

**Preservation of Coarse Grinding
Structures in Compound Feed
Production by
Striking New Paths in Feed Processing**

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Introduction

- ✓ turning away from fine grinding and a clear trend towards so-called structural grinding of feed mixtures;
- ✓ fine grinding of feed can cause serious health and performance problems in pigs and poultry;
- ✓ positive effect of coarse feed structures on the development of the gastro-intestinal tract;
- ✓ during the pelleting process the pan grinder rollers of the pelleting presses post-crush the coarser feed particles;

Introduction II

- ✓ during expansion the coarse feed particles largely remain unchanged despite intense compression and kneading stress;
- ✓ expansion has positive nutritional effects:
 - starch and crude fibre modification
 - higher crude fat digestibility
 - elimination of anti-nutritive factors
 - minimization of the "cage effect"
- ✓ the feed industry urgently needs a pelleting or agglomeration process which does not exert any post-grinding effect.

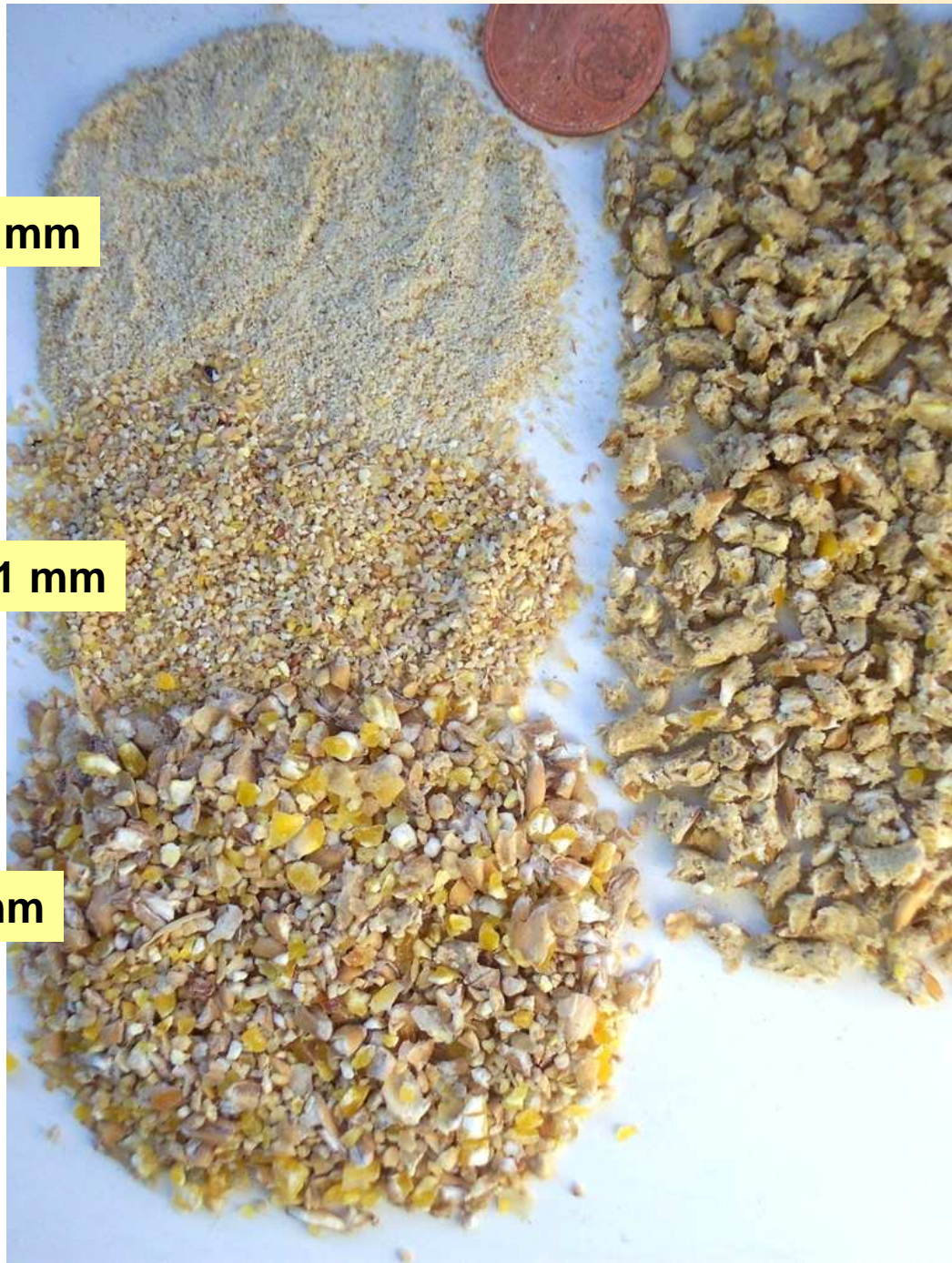
How broiler feed needs to be:

- ✓ Starter feed shall be crumbly
 - uniform crumble size; few fines
- ✓ Feed shall contain coarse particles – the more, the better
- ✓ Pellets are not required - on the contrary: Pelleting = fine-grinding
 - Aggregated feed („cookie crumbles“) should be favoured
 - Crumbles shall contain coarse particles.
- ✓ Coarse structures in the digesta are essential for stomach health, for a proper intestinal flow regulation and for good metabolic functions.
- ✓ Feed shall be hygienised
- ✓ Feed aggregates should not be fat-oversaturated
 - good post-pelleting capabilities required
- ✓ additional nutritive effects appreciated.

< 0.5 mm

0.5 - 1 mm

> 1 mm



Broiler feed



How turkey feed needs to be:

- ✓ Feed particle size (either pellets or aggregates) shall be homogenous.
 - higher portions of fines in pelleted feed must be avoided.
- ✓ Feed particles comparable in their shape, colour and surface would be the optimum.
- ✓ Also in future, the expander treatment in combination with pelleting will be a reliable method to optimize turkey feed.

⇒ Our vision:

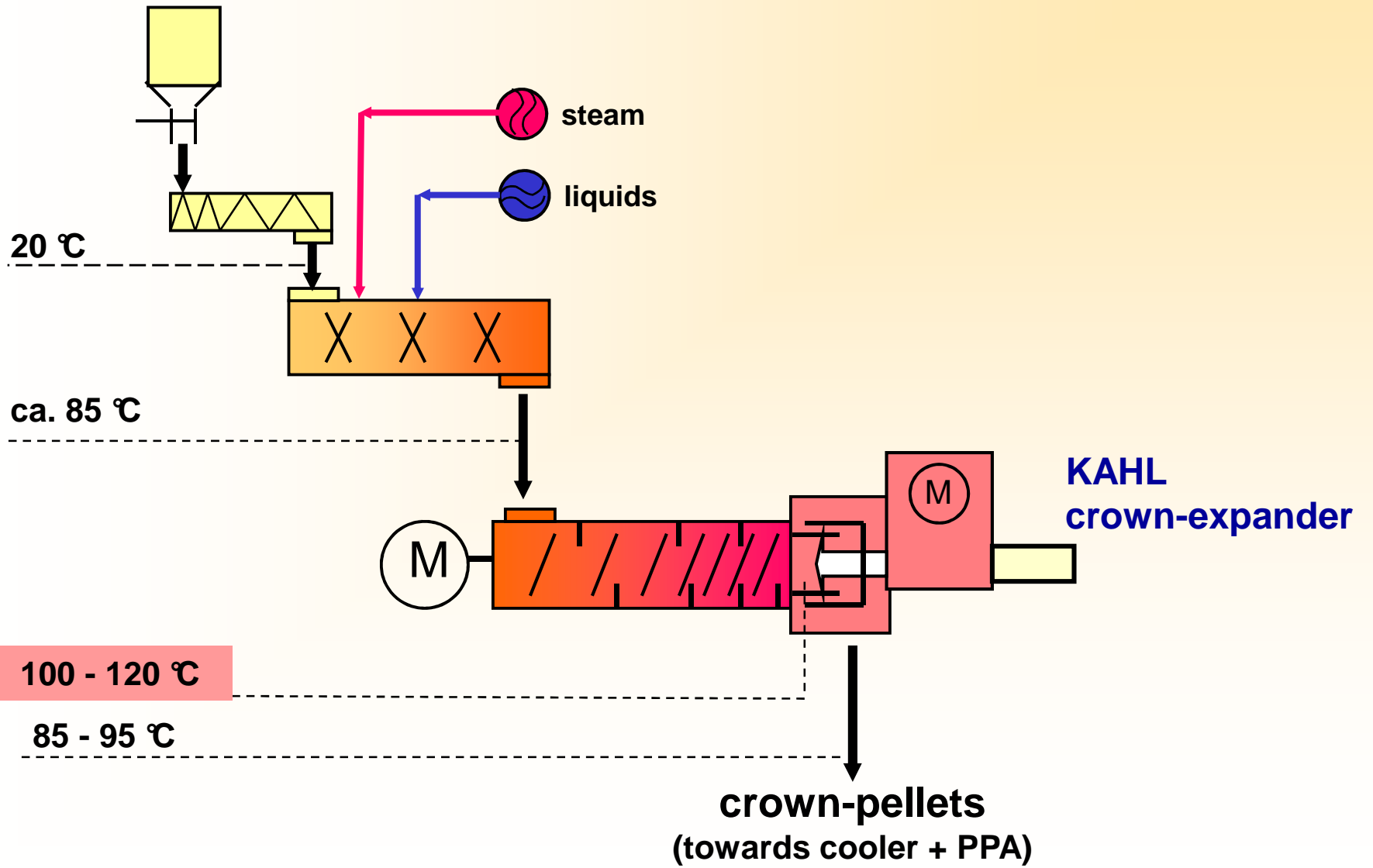
Pellet structures wherein coarse particles are being embedded in the matrix of aggregated fine particles

- no selected feed intake
- high intake rates
- few fines and dust
- hygienization and nutritive benefits
- excellent post-pelleting capability

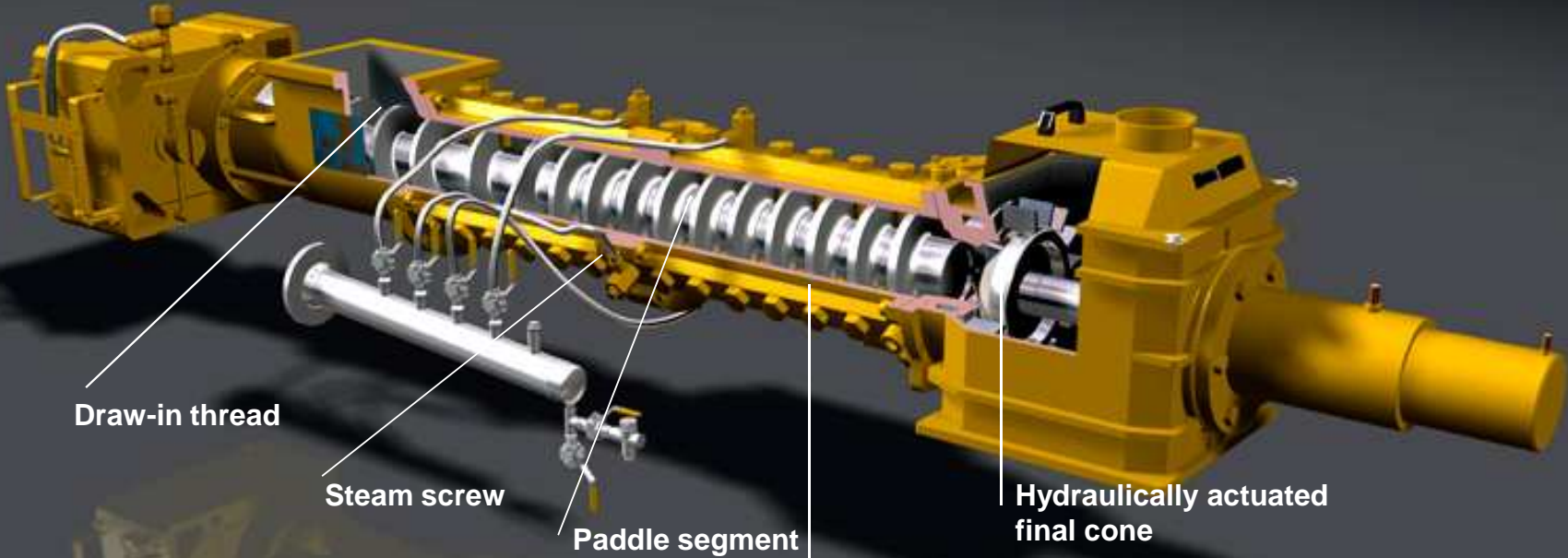
Turkey feed



Turkey feed



KAHL Annular Gap Expander® OER



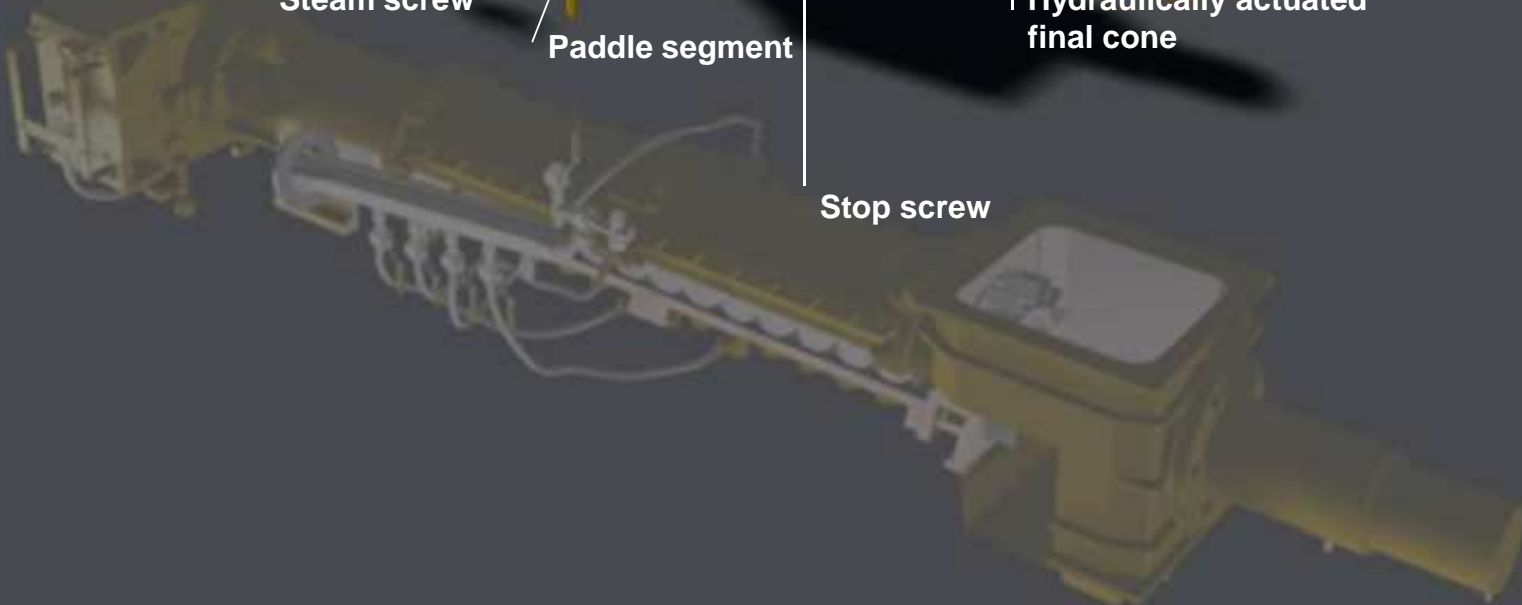
Draw-in thread

Steam screw

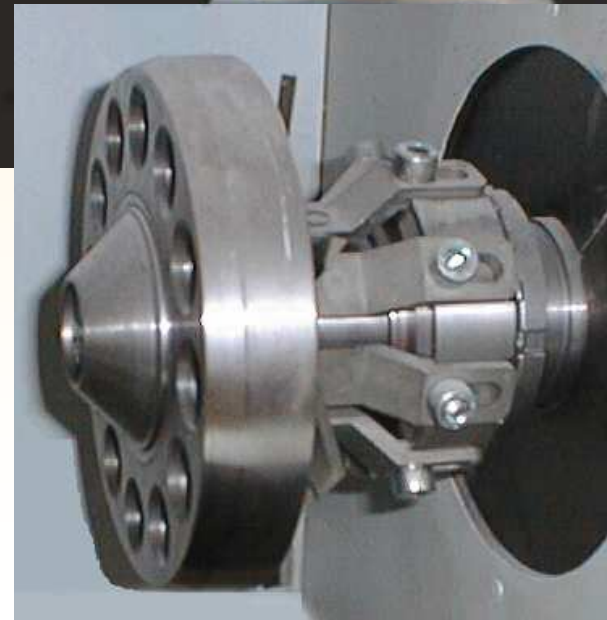
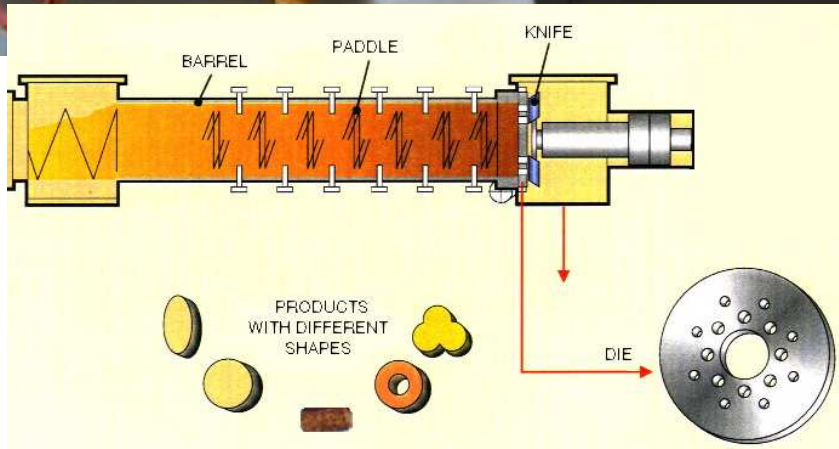
Paddle segment

Hydraulically actuated final cone

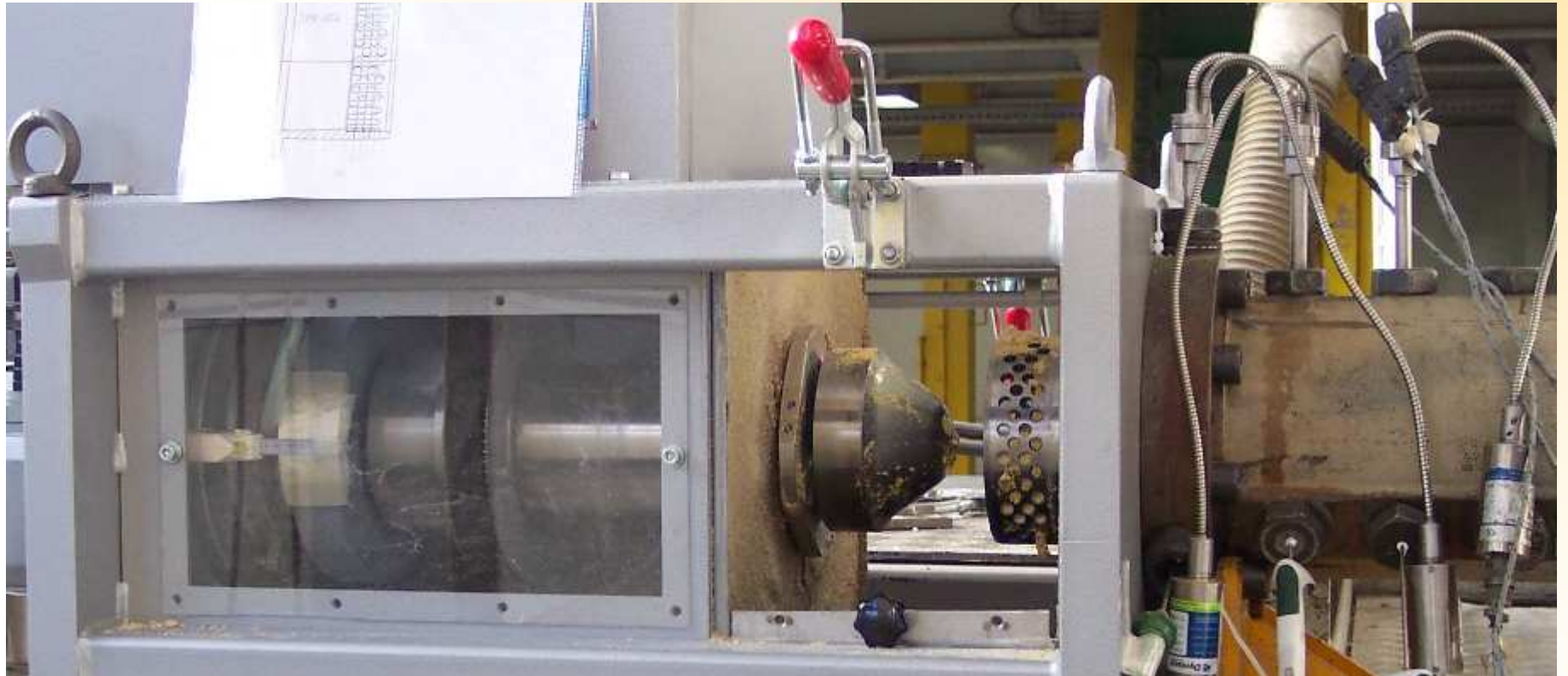
Stop screw



KAHL Expander/Extruder, Type OEE



KAHL-Crownexpander





At the expander outlet a tube extension ("crown") with drilled holes was mounted which resembles the annular die of a pelleting press

- The hydraulically adjustable closing cone of the expander is moved into the tube end.
- As a result, the product is forced to leave the machine through the holes of the crown.
- An orbital cutting device, the knives of which rotate around the crown, cuts the emerging product strands into pellets.

Pig feed with Crown-expander



➤ An important process characteristic is the fact that the energy inputs in the expander are controlled by the position of the cone in the crown:

✓ The deeper the cone is moved into the crown, the more holes are closed by it and the higher rises the mechanical energy required for pressing the product through the holes.

Remember the basic requirements:

- ✓ **Pellet presses destroy coarse grinding structures**
- ✓ **Don't use hammermills, go for roller milling**
- ✓ **Keep the portion of fine particles (< 0.4 mm) below 35%**
(minimize the use / the purchase of finely ground feed components)

How about the Crown expander for pig feed processing?

- ✓ **The Crown Expander ...**
 - produces stable pellets or feed aggregates with minimum impact on coarse grinding structures
 - hygienisates the feed properly
 - improves digestibility
 - creates other beneficial effects for the animals

Water solubility of Expandat (right), compared to mash feed (mid) and to pelleted feed (left)





The "crown" pellets surprised by their excellent post-pelleting properties: In a cool dry state, they absorbed subsequently added vegetable oil quantities of 12 % by weight and more.

Conclusions



- Crown pelleting combines the advantages of expansion, extrusion and pelleting;
 - The feed aggregation while preserving the coarse structure, the outstanding post-pelleting properties of the pellets and the nutritional benefits as a result of the hydrothermal process recommend the process for large-scale application in the compound feed industry;
 - The frictioning process must be regarded as optimised hygienisation and conditioning process.
- This technology is recommended for simple and inexpensive treatment of compound feed in meal structure for different animal species.

**Expanded dairy cow and cattle feed:
- the trigger for surprising performance**

KAHL



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