

# Getting ahead of early chick mortality

## Innate immune stimulant shows promise as antibiotic alternative

Bacterial infection leading to early chick mortality in poultry flocks is a common concern on Canadian poultry farms. To manage risk, producers commonly use preventative antibiotics to ward off infections before they start. But with public health experts around the world expressing serious concerns about growing rates of antibiotic resistance in animals as well as humans, there is growing demand for antibiotic alternatives.

Dr. Arshud Dar, research scientist with VIDO-InterVac at the University of Saskatchewan, is leading research into effective, safe and economical non-antibiotics that allow for the prevention of microbial infection in neonatal chicks. His research has led to the development a non-antibiotic that may be a potential candidate for the control of yolk sac infection (YSI), one of the biggest contributors to early chick mortality.

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“Yolk sac infection is the most frequent cause of early chick mortality, leading to death in the first two weeks post-hatch, and poor carcass quality in the birds that survive,” says Dar. “When we began researching non-antibiotic alternatives, we first had to identify and characterize the bacterial pathogens associated with yolk sac infection in broilers.”

Dar’s team worked with more than 600 field samples from Saskatchewan broiler operations to narrow in on two avian pathogenic *E.coli* strains that were responsible for more than 90% of the YSI cases studied. Next, his team developed an experimental infection model in the lab to experimentally reproduce the disease.

The team identified and selected four innate immune stimulants. They applied each stimulant *in ovo* (directly to the amniotic sac) of 18-day embryos.



Arshud Dar

“We wanted to apply these *in ovo* because it would be much easier and cost effective for the producer to administer in a hatchery setting, and would require less labour,” says Dar.

Of the four innate immune stimulants researchers tested in these studies, *in ovo* administration of three of the stimulants tested showed promising results. One immune stimulant – known as CpG ODN – showed the highest protection activity against YSI, and Dar says it may serve as a potential candidate for replacement of antibiotics.

Now, as part of a Poultry Science Cluster 3 project, Dar's team is continuing its work, with an eye toward determining optimal dosage, and combining other innate immune stimulants that may make the dose more effective. The team is also working to determine the potential for interference with other *in ovo* treatments such as Marek's Disease vaccine.

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"It is possible that, with ongoing research, *in ovo* administration of CpG ODN alone or in combination with other innate immune stimulants could eventually become a routine

hatchery practice to control YSI, and significantly improve disease resistance, growth rates and vaccine responses in young chickens without antibiotics," says Dar. "Reduction of antibiotics is a very big issue. These studies will benefit not only farmers, but human health as well."

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