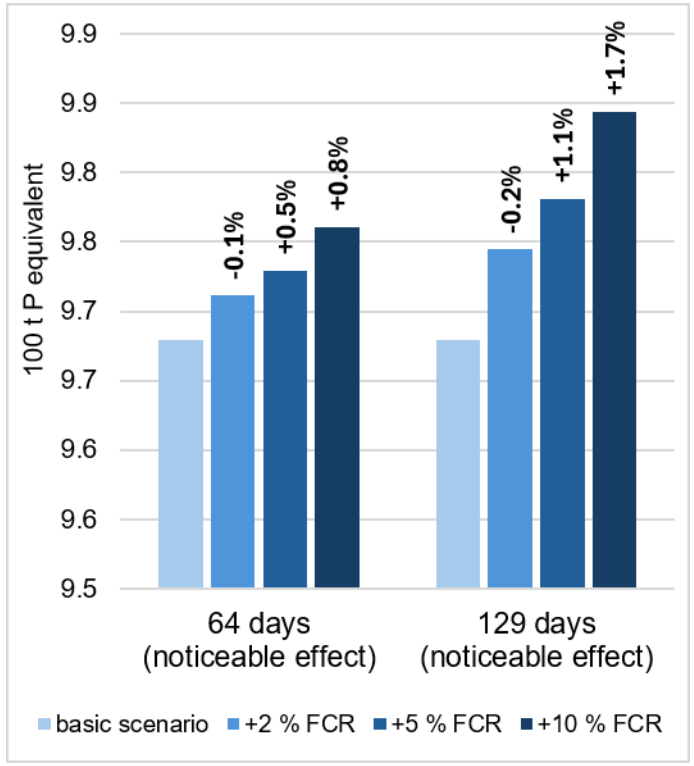
Climate change



Acidification



Freshwater eutrophication



Conclusions

- **Shortage** of **amino acids supply** may result in **noticeable effects** on the market within **60 days**
- **Environmental impacts** reached **up to +4.1 %** in this scenario
- **Broiler supply chain** is **vulnerable to shock scenarios**

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Bericht zur Markt- und Versorgungslage Futtermittel

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