



Aquaculture

450 employees

2015 Turnover : 80 M €

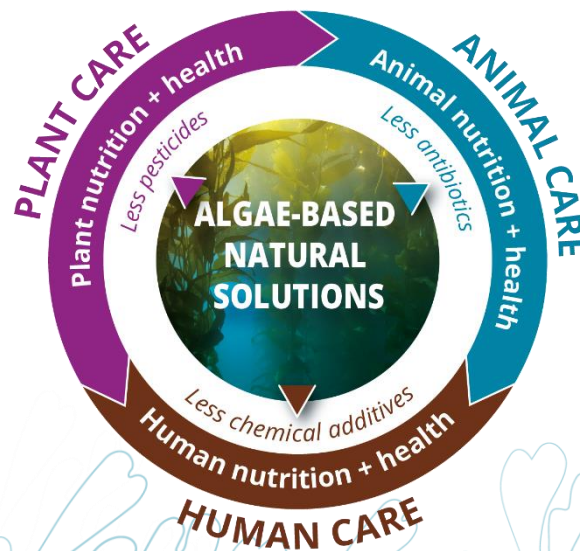
A marine biotechnology specialist for 20 years

The world must produce better and more with less to sustainably feed the planet



A healthy food chain thanks to algae :

- **Less pesticides**
- **Less antibiotics**
- **Less chemicals**





22 locations
100 countries

Primary raw materials



Trace
elements
1994



Clays
1997



Algae
2004

Olmix products



Montmorillonite Clay



Seaweeds



MTx+
(Mycotoxin binder)

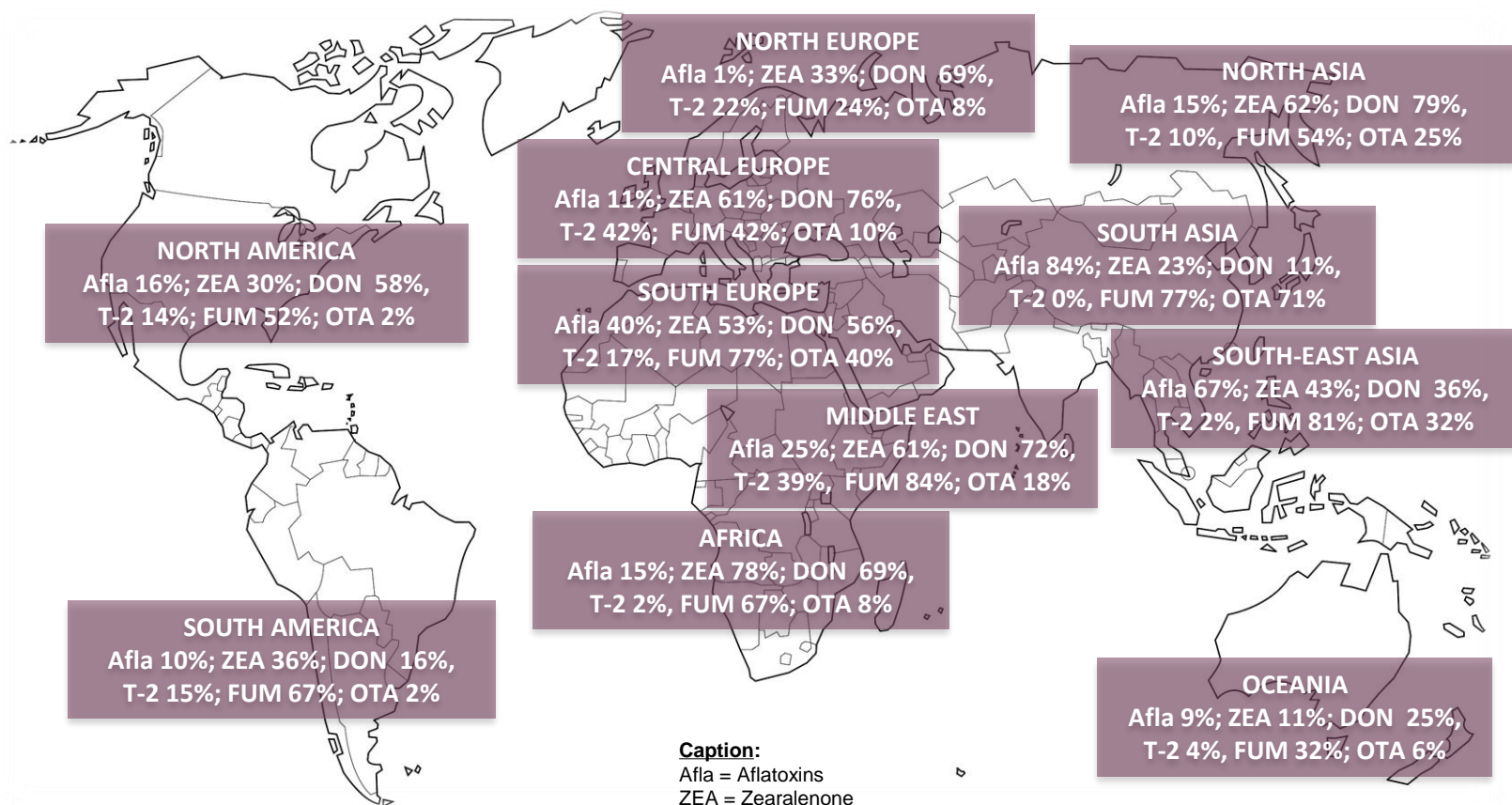


MFeed+
(Digestibility enhancer)



MFeed
(Gut health promotor)

Mycotoxins – worldwide challenge



Caption:
Afla = Aflatoxins
ZEA = Zearalenone
DON = Deoxynivalenol
T-2 = T-2 toxin
FUM = Fumonisin
OTA = Ochratoxins

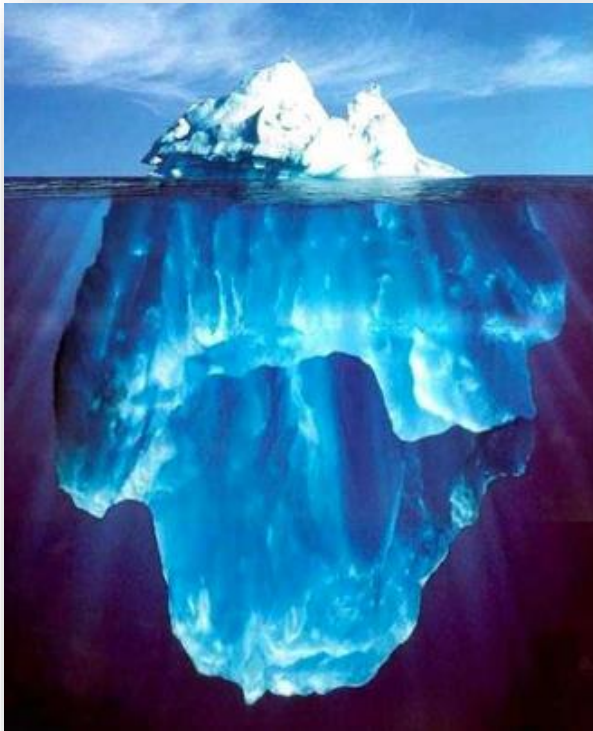
Source: EMAN bulletin, 2014

Mycotoxins - risks



Visible part : acute intoxication

Mycotoxins - risks



Visible part : acute intoxication

Hidden part:
subintoxication or chronic intoxications

This is now widely considered to be the most important impact of mycotoxins, particularly in developing countries. (FAO, 2001)

Mycotoxins – effects of different mycotoxins on different species

Aflatoxin

Species	Symptoms	References
Rainbow trout	Hepatic necrosis Liver carcinomas Higher mortality	Sinhuber et al, 1974 Halver & Mitchell, 1969 Roberts, 2002
Shrimp	Hepatopancreas damage, Poor growth and survival	Zeng et al, 2015 Ostrowski-Meissner et al, 1994 Bintvihok et al, 2003

Species	Symptoms	References
Rainbow trout		
Tilapia		
Shrimp		
Carp		
Catfish		

Species	Symptoms	References
Rainbow trout	Synergic effect through amplification of AFB1 carcinogenic effect.	Carlson et al, 2001

Ochratoxin

Species	Symptoms	References
Rainbow trout	Feed refusal, decrease in weight gain and increase in FCR	Hooft et al, 2011 Matejova et al, 2014 Ryerse, 2014
Shrimp	Damage of HP tissue, lower weight gain and SGR	Supamattaya et al, 2004 Trigo-Stockli et al, 2000
Tilapia	Decrease in weight gain and in feed intake Synergic effect with zearalenone	Braggio, 2015 Siriporn et al, 2015
Carp	Immune suppressive effect	Pietsch et al, 2014 Pietsch et al, 2015
Catfish		

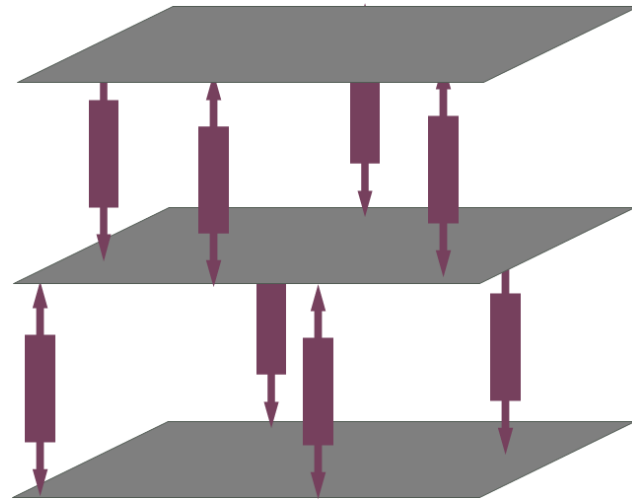
Fumonisin

DON

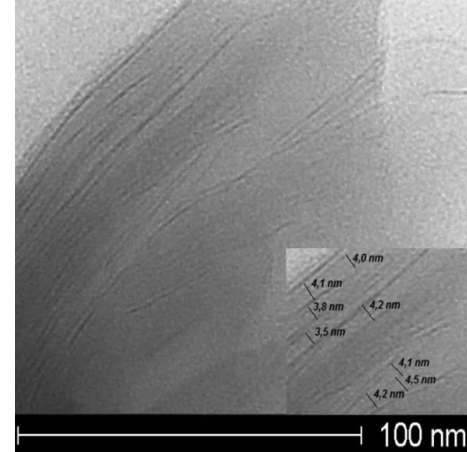
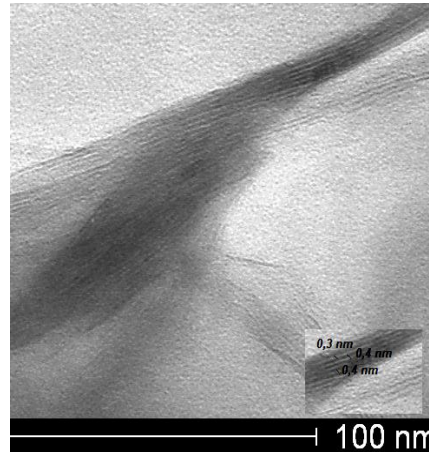
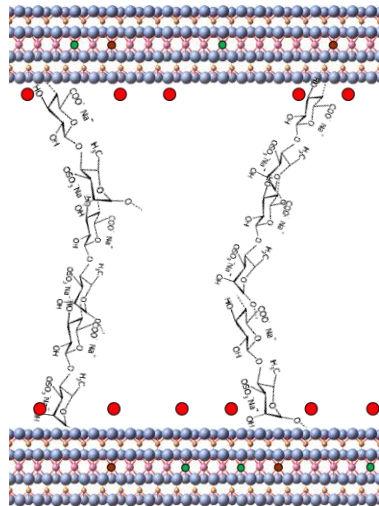
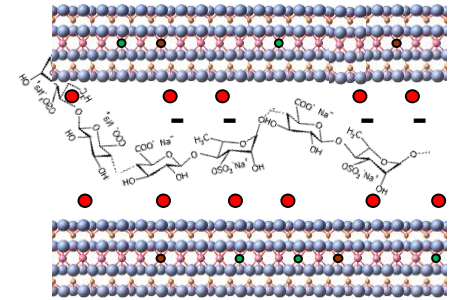
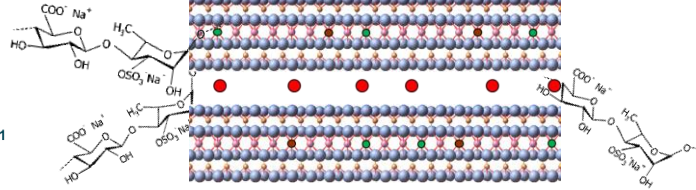
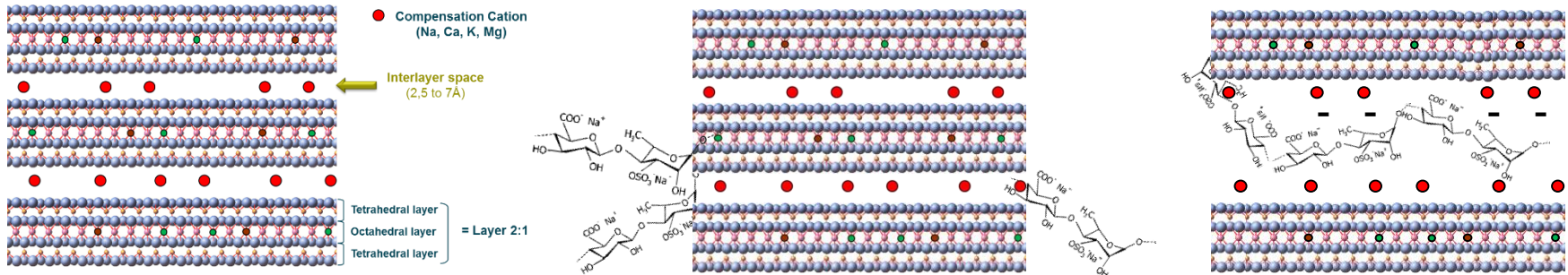
MTx+ - the mycotoxin binder of Olmix

Aim is to prevent mycotoxicosis rather than remedy the symptom

MT.X+



MTx+ - the product



Trials with MTx+



MTx+ - University trial with *L. vannamei* shrimp

Experimental design

Lab trial in Thailand

25 shrimps/tank (6.32 ± 0.2 grams)

5 replicates per treatment:

Control: basal diet

Treatment 1: basal diet + 0.1%

MTx+

Treatment 2: basal diet + 0.2%

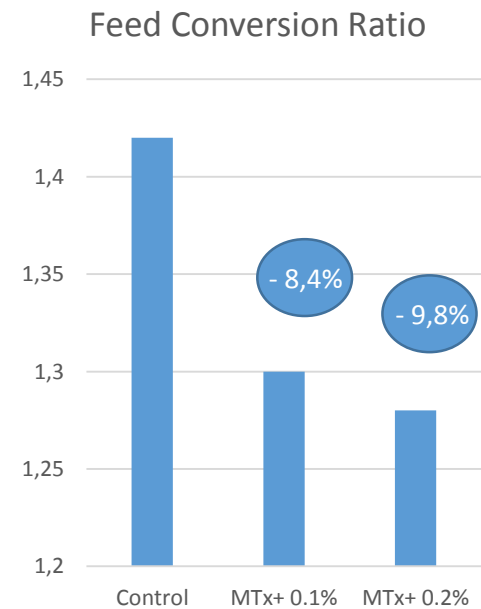
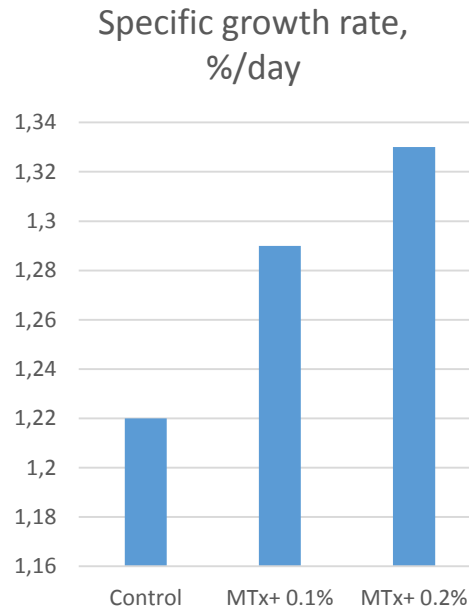
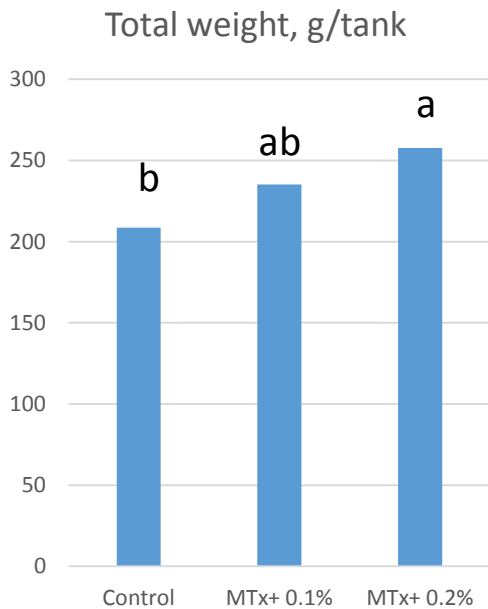
MTx+

Trial duration was 60 days and at the end of which the shrimp were tested for a vibrio count.



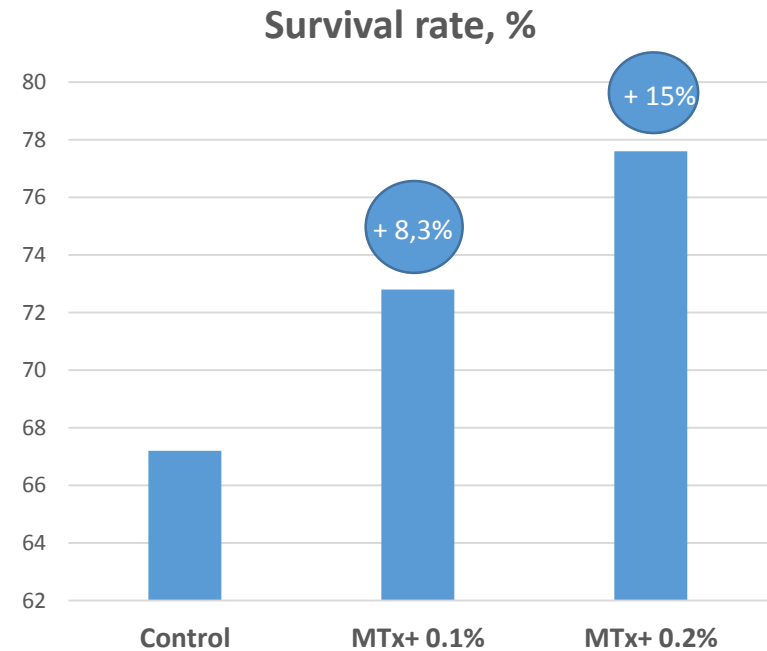
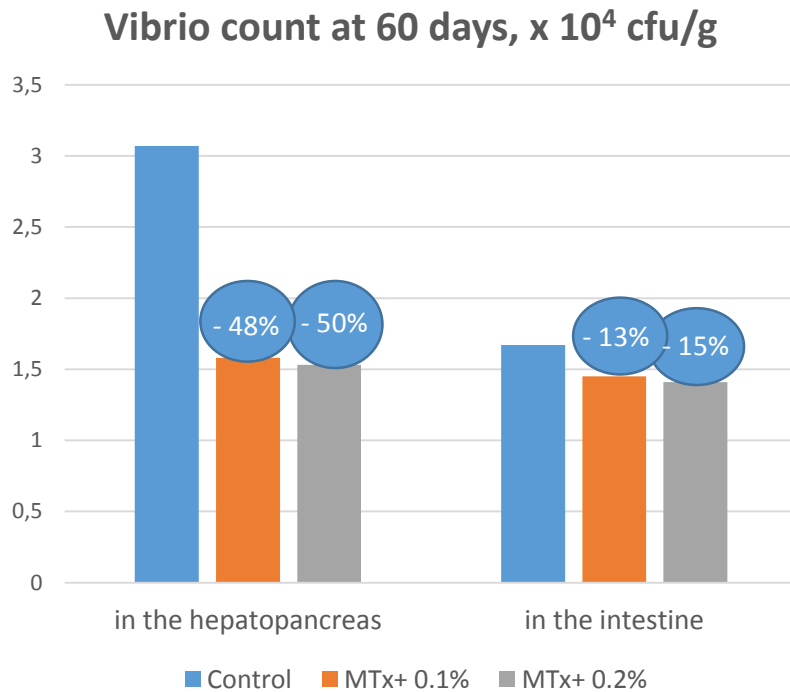
MTx+ - University trial with *L. vannamei* shrimp

Results – growth performance



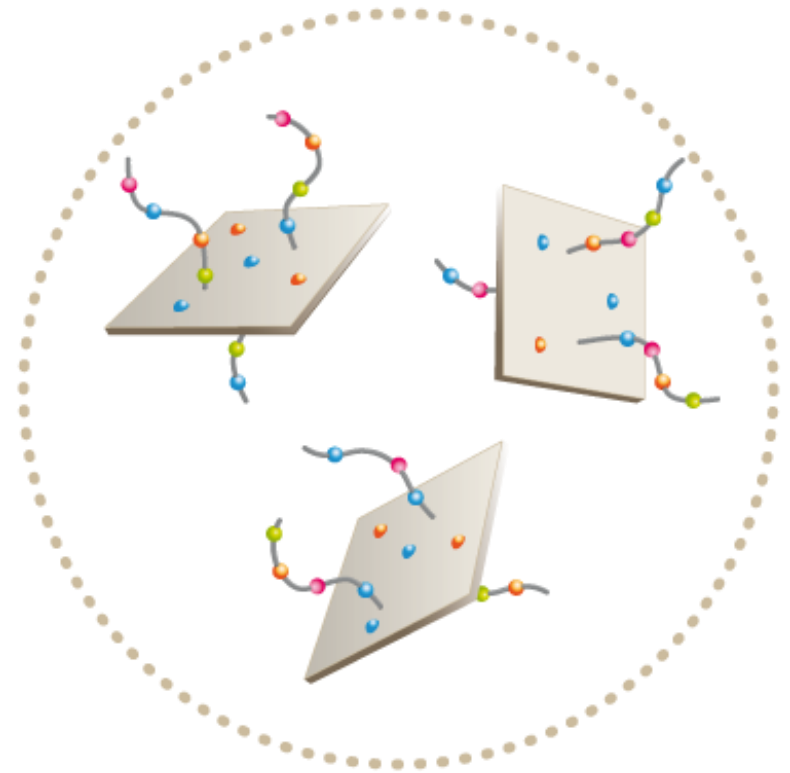
MTx+ - University trial with *L. vannamei* shrimp

Results – health performance

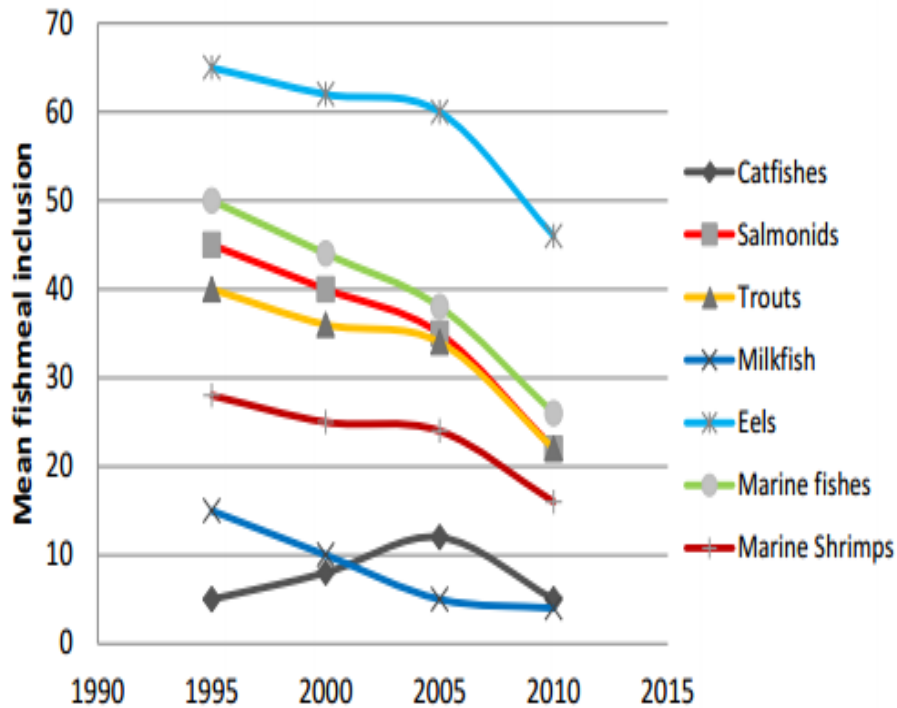


mFeed+

INCREASING FEED
EFFICIENCY
BY OPTIMIZING ENZYMATIC ACTIVITY



MFeed+ - fishmeal in aquafeed



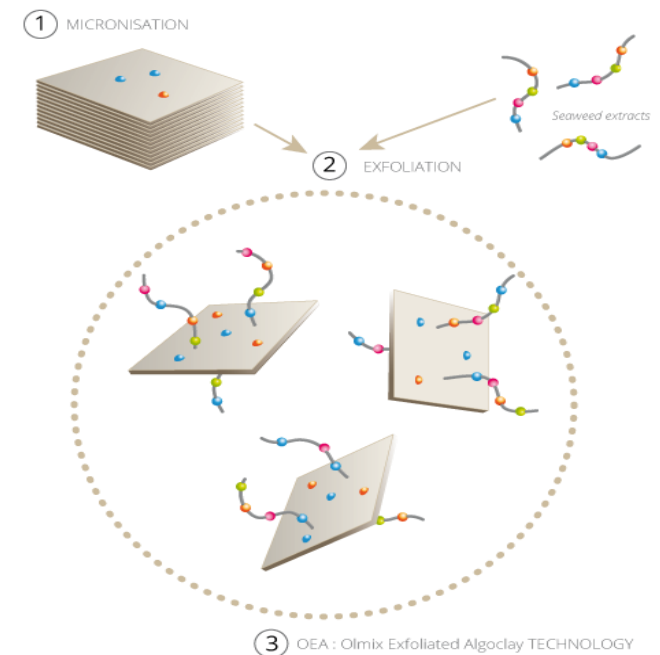
Source Tacon et al 2011

- Stagnant supply of fishmeal (FM)
- Aquaculture still growing fast
 - Results in an increase in Fishmeal price
- Alternative ingredients are being used to replace FM
 - Already less FM in aqua diets
 - Trend expected to continue
- BUT ingredients not always easy to digest

Algae-clay biocatalyst

MFeed+ is based on the patented technology
OEA: Olmix Exfoliated Algo clay

- Micronized and exfoliated: fine dispersion and much larger surface area (up to 800m²/g)
 - More support sites for enzyme - physico chemical interactions
 - More access to metallic ions - cofactors
- Synergy between clay and seaweed
 - More and more diverse metallic ions as cofactors (e.g. Fe, Cu, Zn, Ti, Mn, Mo, Pd, W, V, Co, Ni, Pt, Au, Ag, ...)
- Biocatalysis



Trials with MFeed+



MFeed+ - University trial with *L. vannamei* shrimp

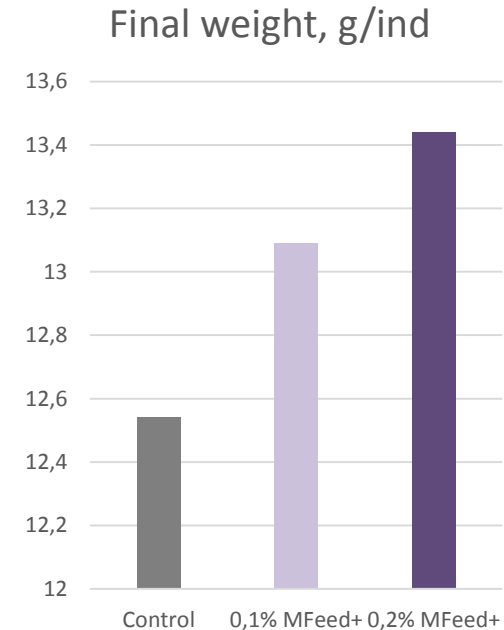
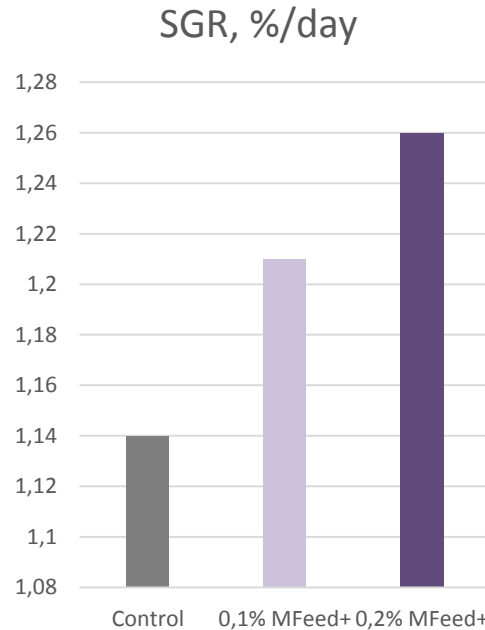
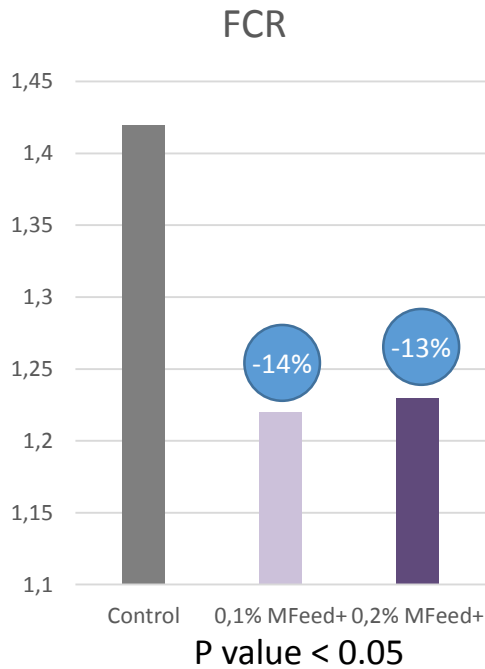
EXPERIMENTAL DESIGN



- Trial conducted at **Kasetsart** University, Thailand'
- 375 shrimps (*L. vannamei*), average weight 6,3g
- **Diets:**
 - Control basal diet
 - MFeed+ 0,1% : basal diet +0,1% MFeed+
 - MFeed+ 0,2% : basal diet +0,2% MFeed+
- Duration 60 days



MFeed+ - University trial with *L. vannamei* shrimp

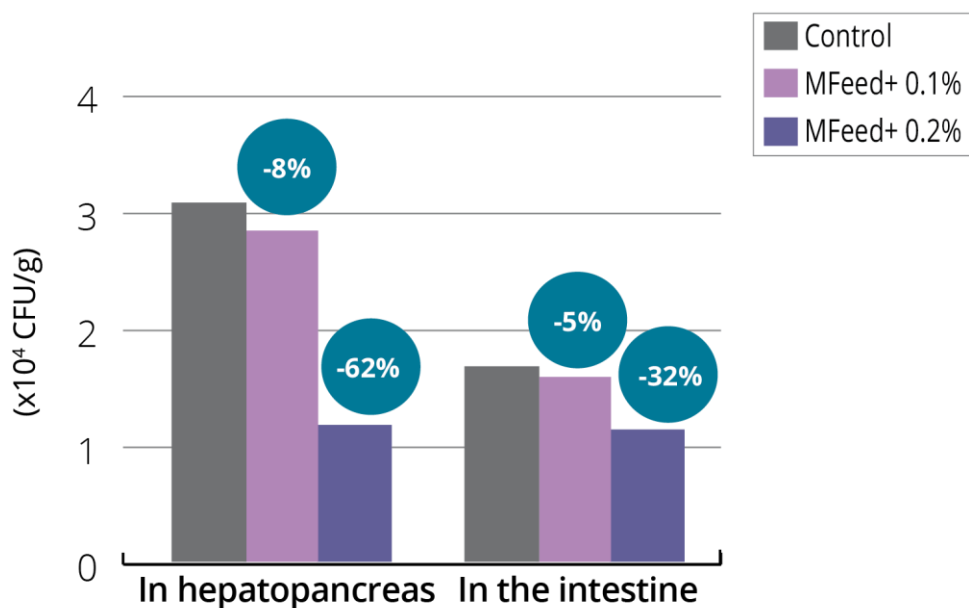


Better growth for MFeed+ groups.
Better feed efficiency, with a
decreased FCR

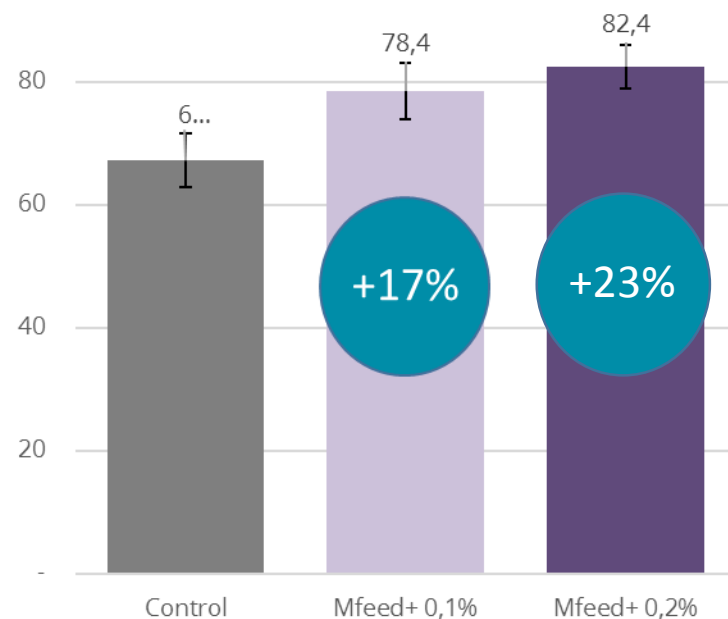
MFeed+ - University trial with *L. vannamei* shrimp

Vibrio count

→ Vibrio count



Survival Rate (%)



P-value < 0,01

Thank you!