



An advertisement for Selko's Fylax Forte product. At the top left is the Selko organic acids logo with a red banner that says "PRESERVATION". The central image is a 100 Euro banknote that is heavily covered in green mold. Below the bill, the text reads "Don't let moulds consume your money". At the bottom of the ad is the "NEW Fylax® Forte" logo, with the tagline "More effective and cost efficient" underneath. The entire advertisement is set against a blue background with a white wavy border at the bottom.

New insights for effective mould control

Serbian Feed Techn. Symposium

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Marketing Manager Selko Feed Additives

Content the presentation

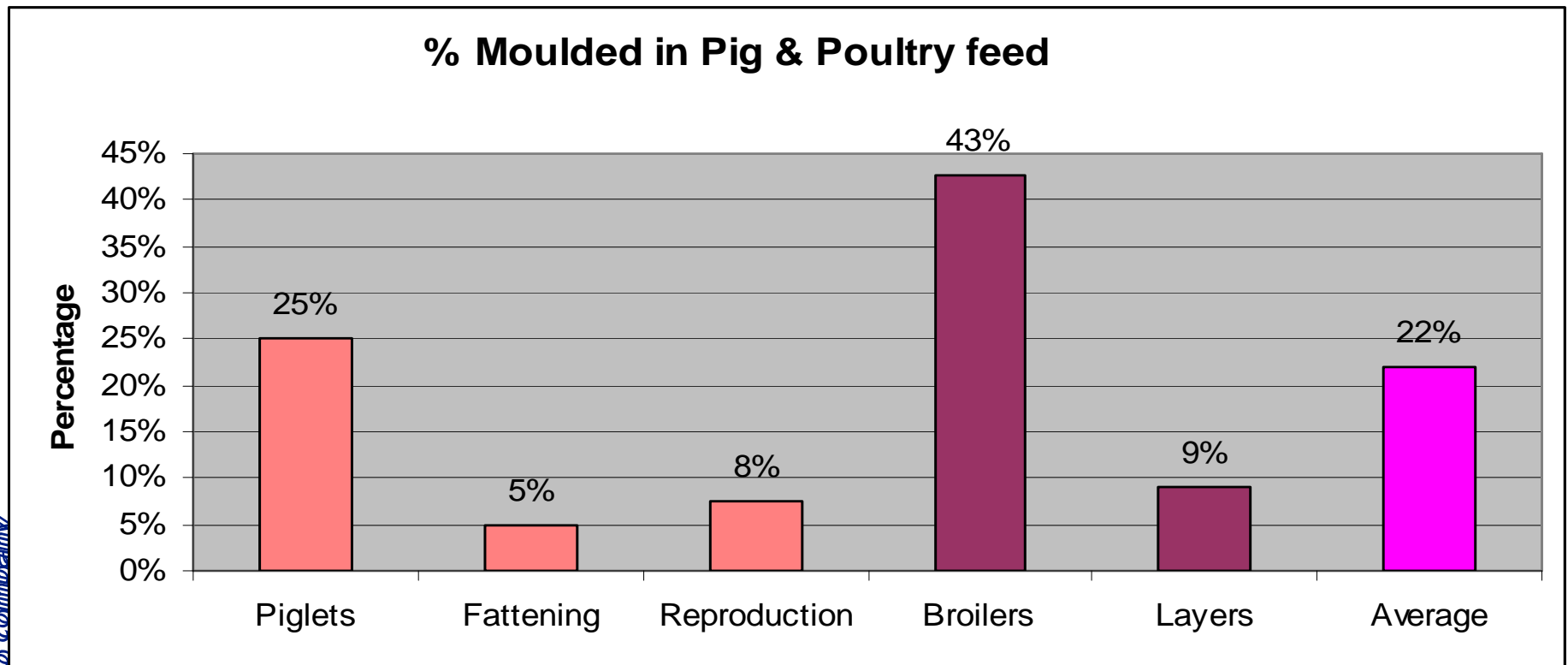


- 🕒 World mould problem
- 🕒 Assignment from the feed industry
- 🕒 New innovation: Activated propionate
- 🕒 Benchmark mould inhibitors
- 🕒 Benchmark moisture optimization
- 🕒 Summary



World mould problem!

Estimation: +/-22% of total feed has to high numbers of moulds



Mould contamination > max limit: 10.000 CFU/gr; Total 756 samples

Average pig feed: 15% ; Average poultry feed 28%.

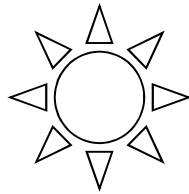
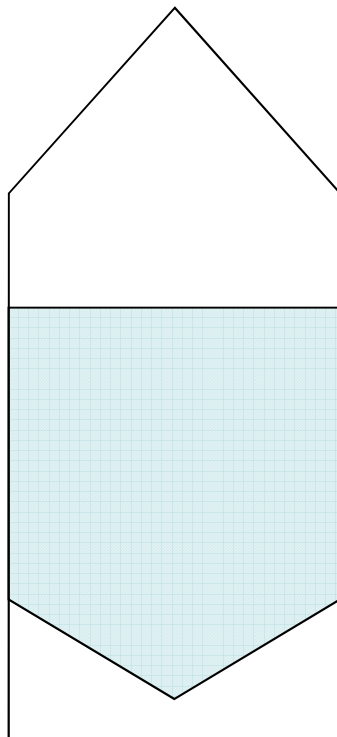
Source: Marković et al. 2005.

Mould growth can start easily!

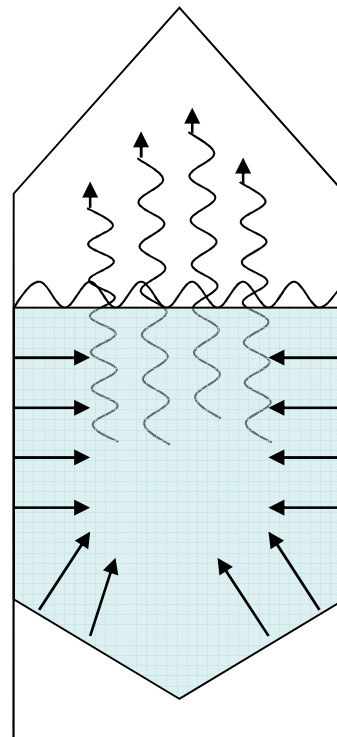


High day temperature

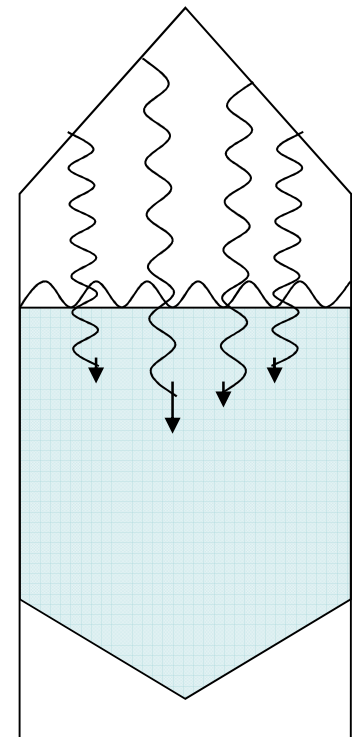
Low night temperature



warm up



cool down



Homogenous moisture distribution

Moisture migration

Condensation of water vapour

Reduction Nutritional value (1)



The effect of mould contamination on nutritional value of stored maize is presented in table 1. The nutritive value drops after contamination by mould.

Table 1: Effect of mould contamination on the nutritional value of stored maize

	ME(Kcal/Kg)	CP(%)	Fat(%)
Good corn	3,410	8.9	4.0
Mouldy corn	3,252	8.3	1.5
Loss in nutrient	158	0.6	2.5
% loss in nutrient	4.6	6.7	62.5

Source: O'keette (2003). ME=Metabolisable energy. CP=Crude protein



Assignment from the feed industry

Assignment from the feed industry



- Cost reduction/ treated ton
- One product with multiple applications:
 - Mould control; or
 - Moisture optimisation or
 - both
- Higher efficacy!

But

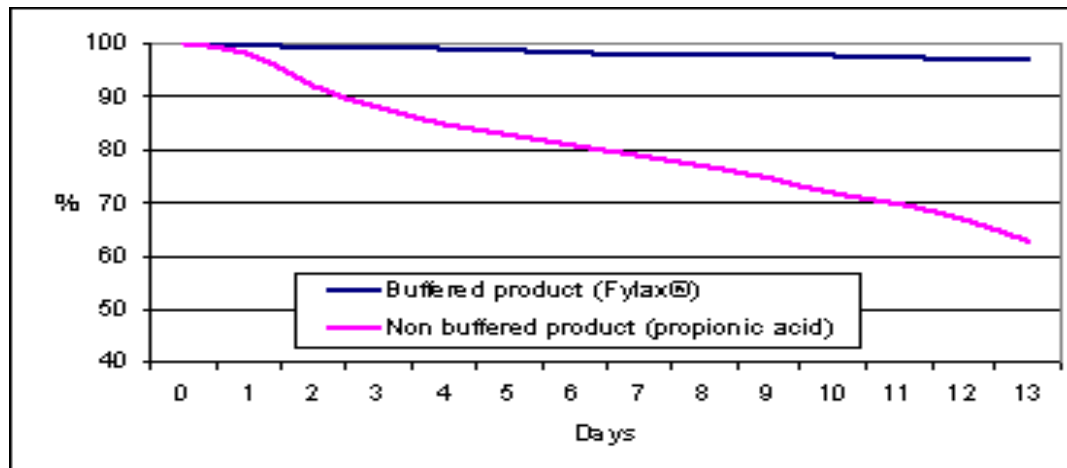
- Higher active ingredients are not possible

Innovation is NEEDED!

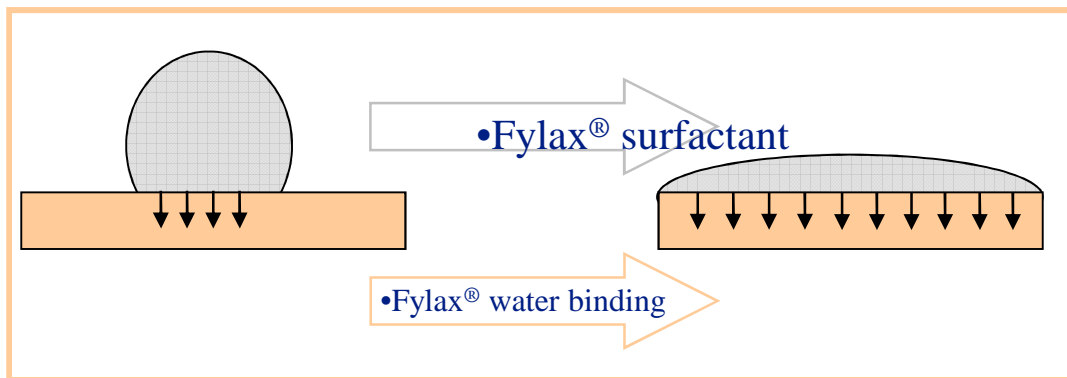


New innovation: Activated propionate

Key features: Fylax, we never will change



- Non corrosive
- No evaporation

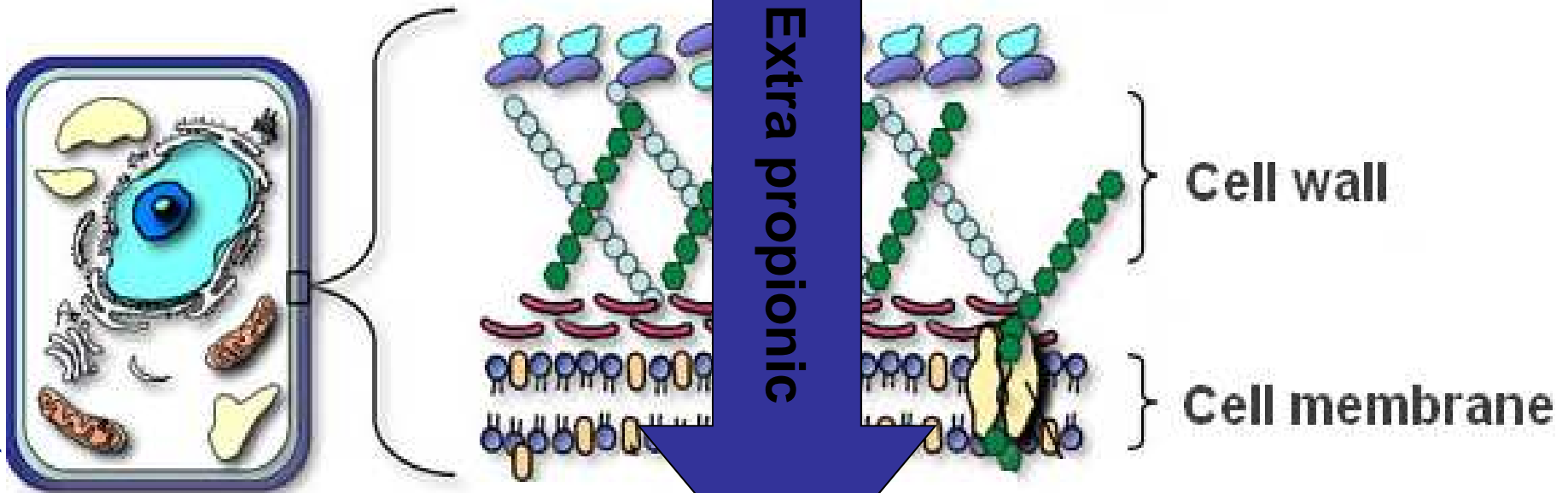


- Surfactant/
- Waterbinding

Moulds: Hard to attack!



Mould cell



Killing moulds: organic acids break through 2 cell layers → Need for increased porosity organic acids

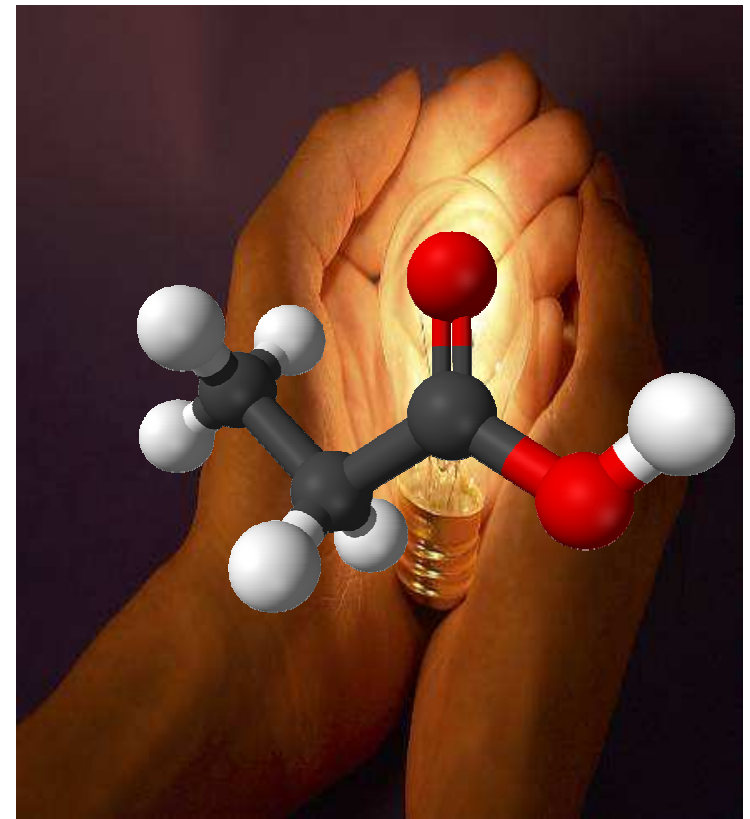
Innovative mould inhibition



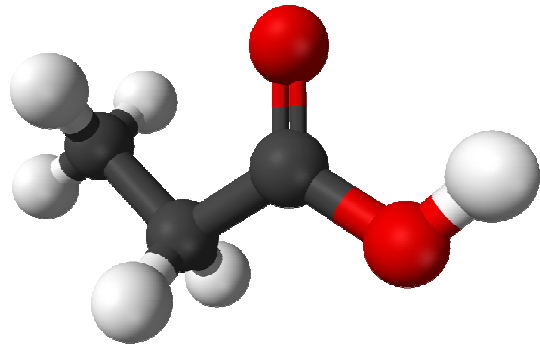
- **New** production technology with activated propionates

Resulting in:

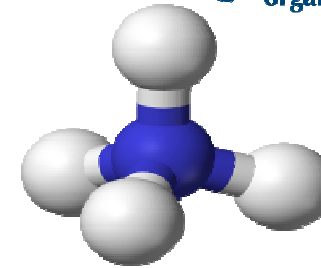
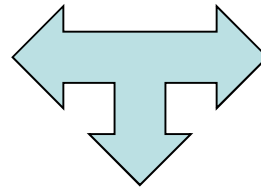
- Improved efficacy
 - Fylax Forte for low risk
 - Fylax Forte HC** high risk
- Lower cost/ton treated material



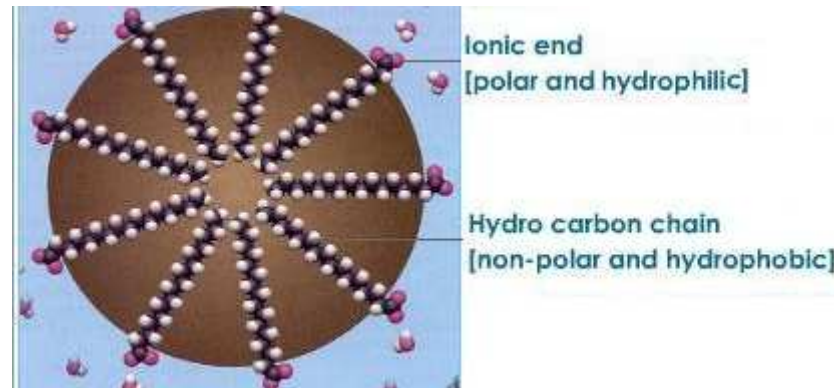
New technology: Activated propionates form micelles



Pronionic acid



Ammonium
Hydroxide



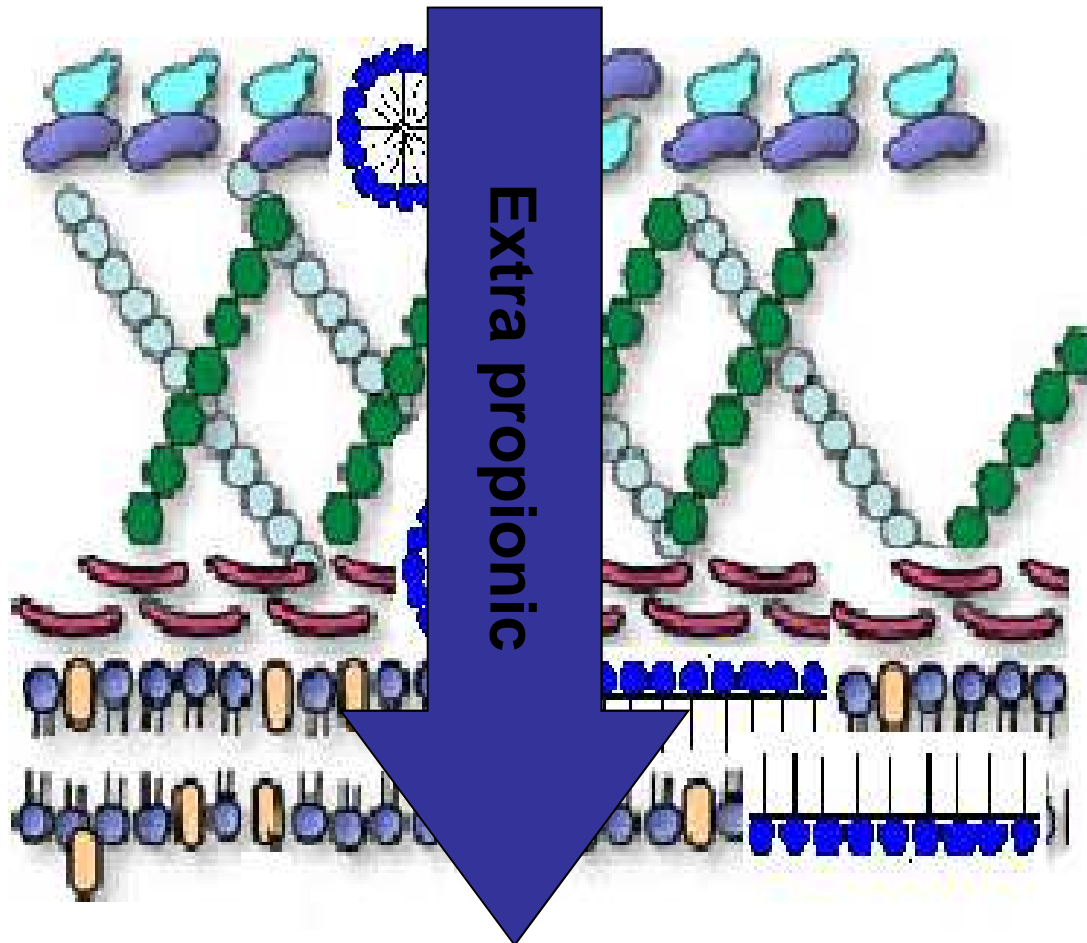
Micelles formed by activated propionates

M. O. Bachynsky; Aya Kitahara; Bressler 1999

Effect of activated propionates on moulds

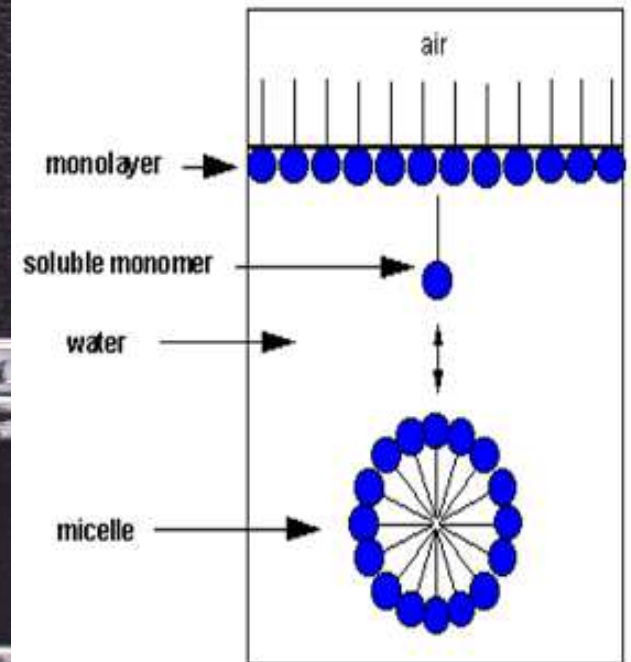
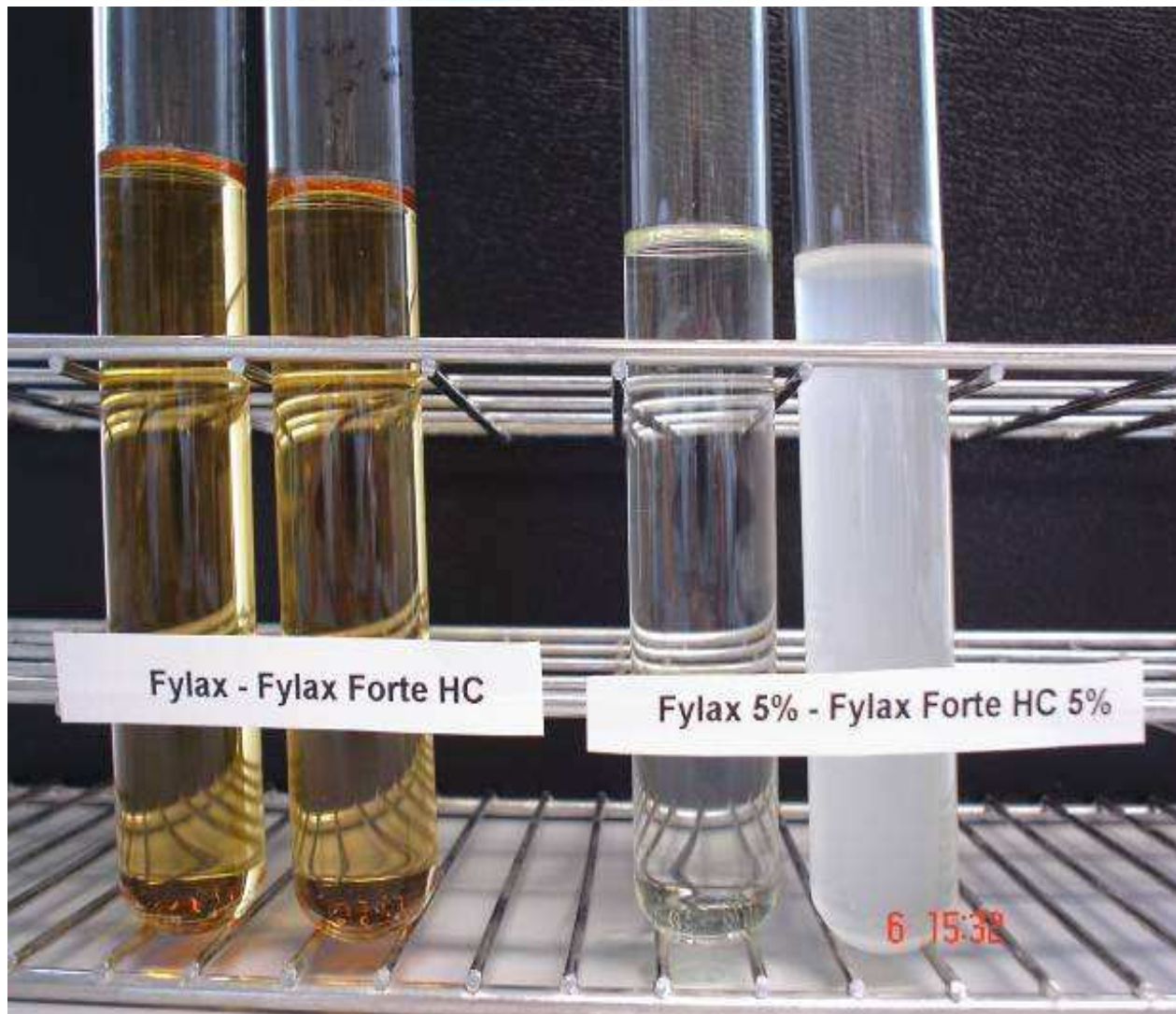


- 1) Increased porosity of cell-wall
- 2) Destabilisation cell-membrane
- 3) Better accesibility of organic acids
- 4) Decrease internal pH → inhibition growth → killing mould



Adapted from mucoses study group

Observe the difference!



Difference by activated propionates bound in micelle structure in water solution!

Pre-solution of 5% in water



Benchmark mould inhibitors

Benchmark efficacy!

1) Analysis the world moulds



Mix tested moulds

- Aspergillus
- Penicillium
- Zygomycetes
- Fusarium



The testing model:

2) Accelerated Stress test



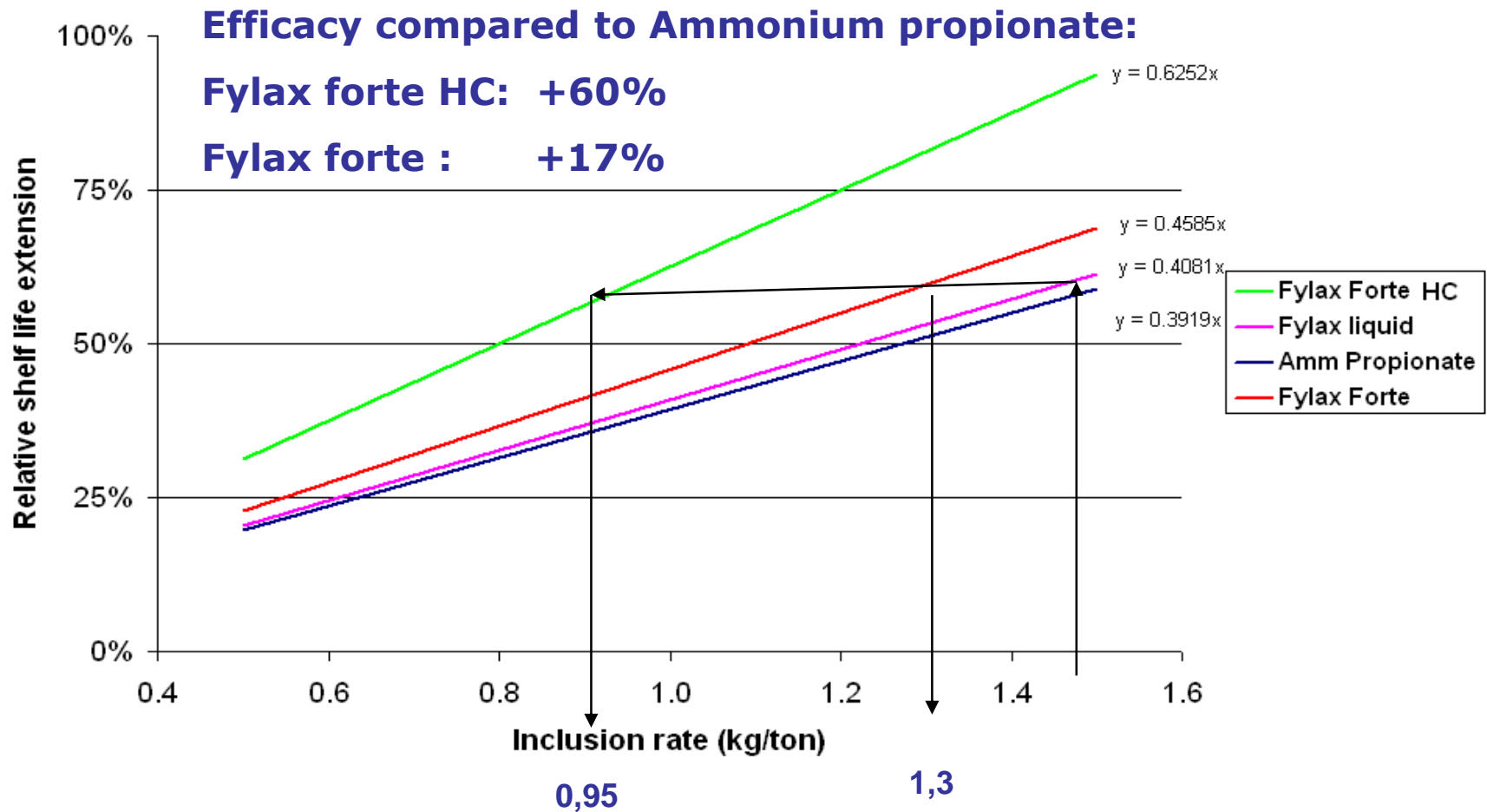
- Incubation: 35°C & 95-99% humidity
- Increased moisture: + 3-6%
- Inoculated with log phase mix 4 mould species
- Treated with different dosages of mould inhibitor: 0.25-1.5 kg/tonne
- Record shelf life in contrast to control



Fylax new; strong efficacy improvement



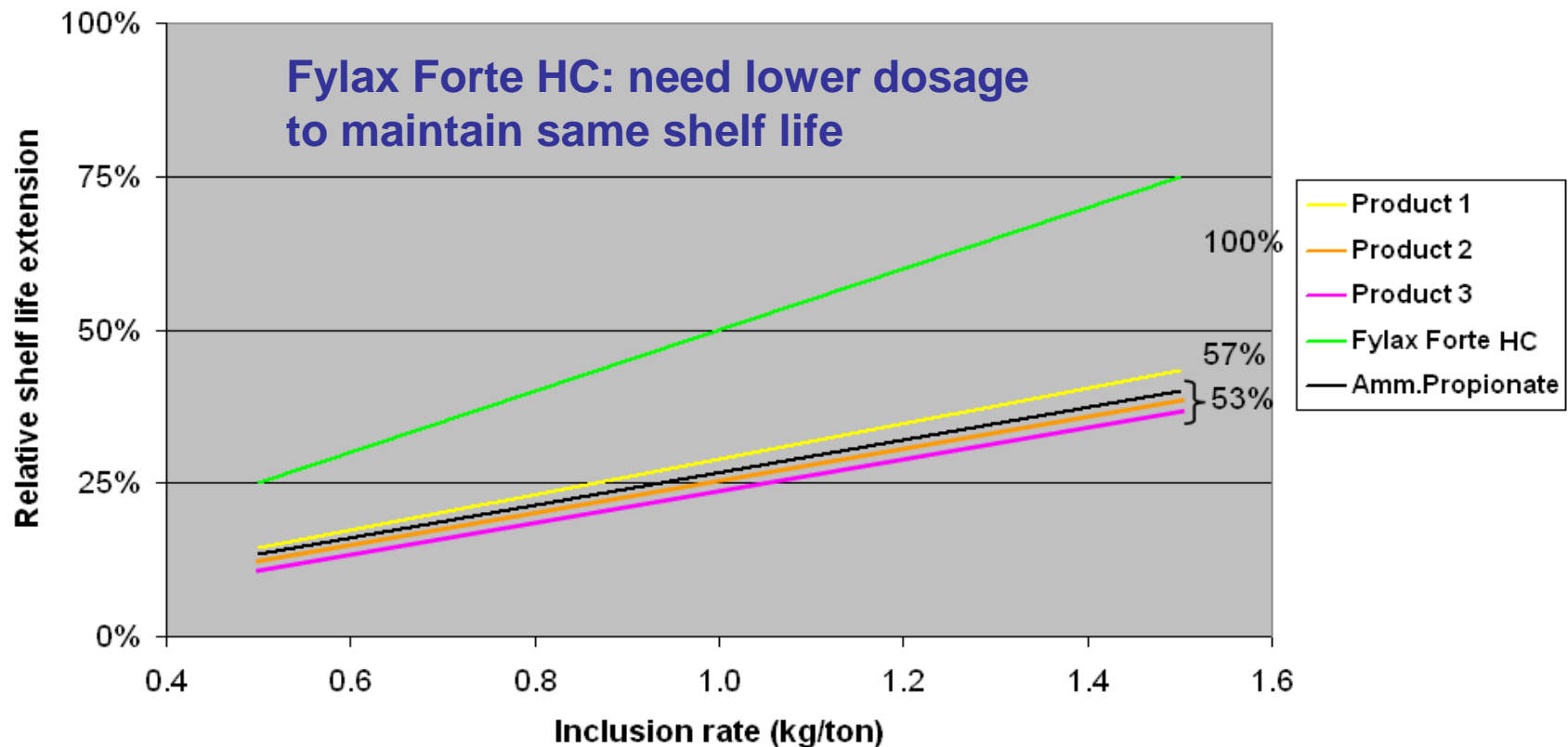
Effect of mould inhibitors on shelf life extension (comp. to control)



Fylax Forte HC stronger mould inhibition efficacy compared to commercial competitors;



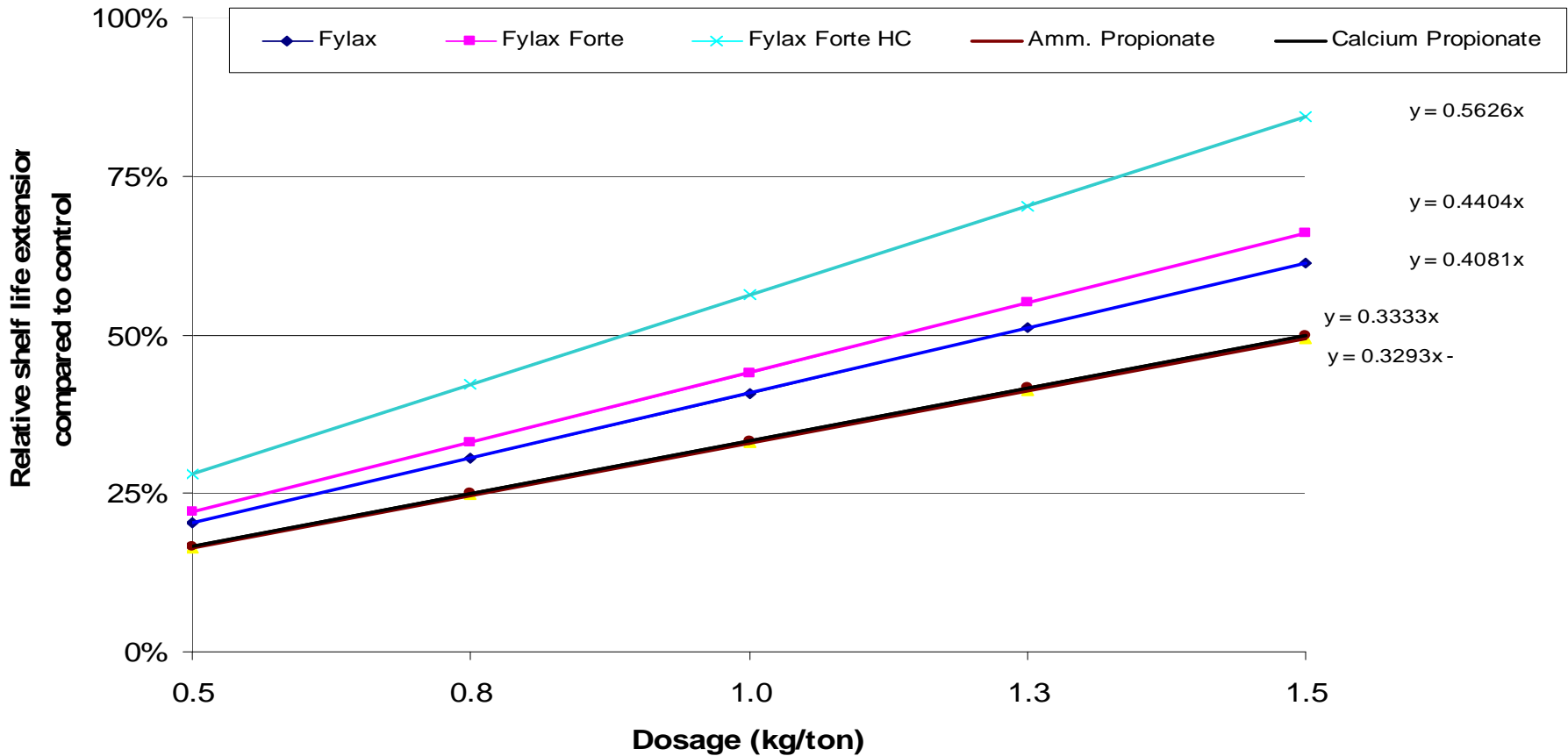
Effect of mould inhibitors on shelf life extension (comp. to control); benchmark with competitors



Comparison with Industrial standards



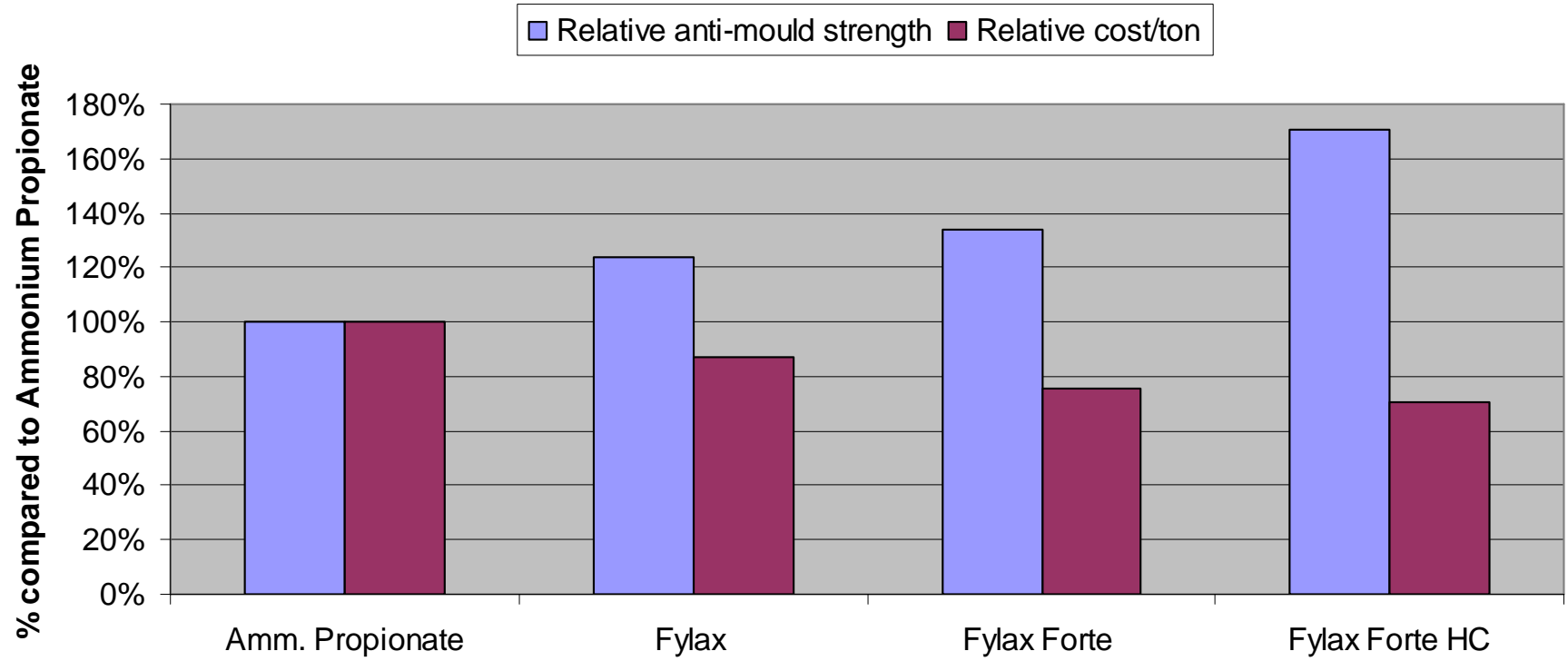
Effect of different mouldinhibitors on effect of shelf life extension



Fylax Forte higher efficacy and more cost effective compared to industrial standards (AP/CP)



Mouldinhibitors comparison





Benchmark moisture optimization

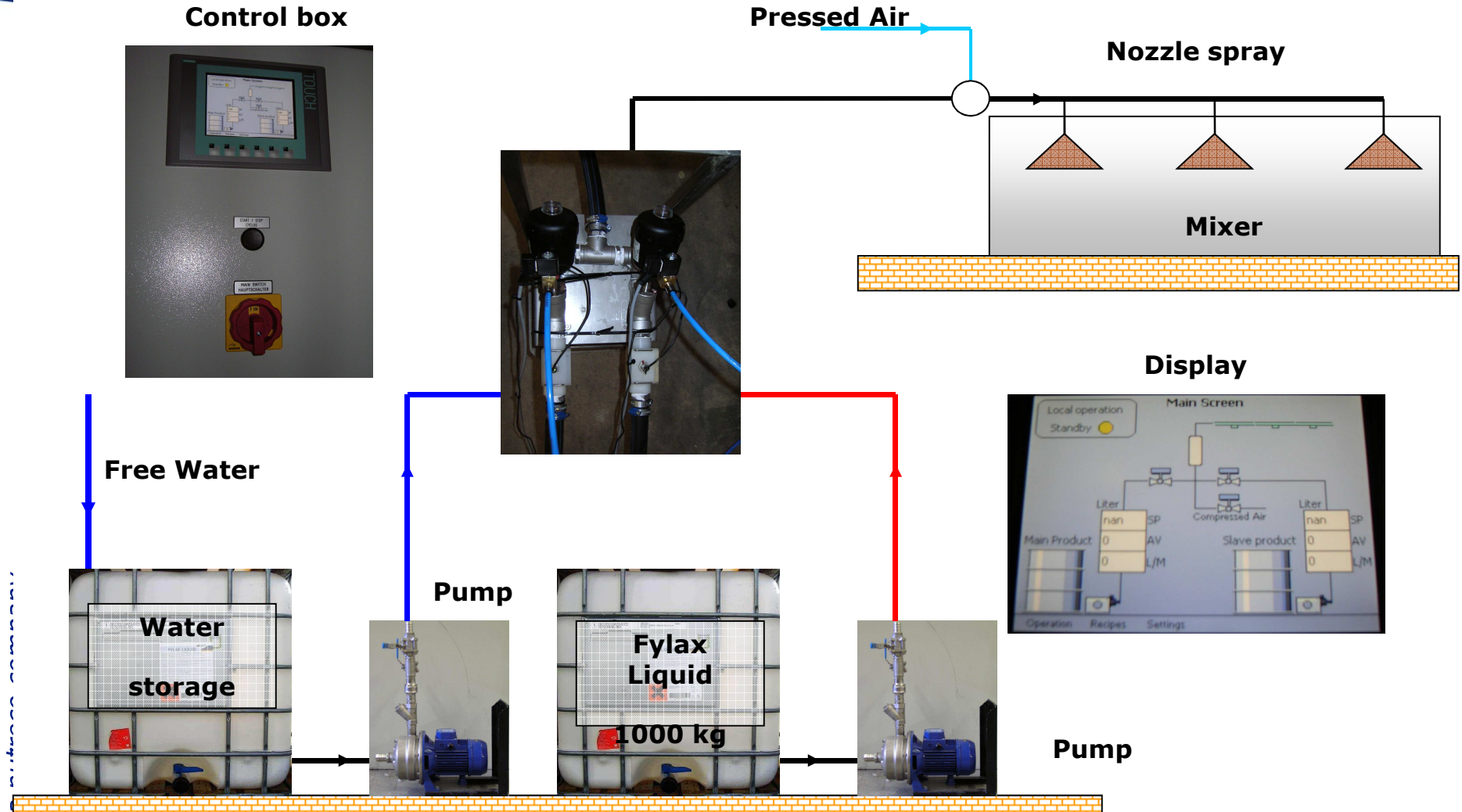
Moisture optimization test trials at Nutreco research feed plant



1. Effect of Fylax Forte HC on Feedmill efficiency
2. Comparison of Fylax and / Fylax Forte HC (25% lower inclusion)
3. Comparison of Fylax Forte with commercial emulsifier



Dosing equipment: Flexible Moisture optimisation E500



1) Fylax Forte HC improved feedmill efficiency



	Moisture % before pressing	Moisture % after pelleting	Pelleting energy consumption (Watt)	Temp.	Hardness pellet	Free water (Aw)
Control	11.5	11.25	11,020	76.6	7.35	0.708
Fylax Forte HC	11.5	12.35	9,880	75.0	7.45	0.741
Difference	0%	+ 9%	-10%	-2.2%	1.4%	5%

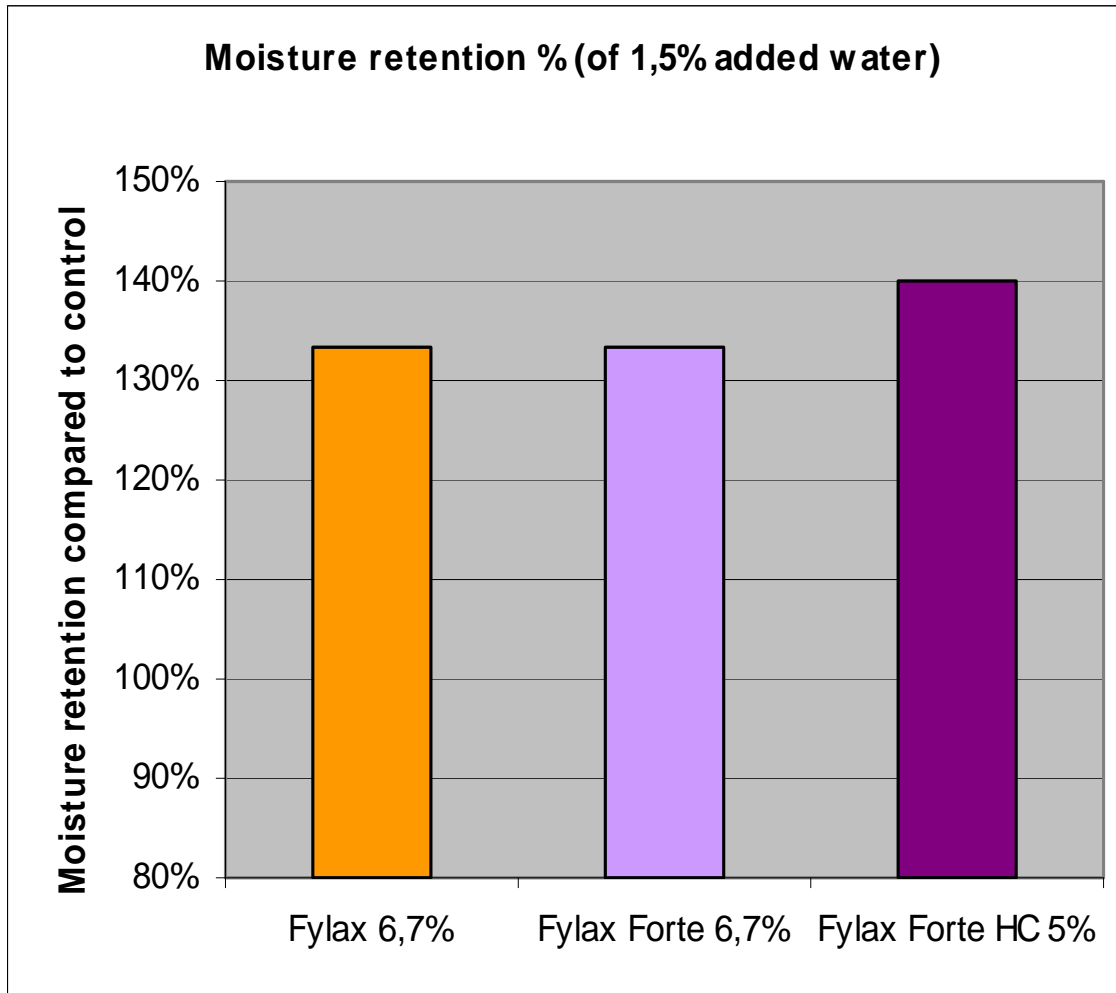
Premix: Fylax Forte HC = 7,5% in water; Dosage 1,5% in mixer.

Control group is without addition of water.

73% Moisture retention with Fylax Forte HC

Source: IRC research plant; March 2009

2) Forte HC; showed same moisture retention at 25% lower inclusion level!



- Piglet feed
- Addition: +/- 1,5% moisture in mixer
- Moisture retention compared to control

Source: IRC research plant; January 2010

Fylax Forte range: Solution for every feed efficiency target



Treatment	Inclusion per ton of feed	Cost-Benefit Ratio *	Shelf life
No moisture control	-	-	
Fylax Forte + 1.5% water	300 grams	1 - 4.4	maintained shelf life
Fylax Forte HC + 1.5% water	750 grams	1 - 4.7	increased shelf life

Choose the most cost effective solution for your target

(* Feed price € 0,25/kg; Electricity € 0,20/ Kwh; Commercial prices for products)

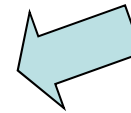
Summary Fylax Forte



🔍 New production technology resulted

activated propionates

- improved efficacy
- 25% lower inclusion



🔍 Fylax Forte HC → 10% lower cost / treated MT

🔍 Energy saving up to 10-15%

🔍 Pellet capacity increased 10%

🔍 Better pellet quality

🔍 Fylax Forte range: solution for every target

Thanks for your attention!



**Don't let moulds
consume your money**

NEW Fylax[®] Forte
More effective and cost efficient



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