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# CANADIAN POULTRY

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# All in the family

**New research shows adding omega-3s to broiler breeder diets improves health and resilience of broiler chicks. By Jane Robinson**

As the poultry sector continues exploring alternatives to antibiotics that can support broiler bird health and growth, a groundbreaking study at the University of Guelph took a step back to look at opportunities to first boost the health of broiler breeder hens. The premise was straightforward: feed the omega-3 fatty acids and see if the benefits could be passed on to the broiler chick.

“We wanted to find out that if we enriched the diet of broiler breeder hens with omega-3s, are they able to pass along the benefits through the eggs so we have broiler chicks that are stronger and more resilient?” says Dr. Elijah Kiarie, professor of monogastric nutrition and McIntosh Family Professorship in Poultry Nutrition at the University of Guelph, who oversaw the research with his graduate student Dr. Aizwarya (Ash) Thanabalan.

“We also wanted to see if those broiler chicks are better able to withstand a disease challenge because the effects of the omega-3s are passed from parent to progeny.”

## **A comprehensive diet design**

The research team ran a 64-week project at the University of Guelph’s Arkell Poultry Research Station. They raised 588 broiler breeder hens that were placed on one of three diets at 0 days of age – a control, a diet with one per cent microalgae (marine-sourced or DHA omega-3) or a diet with 2.5 per cent flaxseed-sourced omega-3 (linPRO).

“It was quite a complex design with 32 combinations of diets to look at a number of variables, including the influence of the two sources of omega-3s,” says Thanabalan, who is now a poultry nutritionist with Jones Feed Mills Ltd. in Linwood, Ont. During the breeder rearing phase, they compared uniformity of flock and bone development based on diet and inclusion of omega-3s. “There is research that shows the benefit of feeding omega-3s to broiler breeders for their own health and development, but we wanted to see if feeding the breeders could influence the health of broiler chicks,” says Thanabalan.

Eggs were collected at various times throughout the life of breeder hens to see if the omega-3 levels in the egg were being passed on



Aizwarya Thanabalan completed her PhD with Dr. Elijah Kiarie for her work on the omega-3 project.

from the hens. They looked at fatty acid content of the eggs, hatch rate and fertility rate. Broiler chicks were raised out through a regular broiler production cycle where they evaluated a full spectrum of measurements. Broiler performance was compared for various configurations of omega-3s in the diet – the two different sources of omega-3s and whether or not their “mothers” had also received one of two sources of omega-3 enriched diets.

“One of the key questions we set out to investigate was – is there a benefit if I feed omega-3s to broiler breeders and then continue feeding their progeny, or should I feed only the broiler breeder and not the progeny, or only feed the progeny omega-3s and not the broiler breeder,” says Kiarie.

This was the key part of the research from Thanabalan’s perspective and one the industry really cares about. For the broilers in the study, they looked at body weight, feed intake, feed conversion ratio and breast meat weight. “We also challenged the broilers at day 10 with coccidiosis – a high dose acute challenge or low dose subclinical challenge – to see how they responded and the impact of omega-3s on their ability to handle the disease challenge,” she says.

PHOTO: DR. AIZWARYA THANABALAN

### Passing along performance

With all the combinations of diets and factors evaluated by the research team, the simple answer to the questions they set out to explore is, yes there is clearly a benefit to feeding omega-3s to broiler breeders and their progeny. And the source of omega-3s makes a difference.

“We are seeing phenomenal results from feeding omega-3 enriched diets to broiler breeders,” says Kiarie.

Broilers fed omega-3s sourced from flaxseed had lower feed conversion ratios than those fed omega-3s sourced from microalgae DHA.

This is good news for the research team as the flaxseed-sourced omega-3s (linPRO) is a sustainable, Canadian option manufactured by O & T Farms of Regina, Sask.

Feeding flax-based omega-3s to both broiler breeders and their progeny improved breast meat weight in broilers by five per cent. Surprisingly, breast yield of flaxseed-fed broilers was much heavier than those of microalgae DHA.

Broiler breeders fed flax-based omega-3s were able to produce heavier chicks compared to the algae-based omega-3s.

“One of the reasons broiler producers like heavier chicks is because they perform better in the barn, and that’s another plus

for flax-based omega-3s which is very interesting to me,” Kiarie explains.

When they challenged birds with coccidiosis, they saw higher lesion scores with birds fed algae-based omega-3. “This fits with previous research that shows DHA can dampen the pro-inflammatory response needed in birds to help build immunity, demonstrating that flax may be a more favourable source of omega-3s,” says Thanabalan.

Kiarie also suspects there is a slow-release effect with flax-based omega-3s because the birds need to process the fatty acid before it is nutritionally available – unlike DHA that is in a readily usable form for the bird – and that may also account for the bigger benefits of flax-based omega-3s for bird health and performance.

### A new way of thinking about nutrition

What this research really brought to light is the need for a re-frame on how we look at broiler chicken health and performance. “We have to change the way we think about feeding,” Kiarie insists.

“There isn’t a lot more we can do with starter diets for broilers, so we need to work at the broiler breeder level to improve egg



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# Nutrition



The main premise of the project was to determine if the benefits of feeding omega- fatty acids to broiler breeder hens could be passed down to their progeny.

quality and chick quality because that's where we can have a huge influence on how chicks perform on the farm," the scientist adds.

For Thanabalán, it's about connecting dots within the industry. "We really have to start consciously feeding broiler breeders with an eye to the health of broilers," she says.

"There is such a divide between these phases of production, but we are seeing value for considering the whole continuous production cycle."

For O & T Farms, it's about the bigger picture. "This research signals a new frontier in nutrition to think about the whole life cycle, and not just the 42 days you are feeding a broiler," says Dr. Bree Kelln, technical services manager for R&D with the company. "What can we do to influence the bird in their lifetime and even have a longer-term effect?"

PHOTO: DR. AIZWARYA THANABALAN



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