Humane on-farm processing

Nearly all spent hens in Denmark are processed on the farm to be used as mink feed. The method used is supported by animal welfare specialists as well as poultry health and food safety authorities. The pulp derived from the process can also be used for the production of bio-energy, as well as meat and bone meal in a feed ration.

By Wiebe van der Sluis

What can be done with spent hens?
That is a question often raised by layer farmers who do not have a processing facility nearby that is willing to buy these birds. Modern spent hens usually have little flesh and tissue that can be used for the food industry. They therefore may have little value, especially since the soup industry often prefers meat from more fleshy birds.

In 2002, Danish layer farmers were suddenly confronted with a prohibition to transport hens kept in laying cages. The ban was imposed because of the high incidence of broken legs and wings found in birds when arriving at the processing plant. People concerned with animal welfare linked these damages to the housing system.

This ruling forced Danish egg farmers to find a solution to set these birds in a different way. Killing on-farm seemed to be the best option, but how, and then what would happen with these dead birds? The answer came from the mink feed industry. Meanwhile, it was found that birds from non-cage origin showed even more broken legs and wings when arriving at the slaughterhouse. This conclusion forced the Danish government to lift the transport ban, but it did not influence the intention of the Danish layer farmers to find a humane way to dispose spent hens. The mink feed industry remained interested in using these hens and supported the initiative to find efficient ways to get them to their plants.

Valorisation
Lars Lunding, who is an egg producer with 40,000 birds in modified cages, struggled for a long time with valorisation of his birds. As chairman of the egg section of the Danish poultry producer’s organisation, and chairman of the egg committee belonging to the Danish Poultry Council, he was heavily involved in finding a solution for Danish egg producers. He was the one who approached the fur industry with the idea to use spent hens for mink feed. Before he did so, he killed several birds and, after having ground them to pulp, analysed what was left to understand the nutritional value. The results were convincing, but the question was how to get the birds to the mink feed plants. Lunding found the answer in developing a mobile system that can humanely kill and grind birds to pulp on-farm. The idea received positive response from colleagues, animal welfare organisations and government officials and resulted in the first ever mobile hygienic slaughter system for spent hens.

Meanwhile, the system is owned by a coop with 110 members of which six are in Sweden. They represent about 80% of the Danish layer business, including almost all producers that make use of cage systems.

Slaughter Mobile
The ‘Slaughter Mobile’ as the entire system is being called, consists of...
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a CO₂ gas stunner that kills the birds humanely within two minutes at a capacity today of 5,000 birds per hour. The dead birds are immediately conveyed to a 12 mm grinder where, at the end, three independent perforated cutters mince the material to a mesh size of 12 mm, depending on the requirement, and a 2m³ storage tank on board of the mobile machine. In the storage tank the pulp is mixed with acids to further disintegrate the feathers and bones at a pH of 2. This will kill all possible bacteria and, according to the latest results, viruses as well. After completing the mixing process the pulp can be pumped into a trailer tank of up to 20,000 birds for transportation to the feed manufacturing plant. Meanwhile, the pH value of the pulp will, due to the disintegration process, be increased to an acceptable level for further processing to be used as feed.

The Slaughter Mobile is made of stainless steel and can be cleaned and sanitised on-farm without leaving any waste matter behind. This allows it to be used under all conditions, whether it concerns the killing of healthy or sick birds. It can even be used in case of emergency killings like stamping-out during an outbreak of a highly infectious disease. In case a higher capacity is required one may change the gas stunner for a bigger one, because the grinder can easily process up to 12,500 birds per hour.

Bio-energy source

Although the Danish poultry industry has signed a contract with the mink feed industry to process all the pulp, the product can also be used for the pet food industry as well as bio-energy production. The German Institute for Soil and Environment did some analyses and concluded that the pulp contained 55.5% water, 11.1% ash, 40.8% crude protein and 43.2% fat, based on dry matter. This material could theoretically produce 577 litres of biogas/kg dry matter with 68.1% methane. Bio-energy trials done by Bioenergie Beratung in Bornim-Potsdam (Germany) showed that chicken pulp is more suitable for biogas production than corn silage substrates.

Gas production from pulp is negligible during the first two days but rapidly increases over the next 10 days, after which the gas production remains at a high level. The trials showed a methane production between 69.9 and 70.2% during the first 10 days, which went up to 79% during the remainder of the trial. The product can therefore be used as basic material for bio-gas generators as well as an addition to other bio-gas substrates.

These findings provide, according to Jürgen Reimers, main shareholder of ProAn International, which holds the worldwide marketing rights for the Slaughter Mobile, and former president of Lohmann Tierzucht, new opportunities for layer farmers in various parts of the world to make alternative use of spent hens and generate some extra money from them by making a contribution to solving the global energy problem, but, due to the high nutrition value in countries where meat and bone meal is allowed to be used in feed rations, she added value is even much higher. For more information, visit www.slaughter-mobile.com