

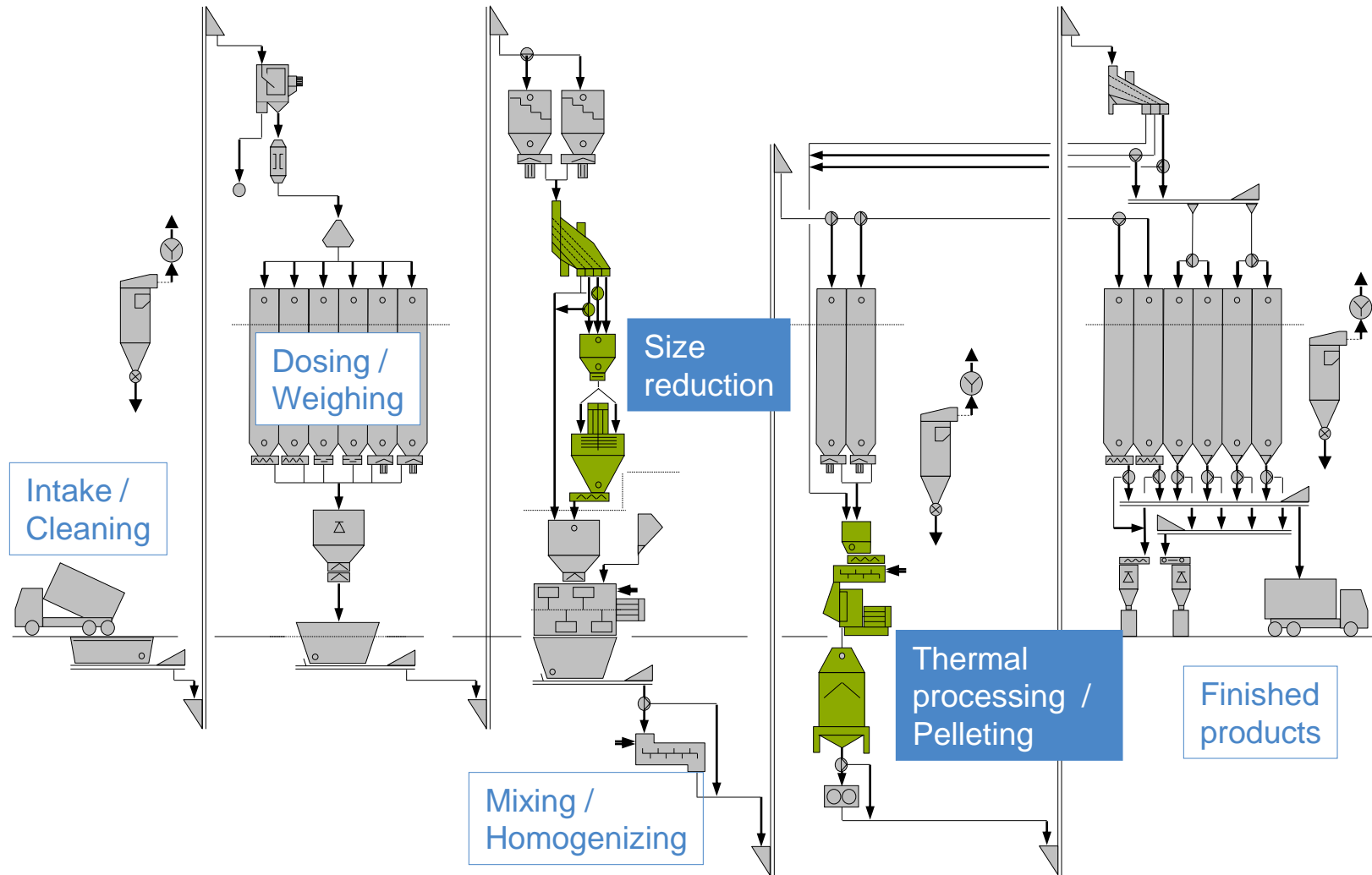


# Feed Safety and Sustainability in Poultry Feed Production.

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# Where to focus on?



# ***Importance of grinding in poultry feed production.***

- 80 % of the raw material in a feed mill has to be ground.
- Grinding is 2<sup>nd</sup> largest power consumer in a feed mill.
- Particle size has major impact on animal health and performance.

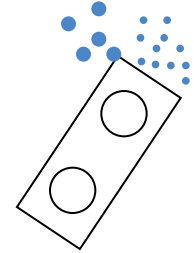


Correct particle size is crucial.

# Comparison hammer mills vs. roller mills.



## Hammer mills



### Advantages

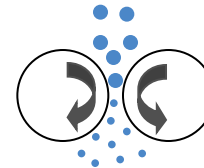
- Higher throughput rates
- Universal applications
- Easy to maintain / operate
- Simple design

### Disadvantages

- Wide particle size distrib.
- High power consumption



## Roller mills



### Advantages

- Narrow particle size distrib.
- Low power consumption
- Low heat generation
- Gentle treatment of product

### Disadvantages

- High capital cost
- Not suitable to grind fibre
- Limited particle size intake

# How to reduce energy consumption in grinding?

## Two stage grinding in post-grinding plant

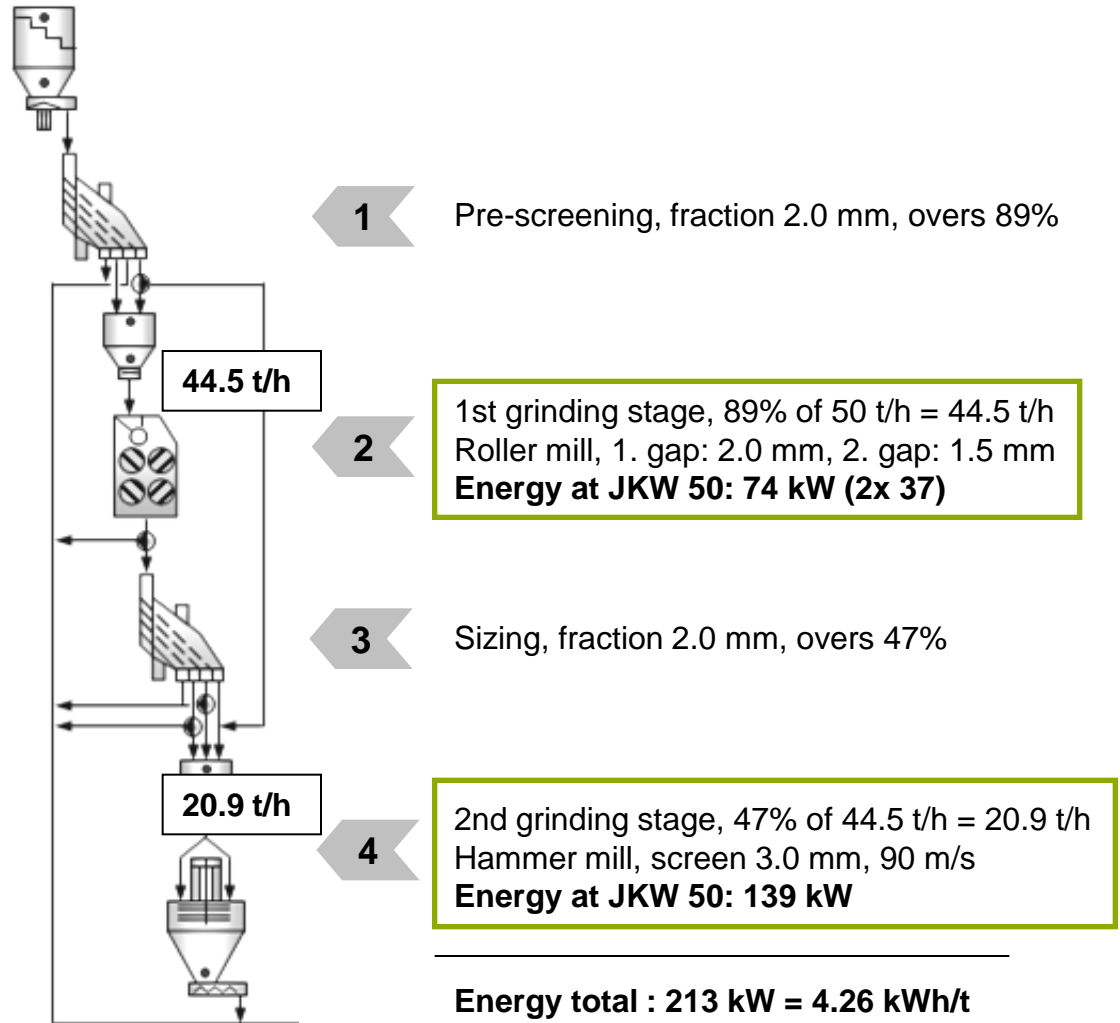
### Example parameters

- Broiler feed
- Plant capacity: 50 t/h
- d50 = 630 micron

### Energy consumption

- Direct grinding hammer mill:  
296 kW = 5.92 kWh/t
- 2-stage grinding  
213 kW = 4.26 kWh/t

**Savings 83 kW = 1.66 kWh/t**  
**In percentage: - 28 %**



# ***How to increase animal health?***

- Pilot trials on 3 broiler farms in the US
- Objective: Identify best particle size for poultry.
- Approach: We feed:
  - coarse/structured particles (roller mill)
  - fine/non-structured particles (hammer mill)

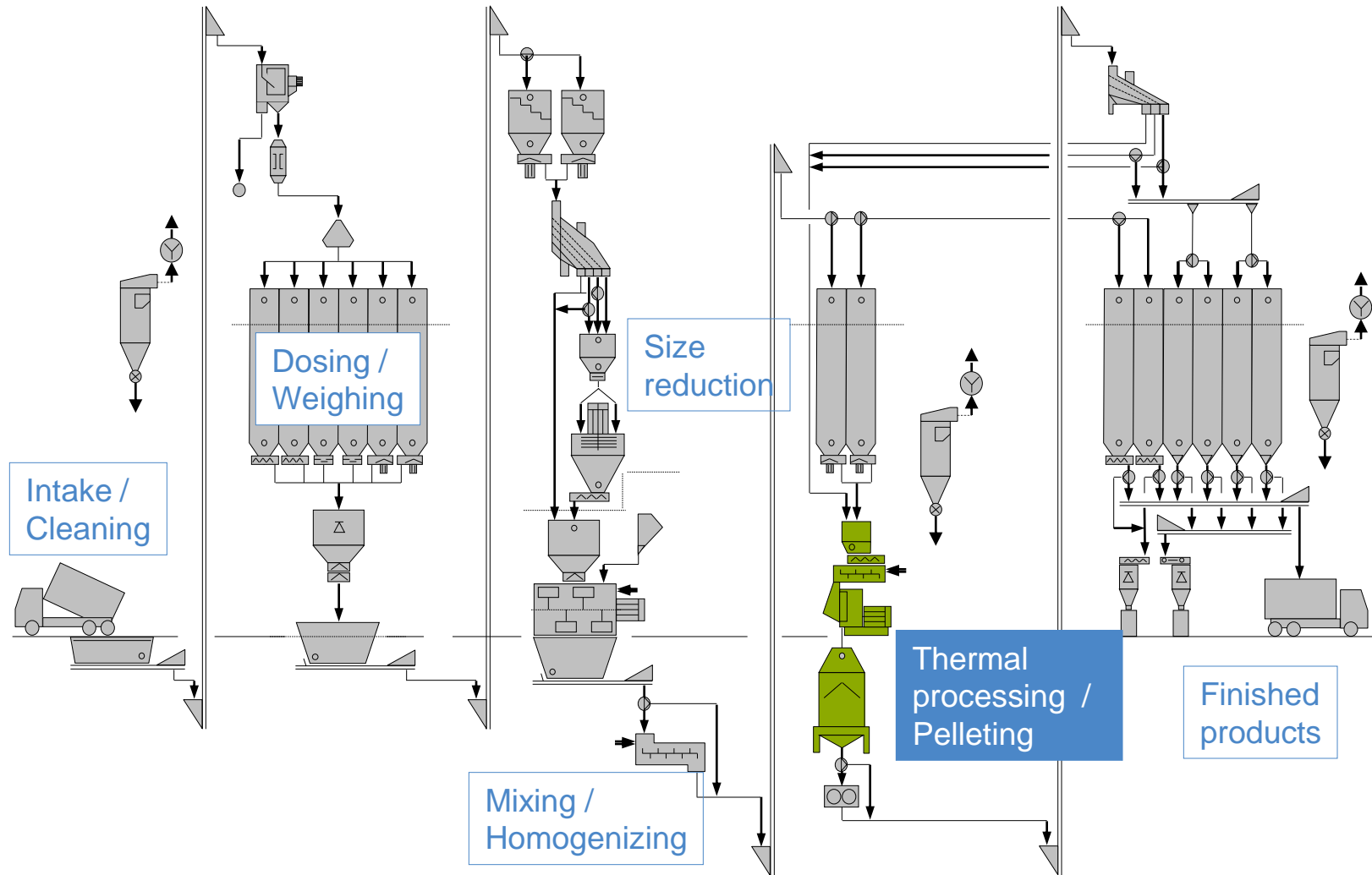
## **Our findings for coarse/structured mash feed:**

- 20 % higher gizzard weight  
(indicator of animals health status)
- Lower mortality rate
- Slightly higher animal performance for broiler



Broiler: Feeding coarser particles seems to have positive impact on the birds health and performance.

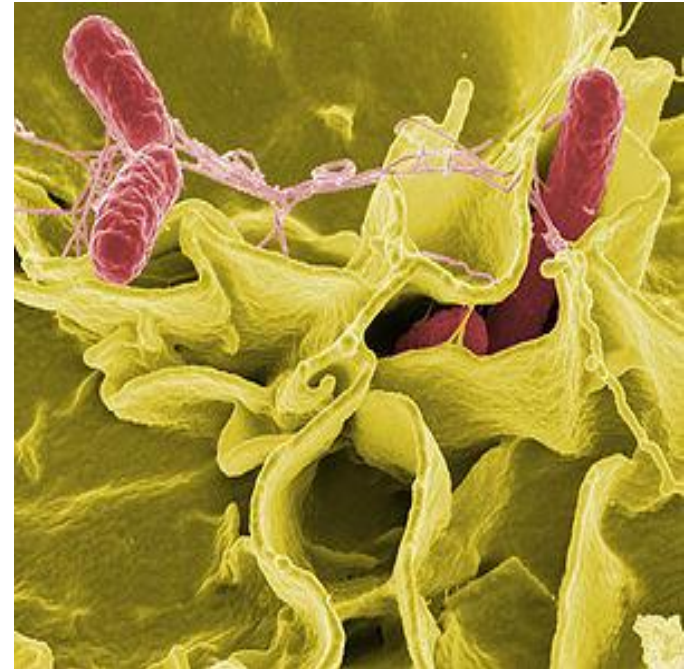
# Thermal processing and Pelleting.



# Why to *hygienize poultry feed?*

- 25 % of EU broiler farms are Salmonella positive.
- 15 % of the Salmonella contaminations in poultry products are caused by feed.
- 90 % of the Salmonella present in feed is caused by contaminated raw materials, especially those with high protein levels:
  - rapeseed meal
  - soya meal

**Source: Feed Compounder, June 2010**



## **Living conditions of Salmonella**

Temperature	< 30 to 45 °C
pH-value	6.0 – 8.0
Product moisture	25 – 80 %
→ Ideal living conditions in feedstuff.	

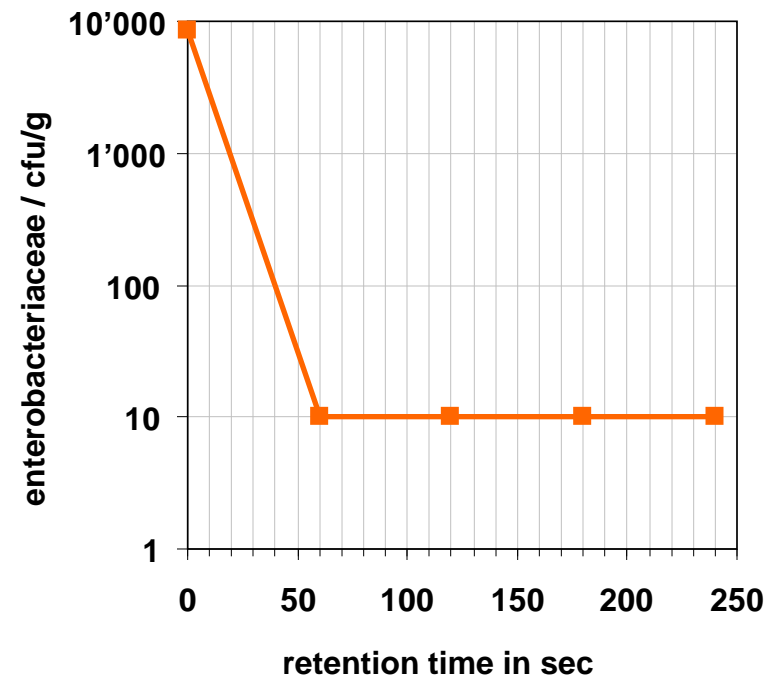
# Hygienizing ≠ Sterilizing.

Target is reduction of pathogenic micro-organism to a “safe” value.

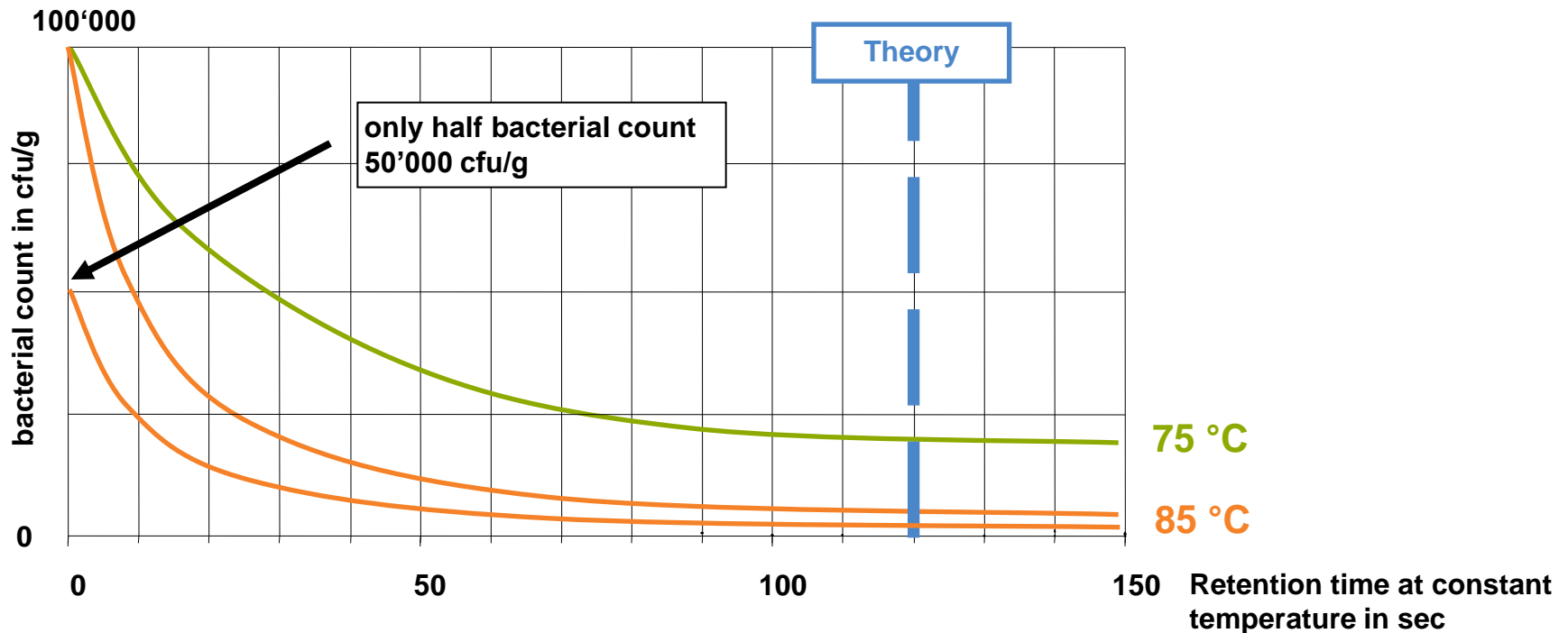
Whatever “safe” means.

Layer feed, 120 sec at 85 °C	untreated	treated
Mesophilic bacteria	21'000'000	1'500
Enterobacteriaceae	92'000	10
		log4 reduction
Moulds	5'800	100
Yeasts	240	--
Salmonella	--	--

The bacterial count will never approach zero.



### 3 parameter are crucial: raw material, temperature, time.



- **Raw material** Initial bacteria count is most important factor.
- **Temperature** The higher the temperature, the more efficient the hygienizing.
- **Retention time** Optimum seems to be at 120 sec.

# ***Pelletized feed: Best practice with HYMIX, HYTHERM.***

## ■ HYMIX Conditioner

- Intensive mixing of feed and steam
- Feed mash is heated up to 80 – 90 °C

## ■ HYTHERM Retentioner

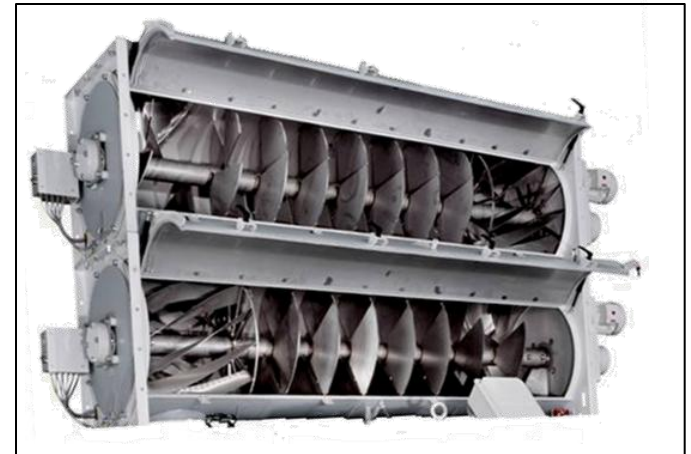
- Adjustable retention times (0.5 to 4 min)
- FIFO: narrow retention time distribution

## ■ All equipment

- Heating mats to avoid wall condensation
- Low amount of product residues
- Very good access and cleaning



HYMIX Conditioner



HYTHERM Retentioner

# Mash feed: New process without recontamination risk.

Old solution

New solution

Hygienizing



HYMIX Conditioner  
HYTERM Retentioner



HYMIX Conditioner  
HYTERM Retentioner

Drying & cooling

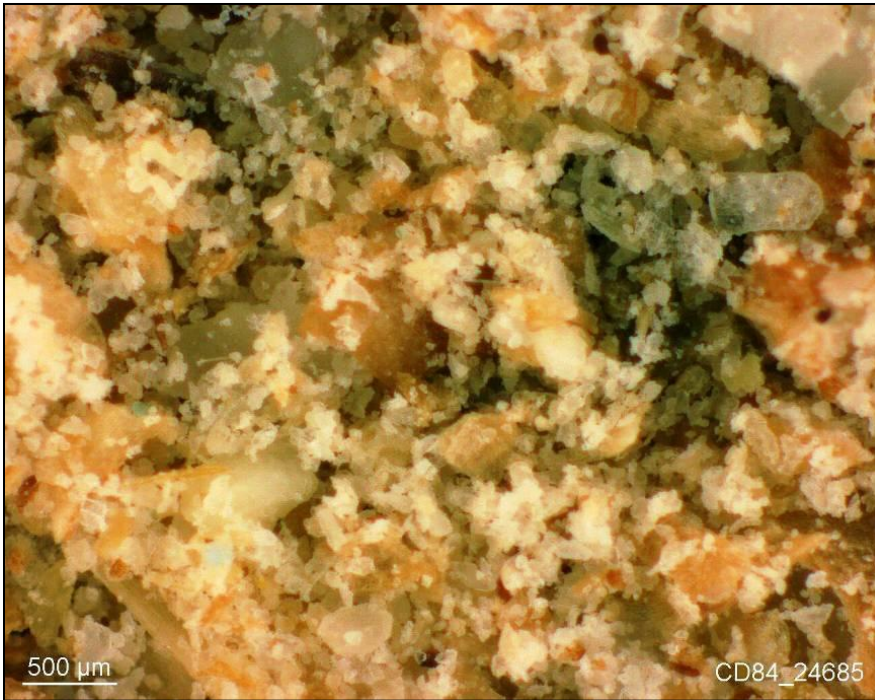


Cooling in counter-current cooler  
and homogenizing in batch mixer



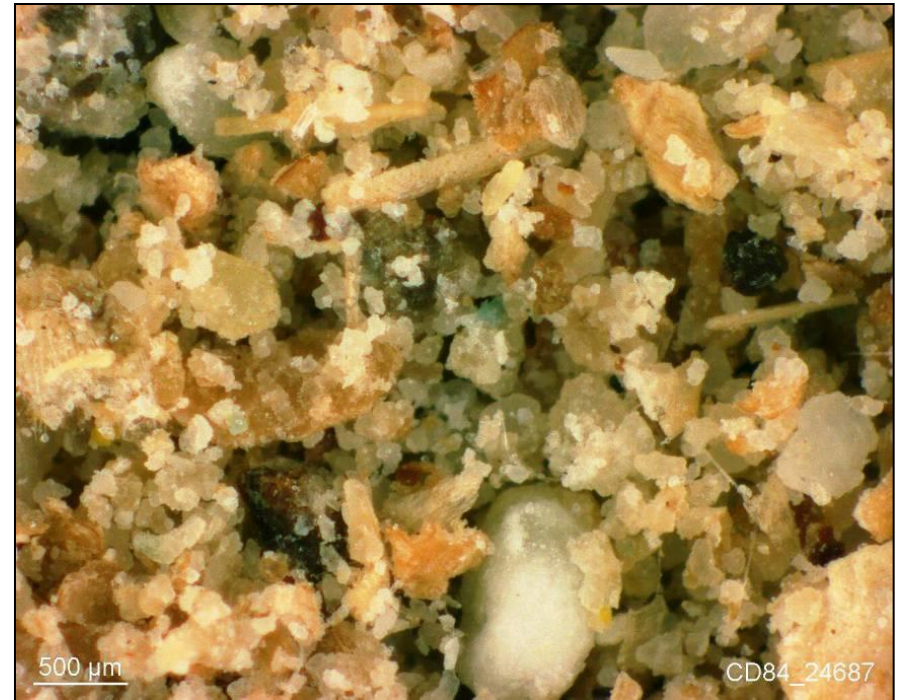
Thermo-pneumatic drying and cooling

## *Improvement of physical feed structure.*



**Raw material, untreated**

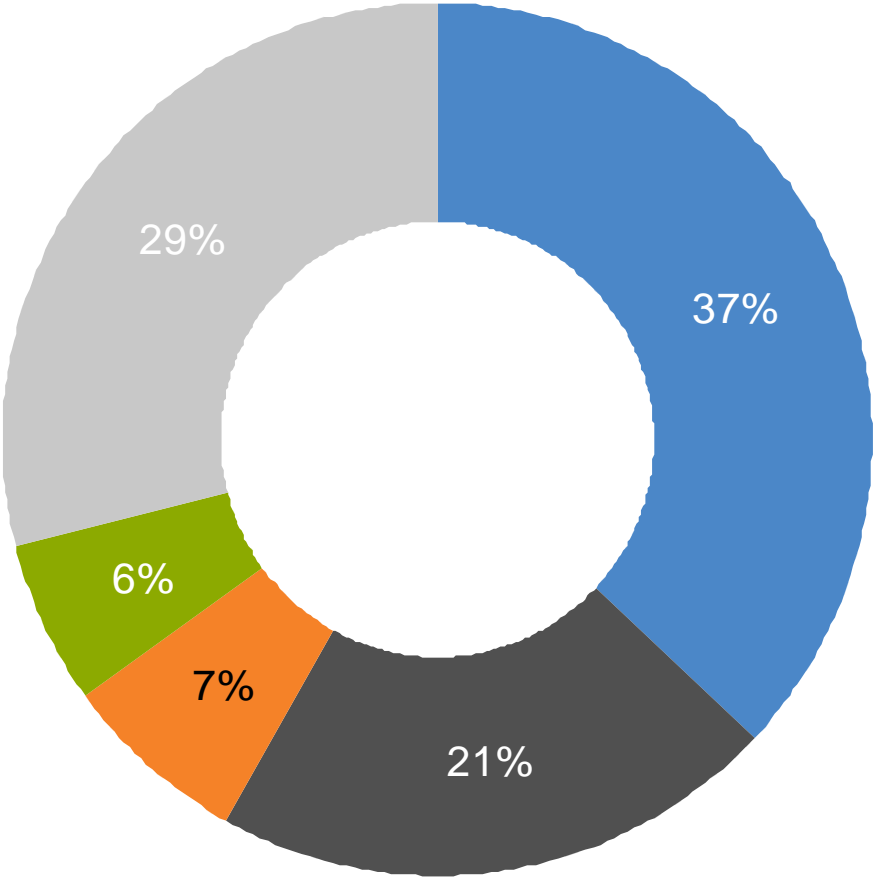
Fines causing dust and reducing flowability.



**Hygienized feed: 85 °C / 110 sec**

Fines are agglomerated onto coarser particles.

***Pellet mill = largest energy consumer.***



Ruminant feed	20-24 kWh/t
Swine feed	15-17 kWh/t
<b>Poultry feed</b>	<b>10-12 kWh/t</b>

- Pellet mill
- Conveying
- Hammer mill
- Compressed air
- Others

## *Imagine a new pellet mill saving 20 % of energy.*

- Energy savings of up to 20 % compared to conventional pellet mills.\*
- New direct drive concept without gearbox or transmission belts.
- Motor directly connected to main shaft, significantly reducing transmission losses.



Kubex T: High capacity pelleting up to 80 t/h with 20 % less energy.

\* Measured values ranged from 10 to 30 %.

# See the difference: Kubex™ T vs. conventional pellet mill.

## Production parameter

Layer feed	100'000 tons/year
SME pelleting	12 kWh/t
Energy costs	0.13 USD/kWh
Energy consumption	1'200'000 kWh/year
Total energy costs	156'000 USD/year
CO <sub>2</sub> emissions	500 tons/GWh

## Annual savings

Energy in kWh	- 240'000 kWh
Energy costs	- 31'200 USD
CO <sub>2</sub> emissions	- 120 tons CO <sub>2</sub>

## ***The final solution?***

*In-vitro meat: 100 % free of animals and CO<sub>2</sub>.*

