

Dietary organic acids as non-antibiotic additives for aquaculture

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ADDCON Nordic AS

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THE IMPORTANCE OF AQUACULTURE

- Aquaculture growth rate of 9% a year since the 1950s (FAO Statistics)
- Almost 45% of the total world fish harvest is coming from aquaculture
- 48.1 Mio t worth 70.3 Billion USD
- Top 20 countries; mainly in Asia (except: 4 in Europe, 3 in America, 1 in Africa)

THE IMPORTANCE OF AQUACULTURE IN THE PHILIPPINES

- Top 10 world aquaculture producer (557,000 t)
- Milkfish, Tilapia and Shrimp are growing aquaculture sectors
- 2003-2005: Milkfish +17.3% (289,200 t),
Tilapia +13.7% (126,600 t), Shrimp +7.7%
(37,700 t)
- those 3 species worth 692.7 Mio USD

HIGH QUALITY FISH FEED

- Fish meal, plant-protein meals as well as grain prices are rising
- Economy and sustainability of “feeding fish” gets crucially important
- Fish growth and FCR are therefore key-factors

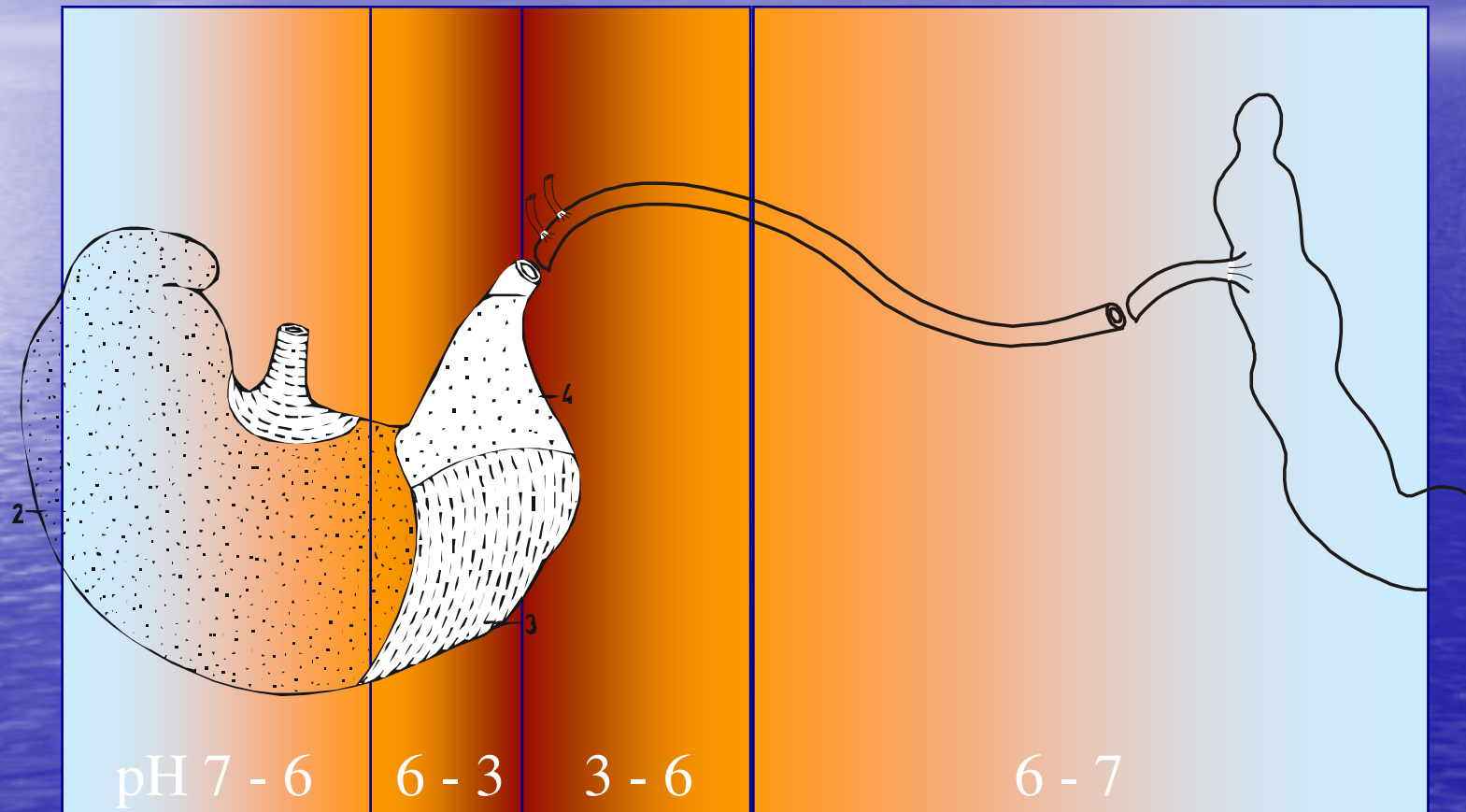
SUSTAINABILITY IN FISH PRODUCTION

- Growing awareness from consumers and producers
- Use of antibiotic growth promoters (AGP) increases the risk of cross-resistances
- EU does not allow the import of aquaculture species which contain residues of AGP → chance for organic aquaculture

MODE OF ACTION OF ACIDIFIERS

- protects raw materials and finished feed from bacterial degradation (feed hygiene)
- promotes animal (fish) performance (role in intestinal tract and metabolism)

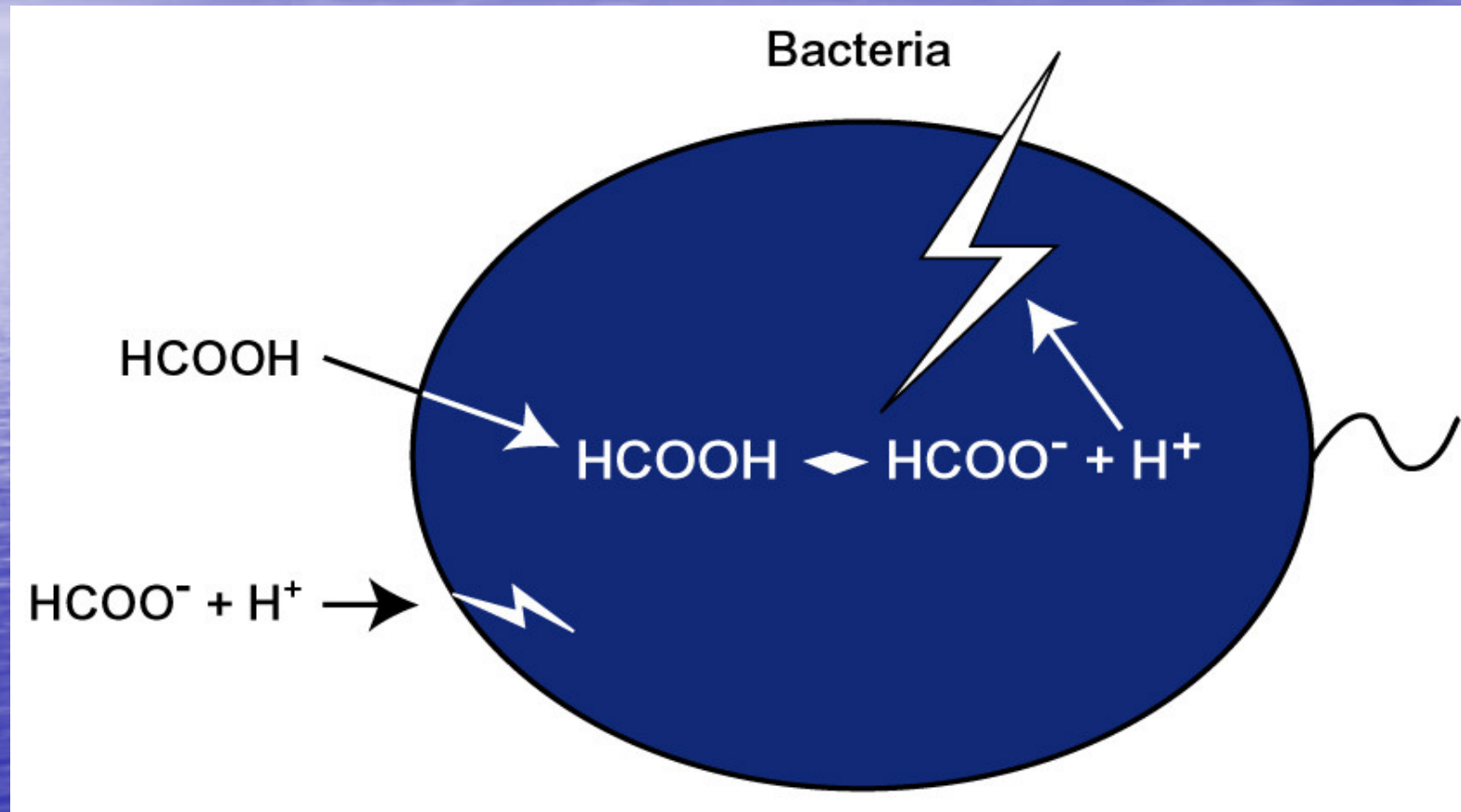
ACIDIFICATION – A NATURAL BARRIER



ACIDIFICATION

- creates unfavourable conditions for pathogenic bacteria
- reduces acid binding capacity
- helps digestion, mainly protein
- supports health
- increases performance

Organic acids inhibit bacteria growth – thereby preventing degradation of feed; healthy intestine



ACIDS AND ACID SALTS IN AQUACULTURE

- Organic acids:
formic acid, acetic acid, propionic acid,
lactic acid and citric acid
- Organic acid salts:
calcium formate, sodium formate,
potassium diformate (KDF), calcium
propionate, calcium lactate

TRIALS WITH TILAPIA IN SE-ASIA I

- tilapia grow-out for 63 days
- initial fingerling weight: 7 g
- 1.5% acidifier (Ca-formate, Ca-propionate, Ca-lactate, Ca-phosphate and citric acid) vs. 0.5% AGP (Oxytetracycline) and a negative control
- feeding twice a day (31% CP)

Performance of Tilapia fingerlings with acid mix

Treatment	Final length (in cm)	Final weight (in g)	Feed conversion ratio FCR
Negative Control	12.5	37.9	1.43
Positive Control (AGP)	12.8	40.3	1.40
Acidifier group (1.5%)	12.9	41.3 (+2.5%)*	1.38 (-1.4%)*

*Relative values against AGP; after Petkam et al. 2008

TRIALS WITH TILAPIA IN SE-ASIA II

- tilapia grow-out with bacterial challenge for 85 days (*Vibrio anguillarum* at day 10)
- initial fingerling weight: 16.7 g
- 0.2%, 0.3% and 0.5% KDF (Aquaform[®]) vs. negative control
- feeding 6 times a day (32% CP)

Performance of KDF (solid) treated Tilapia

	Control	2 kg/t KDF	3 kg/t KDF	5 kg/t KDF
Final weight (g)	218	258	246	252
FCR	1.34	1.23	1.25	1.22
Mortality (%) – post infection	33.0	20.8	18.4	11.0

after Ramli et al. 2005

OTHER REPORTS/COMMENTS

- 2 kg/t Ca-formate reduces mortality in shrimp
- formates successfully tested in trout and charr, butyrates in catfish
- “Acidifiers” are beneficial for Abalone
- Increased scientific interest; upcoming published articles

Acidifier...

...a sustainable alternative for organic aquaculture



Acidifiers in Animal Nutrition

A Guide for Feed Preservation and Acidification to Promote Animal Performance

Christian Lückstädt, Editor

The potential of organic acids in forage preservation as well as in livestock nutrition has been known for decades and is widely documented. Acidifiers make a fundamental contribution to feed hygiene, gut health and natural growth promotion in modern animal nutrition. Due to the reduction in use of antibiotic growth promoters in livestock production, acidifiers are becoming increasingly important as part of an alternative feeding concept.

This book provides an overview on the use of acidifiers in animal nutrition and their possible beneficial effects for livestock production and in aquaculture. It contains a compilation of papers from research institutes and the industry worldwide related to the mode of action and potential benefits of acidifiers.

Contents:

Introduction • Effects against E. coli and Salmonella • Use of inorganic acids in pig production • Use of organic acid blends for pig, poultry and aquaculture • Mixtures of acidifiers with other feed additives • Silages and feed preservatives • Index

Acidifiers in Animal Nutrition

C. Lückstädt

Acidifiers in Animal Nutrition

A Guide for Feed Preservation and Acidification to Promote Animal Performance



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Edited by Christian Lückstädt

increasing growth

saving feed costs

strong antimicrobial effects

high survival rates

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