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Case Nortura/Norilia

Improving the utilisation of co-streams in poultry processing

Adler S.¹, Løes A.-K.², Slizyte R.³, Bar E.M.S.³, Misimi E.³, Carvajal A.K.³, Tveit G.M.³, Wold J.P.⁴, Vikman M.⁵, Wikberg H.⁵, Honkapää K.⁵, Egelyng H.⁶, Alvestrand H.⁷, Nordal J.⁷

The research project **CYCLE** aims on achieving total utilisation of raw materials from fish, chicken and vegetables with cycle thinking and sustainable technological solutions for an efficient and profitable food industry. CYCLE-industry partner **Norilia** is responsible for development and sales of co-streams

from **Nortura** slaughterhouses. Some of the co-streams are further processed. Chicken **co-streams** are fully exploited, but there is still potential to increase value by up-cycling, i.e. by processing the material for new applications in more high-value-markets.

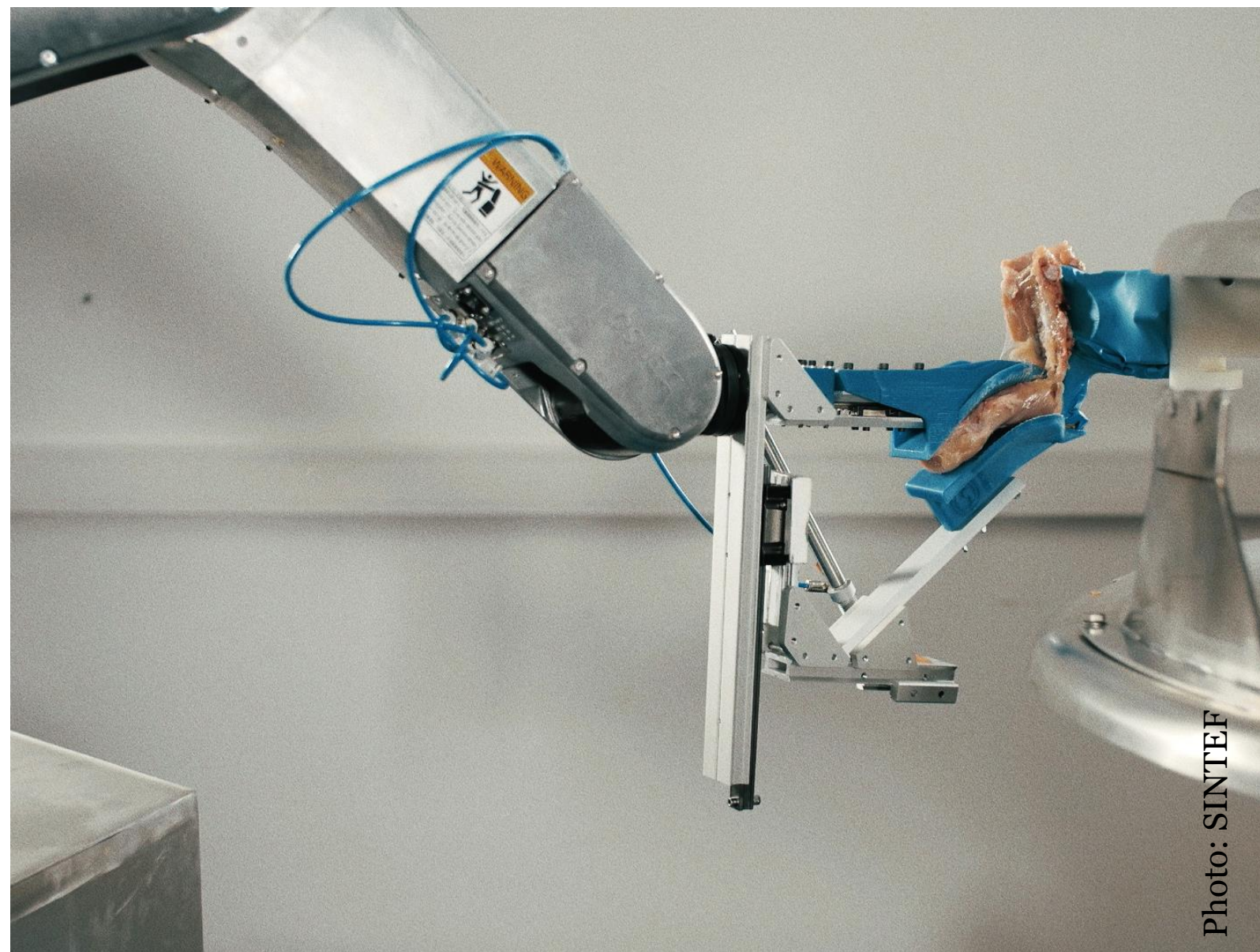


Photo: SINTEF

Robot

Automated concepts have been developed for an efficient and precise sorting of raw materials and co-streams.

- The Gribbot (photo) is successful in both scrapping the carcass and harvesting the fillet including the tenderloin. The entire procedure takes 4.75 seconds (Misimi et al. 2016)



Photo: Nofima

Online analysis

CYCLE researchers have developed VIS, NIR and X-ray based sensor systems for quality differentiation of raw materials and co-streams.

- Mapping of fat and protein in poultry bones (photo)
- Collected data can be used to steer hydrolysis of the material



Photos: SINTEF

Enzymatic hydrolysis

Enzymatic hydrolysis, originally developed for fish co-streams, was adapted for use with poultry bones.

- For food applications, oil and dried hydrolysates were derived (photos)
- Chicken oil had low oxidation and hydrolysis values, but thermally separated oil had better quality than oil after enzymatic hydrolysis (Tveit 2014)



Photo: Adler S., NIBIO

Feather meal

Pressure cooking increases the digestibility of feather keratin, but limits the availability of some amino acids. CYCLE researchers worked on improving the hydrolysis process.

- Autoclaving, NaOH and Na₂SO₃ improved digestibility, but the tested enzymes had no effect
- Solubilised and residual fractions differed in pepsin digestibility and amino acid composition



Photo: Norilia

CYCLE industry partner

Nortura / Norilia

Nortura SA is a cooperative owned by 19,000 farmers. Nortura-owned Norilia AS is responsible for development and sales of co-streams from slaughtering of beef, pork, lamb and poultry at the Nortura slaughterhouses.

Upcycling

Norilia is planning to invest in a hydrolysis plant for poultry bones in Hærland. A separate plant for hydrolysis for category 3 material is an option. Further development and implementation of CYCLE research may significantly improve resource utilisation and improve environmental sustainability in the chicken value chain by up-cycling co-streams and thereby improving the profitability for Nortura/Norilia.

References

Misimi E. et al. 2016. GRIBBOT – Robotic 3D vision-guided harvesting of chicken fillets. Computers and Electronics in Agriculture, 121:84-100.
Tveit, G.M. 2014. Enzymatic hydrolysis of Chicken Rest Raw Material. M. Sc. thesis. Norwegian University of Science and Technology (NTNU), Trondheim.



Photo: Vikman M., VTT

HTC

The residues from enzymatic hydrolyses of poultry bones were treated with hydrothermal carbonization (HTC: 150-220°C, <50 bar in aqueous suspension).

- Distribution of the P and N between the liquid and solid phase can be controlled by adjusting process temperature and pH
- HTC yielded between 43 and 65% biochar
- The solid fraction can be utilised as feed ingredient, soil amendment, fertilizer or energy source (photo)
- Nutrients can be recovered from the liquid fraction



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Nordic Research and Innovation Pathways
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www.cycleweb.no

nibio.no

PO Box 115, N-1431 Ås, Norway
+47 406 04 100



¹ Norwegian Institute for Bioeconomy Research (NIBIO), ² Norwegian Centre for Organic Agriculture (NORSØK), ³ SINTEF Fisheries and Aquaculture, ⁴ Nofima, ⁵ Technical Research Centre of Finland Ltd (VTT), ⁶ Nortura / Norilia, ⁷ Nortura / Norilia