



# The Plan of Approach: Salmonella

## Tackle Salmonella in your farm step by step !

During the agro exhibition LIV Venray (end of feb. 2015), Daavision launched its Plan of Approach: Salmonella. Since February, more and more farm managers have come into contact with Daavision and its partners. Now it's a good opportunity to give you an update of the field results.

All blood samples from the first and second sampling were gathered at the participating farms. These samples were analysed and documented. Results show that at least 80% of the participating farms improved their salmonella status. The OD values did drop considerably. It means that these farms do get less total points per trimester. Which will result in a lower category level.

### Introduction

Fattening pigs that carry the Salmonella at the moment of slaughtering, could contaminate and infect the slaughterhouse and the slaughter lines, resulting in infection of the meat. (source : [www.gddiergezondheid.nl](http://www.gddiergezondheid.nl)). To guarantee the food safety, a countrywide monitoring program for Salmonella presence in pig production has been established. Based on the annual results of 36 blood samples, farms producing pig fatteners are scaled in in Category I (good), II or III (problematic). Slaughterhouses focus on farms with category I status (source: [www.pve.nl](http://www.pve.nl)).

To avoid a category III status, it's essential to control the salmonella pressure in the farm. Daavision developed, an unique 'Plan of Approach Salmonella' in close cooperation with several experts (e.g. Peter van der Wolf

(GD), Filip Boyen (University Gent), veterinarians in the field). The role of the product Daaquasafe® is key. The 'Plan of Approach Salmonella' is much more than only using organic acids. It includes several tools to deal with Salmonella pressure on the farm.

We do promote a strict protocol (in close cooperation with the above mentioned experts) to successfully restrict salmonella infections in the farm. Together with your local veterinarian we determine your salmonella status, which is based on analysis of blood and manure samples. In close cooperation with your veterinarian the "best fit" action plan for your farm will be determined, again based on the outcome of the sampling. In this way the Salmonella can be controlled and you will get the best results. Our goal is to steadily decrease the salmonella pressure and excretion for each production cycle, resulting in lower score per trimester. Finally, your salmonella category will improve. de Salmonella categorie dus ook!

### Materials and methods

For each type of farm (fattening pigs, reproduction farms and all in one' facilities), we have developed a protocol in cooperation with the experts. The protocol is based on a stable and balanced combination of liquid organic acids with a focus on short chained fatty acids (SCFA) with proven efficiency against gram negative bacteria (Daaquasafe®).

At the start of our cooperation, every farmer sends 12 blood samples to the VLG i.e. Veterinary Laboratory Gelderland in Epe (for Dutch farms only – a suitable laboratory will be determined in close contact with Daavision). This will be done by your veterinarian. Also samples of the faeces will be sent to this institute. In the protocol, it is described from which category of animals samples must be gathered. These samples give you an insight view in the actual status of your pigs, present in the farm.

Additionally, for each type of category (I,II or III), a unique protocol could be distinguished, with category III being the highest level of salmonella infection.

After about 12 weeks, 12 new blood samples will be collected.

In case it's possible, the same animals as the first time will be sampled. It means that these pigs did get the Daaquasafe® via the drinking water (2kg/1000 liter drinking water) over the whole period of 12 weeks.

In reproduction farms, the piglets are already transferred to another facility after 12 weeks but by means of this new sampling, the excretion of Salmonella could be monitored and it could be proven that salmonella status does improve after each weaning period.

### The product

Like has been explained already, in this 'Plan of Approach Salmonella' using Daaquasafe® is key. Daaquasafe® is a blue coloured combination of SCFA, completed with Cu (copper) and Zn (zinc). SCFA are very effective against gram negative bacteria like Salmonella, but also E.Coli. Addition of Daaquasafe® to the drinking water lowers the pH in the stomach. It prevents the reproduction of the bacteria. Several organic acids in Daaquasafe® have the capacity to enter the bacterial cell and kill them from the inside.

### Data

Blood- and manure samples of all participating farms are analysed by the VLG in Epe.

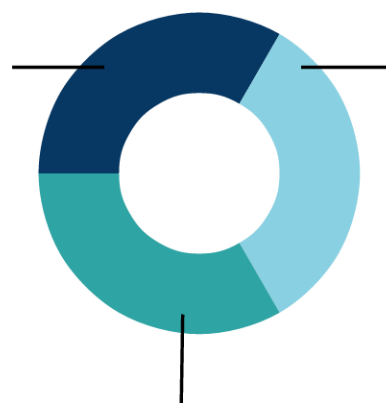
The analysis of the blood samples show the level of anti bodies against Salmonella. It is expressed in a typical OD value (Optical Density %). The higher the OD-value, the more antibodies are present in the blood serum.

The ultimate goal is of course to limit the excretion of Salmonella, resulting in a lower Category status for the farm.

Below, you will find the Dutch method of calculation to categorize each farm. For reproduction farms, the goal is to deliver piglets without any suspicion of salmonella infection.

36 blood samples each year

Category 1  
Low risk. 20% or less results of bloodanalyses do show an OD value > 40



Category 2  
Moderate risk. more than 20% and less than 40% of all bloodsamples do show an OD value > 40

Category 3  
High risk. 40% or more of all blood samples do show an OD value > 40

Per period of 4 months (trimester), each farm does get a score:

**1 point:** 20% or less results of bloodanalyses do show an OD value > 40 ;

**2 points:** more than 20% and less than 40% of all bloodsamples do show an OD value > 40;

**3 points:** 40% or more of all blood samples do show an OD value > 40

Finally, the results of three consecutive trimesters will be added to determine the category of the farm :

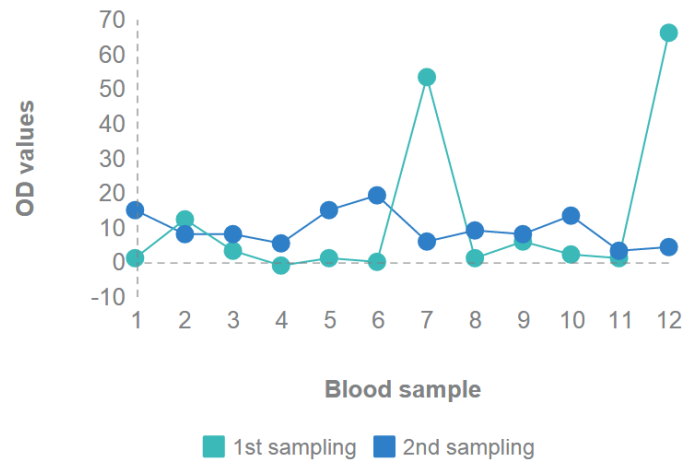
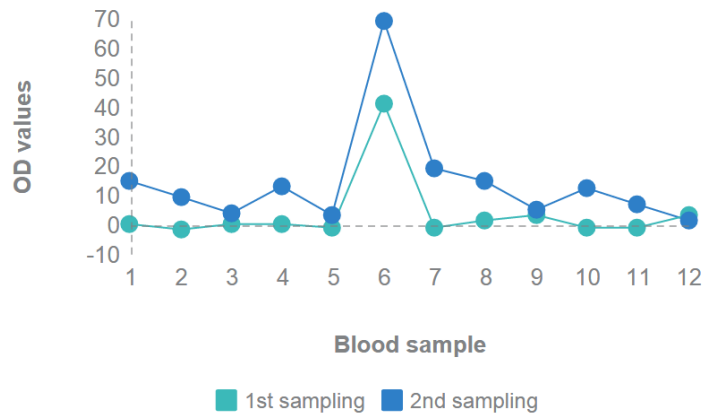
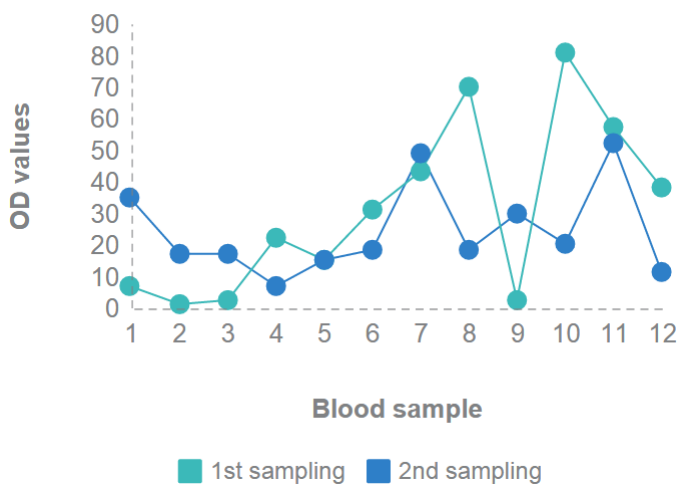
**Category 1:** Low risk. The sum of the scores of the last three consecutive trimesters is 3 or 4.

**Category 2:** Moderate risk. The sum of the scores of the last three trimesters is 5 or 6 or 7

**Category 3:** High risk. The sum of the scores of the last three consecutive trimesters is 8 or 9.

The results of the blood samples of blood sampling 1 and 2 for all participating farms are known. The response to the 'Plan of Approach Salmonella' is over 80%: 80% of the farms show lower OD values. This means that these farms do get a lower amount of points per trimester. Consequently, this will be reflected in a lower category on mid-long term.

Some examples:



For all young piglets, at the beginning of the battery period (until 25 kg live weight), the target value is OD 10. All values over OD 10 must be indicated as salmonella positive.

In case the piglets already have higher values at this age, you may assume that much higher titers will be found at an older age. For older pigs, like growers and finishers (fattening pigs), the target value is OD40, this is the same value as with trimester scores.

The graphs shown above are from some participating farms and do show us the tendency to be seen within every participating farm

## Conclusion and discussion

Based on the collected values, one may conclude that the 'Plan of Approach Salmonella' will result in same or lower levels of antibodies against salmonella after a period of 3 months.

The 'Plan of Approach Salmonella' supports the reduction of the salmonella status of the pig farms. The general goal to reduce the after each production cycle the excretion of salmonella will be realized.

Levels in the blood of antibodies against Salmonella could increase considerably on short term (within one or two weeks). Decreasing these levels takes much more time. You may compare this mechanism with the flu infections for human beings and the traced antibodies in the blood. Even when the problem with the flu is solved, still 3-4 months later, antibodies can be found in the blood.

It is key with the Salmonella monitoring that antibodies in the do not increase further but will be brought to status quo levels and slowly start to decrease by effectively using balanced mixtures of organic acids within the drinking water.

To be successful, you must realize that Salmonella is a multifactorial disease, it needs an effective control step by step; it implicates that several variables do effect the salmonella pressure of each farm. In order to have a clear impression, a checklist has been made which could be used as a guideline by the farmer, veterinarian and consultants.

Supplementing the drinking water with Daaquasafe®, is positively contributes to the salmonella control. Just acidifying water could be not enough to guarantee good results. The whole bio security and management needs to fit in order to get optimal results.

One of the basic rules to improve the efficiency of Daaquasafe®, is to start with clean drinking water of good quality. Cleaning the drinking water system improves the results. The mode of action of the organic acids is optimal with clean water tubes. We have noticed

this with one of the participating farms as well. Therefore, a good and regular disinfection protocol is essential. After each disinfection, the drinking water system must be flushed before applying the Daaquasafe® in the drinking water.

Another important aspect of the usage of Daaquasafe® is the dosage. Please respect a dosing of 2 l per 1000 liter drinking water, not only to drop the pH to the desired level but also to create enough efficacy for the optimal environment within the gut.

No concessions towards dosage should be made.

Salmonella infections could be controlled by the described 'Plan of Approach Salmonella'. Most probably, the OD values in the blood will start to decrease. As the mode of calculation of the category is based on values over a whole year, it's not likely but possible that your category will not change on short term.

It is still advisable to collect samples regularly together with your veterinarian to have a good idea of the immuno status of your pigs.