Process Innovations – Protein Aeration Technology & Breaker Plates

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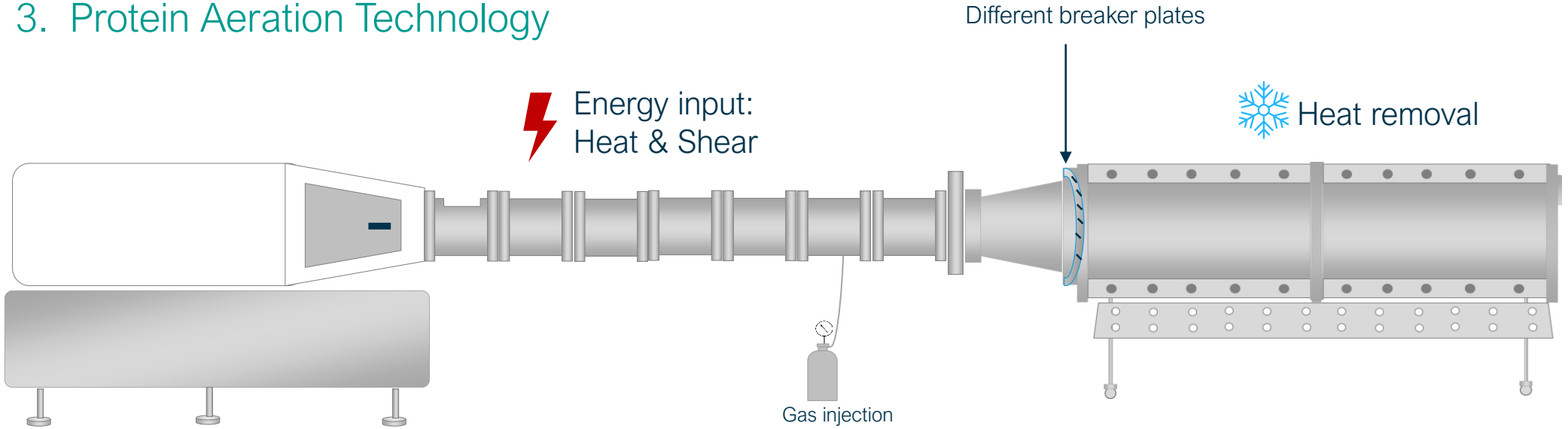
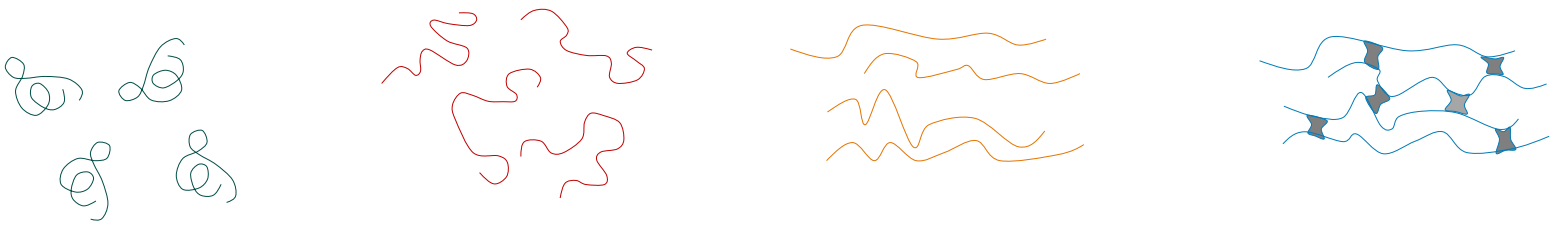
Process Controls to Optimize Product Texture

1. Breaker plates
2. Distinct tempering of zones
3. Protein Aeration Technology



4 tempering zones

- Conus
- Inside
- Right side
- Left side



Folded proteins**

Denaturing / disentanglement

Rearrangement & elongation

Aggregation & Solidification

Breaker Plates
Improving Texture in HME

Flow modification of plasticized, viscoelastic mass

Specific flow pattern depending on

- Breaker plate dimension and geometry
- Breaker plate open area

→ Macroscopic and complex textures

→ Tailoring of texture by custom-made breaker plate concepts

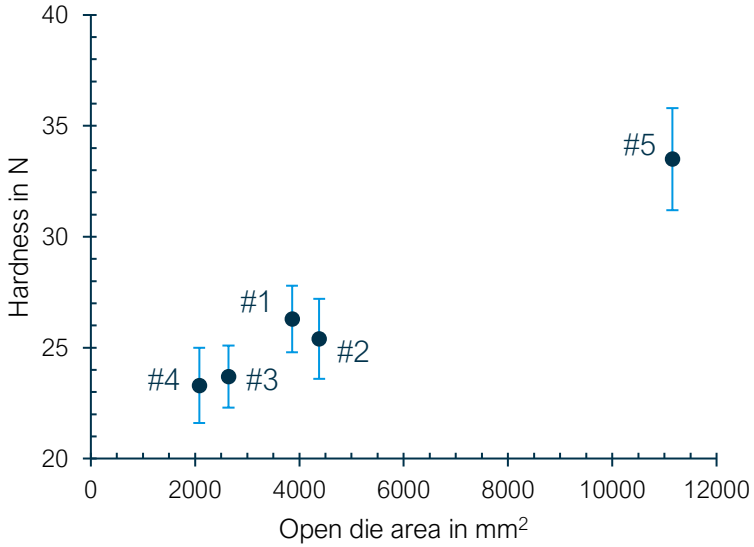
→ Loose overall texture of extrudate (natural appearance)

Possible applications

- Muscle meat cuts
- Fish-like products

Breaker Plates

Effect of Breaker Plates on Product Texture (PolyCool 500)



Figs. Hardness vs open die area (left) and macroscopic texturization (right) (internal R&D).

→ The lower the open area, the larger the shear stress and thus, looser texture in final product (lower hardness)

Distinct Tempering of Zones in the PolyCool 500

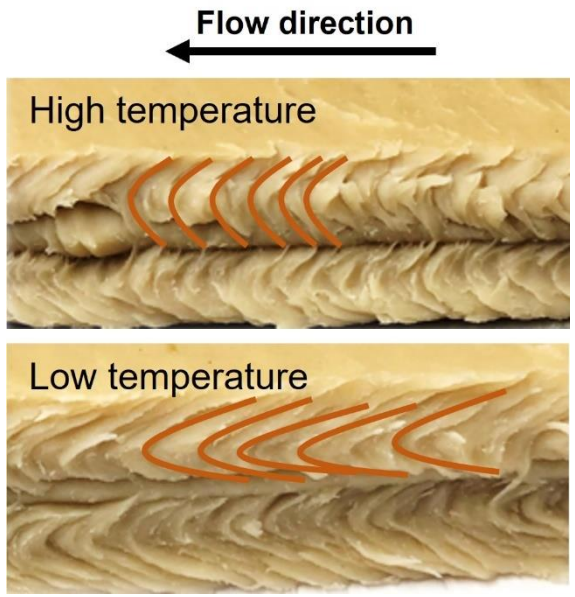
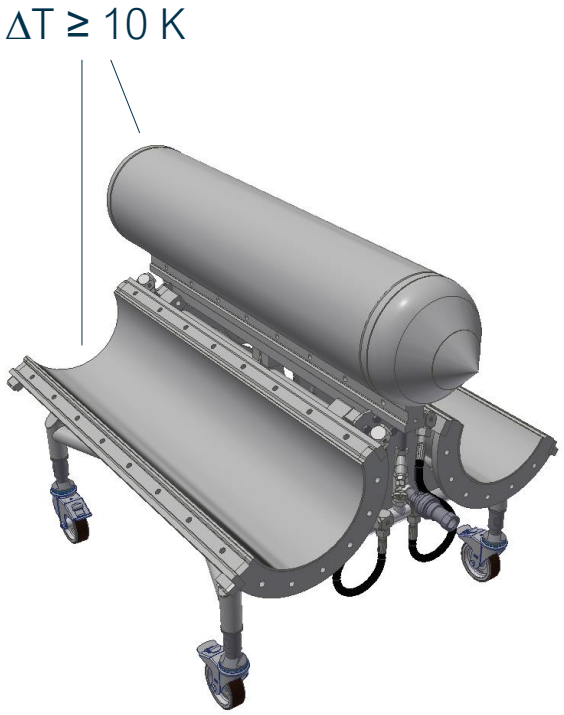


Fig. Effect of cooling die temperature on PolyCool 500 flow characteristics.

→ Low temperature: Elongated flow profile

→ complex structure and mouthfeel



What is Protein Aeration Technology?

The next generation of meat substitutes.

In using Protein Aeration Technology, gas is injected into the extruder to create a microporous structure in the product. When the product leaves the cooling die, gas expansion is achieved between the protein fibers.

This helps to generate biting properties and mouthfeel closer to meat or fish.

Products are lighter and look just like real chicken.

0%

0.05%
gas injection

Protein Aeration Technology changes the colour and texture of your product according to your needs.

These unique novel textures can be adjusted by injecting different volumes of gas. This provides a great degree of versatility, ranging from a simple color change to generating softer textures, such as those used in seafood and fish substitutes.

Without Protein Aeration

With Protein Aeration

Protein Aeration Technology

Video. Effect of Protein Aeration Technology and breaker plates on texture.

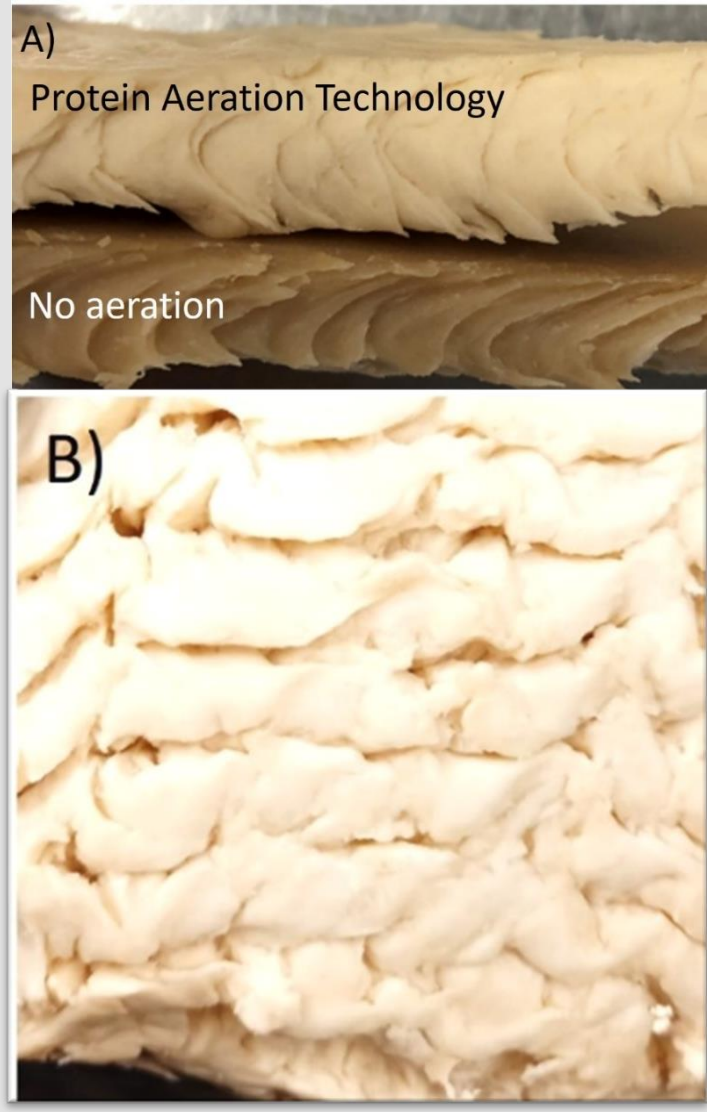


Fig. A Effect of Protein Aeration Technology on texture
Fig. B Example meat alternative produced by breaker plates and Protein Aeration Technology.

Protein Aeration Technology and Breaker Plates
The Next Generation of Meat Analogues

Meatier fibers
Altered flow pattern within cooling die

Different shades of Color
Depending on amount of gas, color shades can be adjusted to match animal meat

Higher Flavor Absorption
Through micropores created by gas expansion flavor infuses deeper

Thicker Product
Gas expansion after leaving cooling die leads to up to 10% thicker extrudate

Meatier/Fishier bite and mouthfeel
Adjustable to mimic different kinds of meat and fish through softer bite and reduced density

INNOVATIONS FOR A BETTER WORLD