



General information	
PPP-number	TKI-AF-18022
Title	To Control Coccidiosis
Theme	Climate neutral
Implementing institute	Wageningen Livestock Research
Project leader research (name + e-mail address)	Dr. ir. Ingrid de Jong, ingrid.dejong@wur.nl
Coordinator (on behalf of private partners)	Mr. J. Zonneveld (ForFarmers) (replaces mr. A. Dijkslag, ForFarmers)
Project-website address	https://www.wur.nl/en/Research-Results/Research-Institutes/livestock-research/show-wlr/To-control-Coccidiosis-in-broiler-chickens.htm
Start date	01-01-2019
Final date	31-12-2022

Approval by the coordinator of the consortium	
The annual report must be discussed with the coordinator of the consortium. The "TKI's" appreciate additional comments concerning the annual report.	
Assessment of the report by the coordinator on behalf of the consortium:	<input checked="" type="checkbox"/> Approved <input type="checkbox"/> Not approved
Additional comments concerning the annual report:	

Summary of the project	
Problem definition	<p>Currently, the infection with the pathogen <i>Eimeria</i>, causing the disease coccidiosis, cannot be prevented. Therefore it is important to control the inevitable infection to prevent impaired animal welfare and production losses.</p> <p>To reduce the negative consequences of coccidiosis and secondary infections in broiler chickens, and thus to limit the negative impact on animal welfare and production losses, coccidiostats are usually added to the feed. However, this approach controls the negative consequences of infection only to a limited extent. Treatment can therefore be alternated by using vaccination, but this is expensive and difficult to carry out adequately on farms. Vaccination is only preferred over coccidiostats if it results in an early, uniform infection by the vaccine strain and a timely developed immunity in the flock, which is often not the case. Vaccination may therefore still result in secondary infections. Medication to prevent coccidiosis and secondary infections is not only expensive but also not preferred from a public health point of view and societal acceptance of broiler production.</p>
Project goals	<p>The aim of the project is to control coccidiosis in broiler chickens by promoting resilience to infection, and thus to reduce the need for application of medication (also for secondary infections) in the future. We will follow an integrated approach in which we will stimulate early protection against infection as well as support gut health during infection and recovery. This integrated approach is new, because it is not aimed at elimination or suppression of the parasite, which has thus far shown limited success, but is aimed to support the broiler chicken during infection with the <i>Eimeria</i> parasite.</p>

Results

Planned results 2019

Two experiments were planned, aimed at:

1. Finding management measures that can stimulate early and repeated uptake of a load of oocysts from the moderately infected litter, to achieve early and more uniform infection dynamics and resistance in the flock, without compromising chick health (promoting a more uniform and better resistance in a broiler flock);
2. To reduce disease symptoms in a broiler flock by promoting a healthy microbiota composition and supporting the chicks in limiting and quickly repairing intestinal cell damage, by providing them with nutritional additives that will support gut integrity, immunity to infection and recovery after infection.

Achieved results 2019

1. Two pilot studies have been carried out, in which four measures were tested that were aimed at promoting the pecking of the chickens at the litter, and thus stimulating the uptake of oocysts to promote a more uniform infection dynamics: double density, red coloured feed, UV light, and a dark brooder (in which the chicks will huddle together), all applied until day 14 of age. The results of the pilots showed that the first three methods seemed suitable to promote litter pecking. Double density and red feed are easy to apply in practice, and will be further studied in a follow up experiment. If possible, the UV light treatment will be included as well.
2. Four feeding strategies have been tested with respect to their ability to promote resilience of broiler chickens to coccidiosis:

Trt	Challenge ²	D0-9	D9-18	D18-28	D28-35
1	YES	Multi-species probiotic	Multi-species probiotic + 1,3/1,6 beta-glucanen	Multi-species probiotic + 1,3/1,6 beta-glucans + tannin	Butyrate + threonine
2	YES	Multi-species probiotic	1,3/1,6 beta-glucanen	1,3/1,6 beta-glucans + artemisin + curcumin	Butyrate + threonine
3	YES	Multi-species probiotic	Multi-species probiotic + Saponins	Multi-species probiotic + Saponins + tannin	Butyrate + threonine
4	YES	Multi-species probiotic	Saponins	Saponins + artemisin + curcumin	Butyrate + threonine
5	YES	Anticox (chemical: Clinacox (Diclazuril))			
6	YES	No anticox			

Results showed that: treatments with the best results regarding performance were those combining (1) Probiotics + β -Glucans/Probiotics + β -Glucans + tannins/Butyrate+threonine (Trt 1) or (2) Saponins/Saponins + artemisin + curcumin/Butyrate+threonine (Trt 4). The results also suggested that butyrate + threonine supported broilers recovery.

With respect to the lesions and excretion, treatment 4 showed the best results. Further, data indicated that other *Eimeria* species than *E. maxima* were more effectively controlled by anticoccidials or the dietary treatments compared to no treatment at all, but that *E. maxima* overshadowed most of these effects. As especially *E. maxima* could not be controlled sufficiently by the different treatments including the positive control, and with *E. maxima* generally having the most impact on body weight and FCR, this may explain the lack of measurable effects on performance parameters.

As here a combination of various products was tested, in the follow up studies the various products will be tested separately and in combination, to get more insight in the actions of the separated products and their underlying mechanisms. As this is not possible in a single experiment, more follow up experiments are planned.

Planned results 2020	<p>For 2020, three experiments are planned:</p> <ol style="list-style-type: none"> 1. Follow up study on infection dynamics 2. Follow up study on the effects of the different feed additives (testing saponins+essential oils in starter or grower, and butyrate+threonine in finisher phase, and a combination in starter, grower and finisher phase) 3. Second follow up study on the effects of the different feed additives, products to be decided <p>Further, the final report of the experiment on feeding strategies in 2019 will be available.</p>
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Deliverables/products in 2019 (provide the titles and /or a brief description of the products/deliverables or a link to a website.	
<u>Scientific articles:</u>	-
<u>External reports:</u>	-
<u>Articles in professional journals/magazines:</u>	-
<u>(Poster) presentations at workshops, seminars, or symposia.</u>	-
<u>TV/ radio / social media / newspaper:</u>	-
<u>Remaining deliverables (techniques, devices, methods, etc.):</u>	<p>Internal report of experiment 2 for the consortium Several student theses (from HAS Den Bosch and Veterinary Medicine interns, both at the Faculty on Veterinary Medicine), for all experiments carried out in 2019</p>