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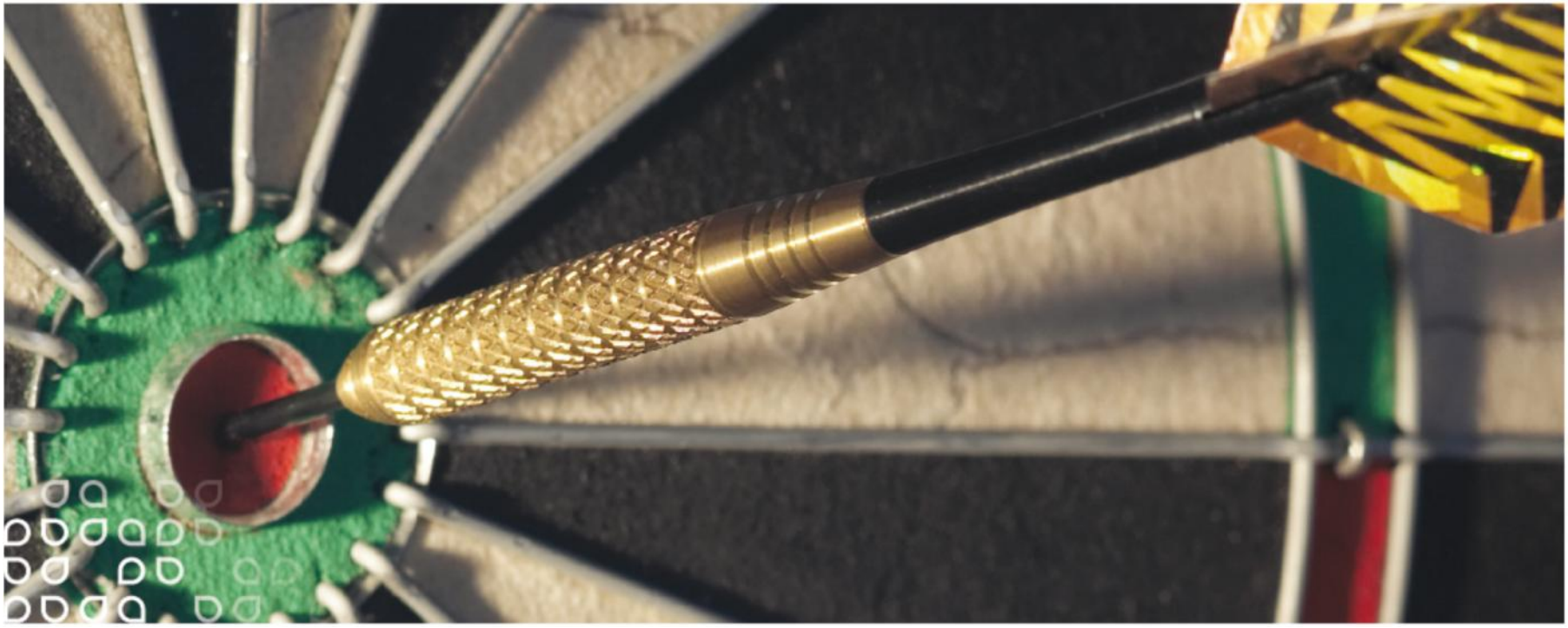

Setting a new standard in animal biosecurity

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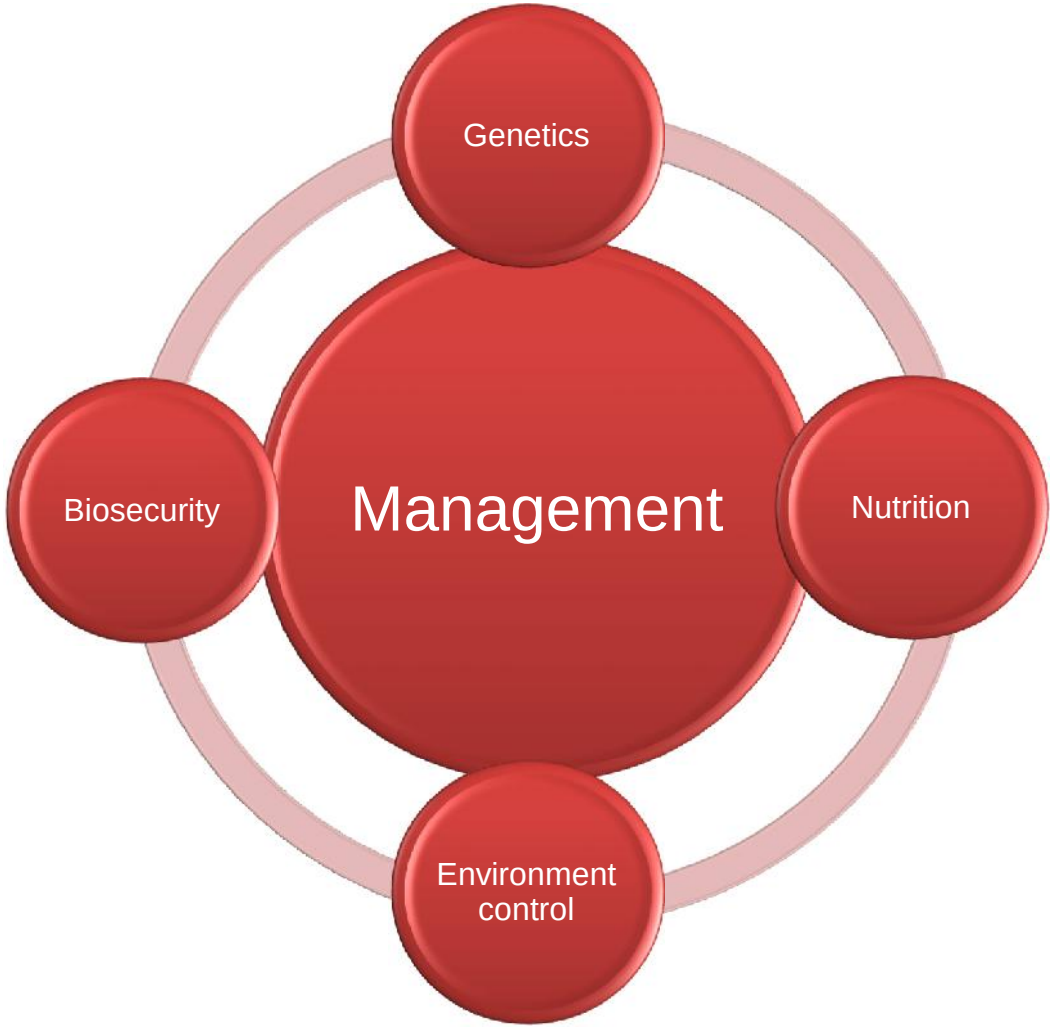
ANIMAL PRODUCTION ELEMENTS



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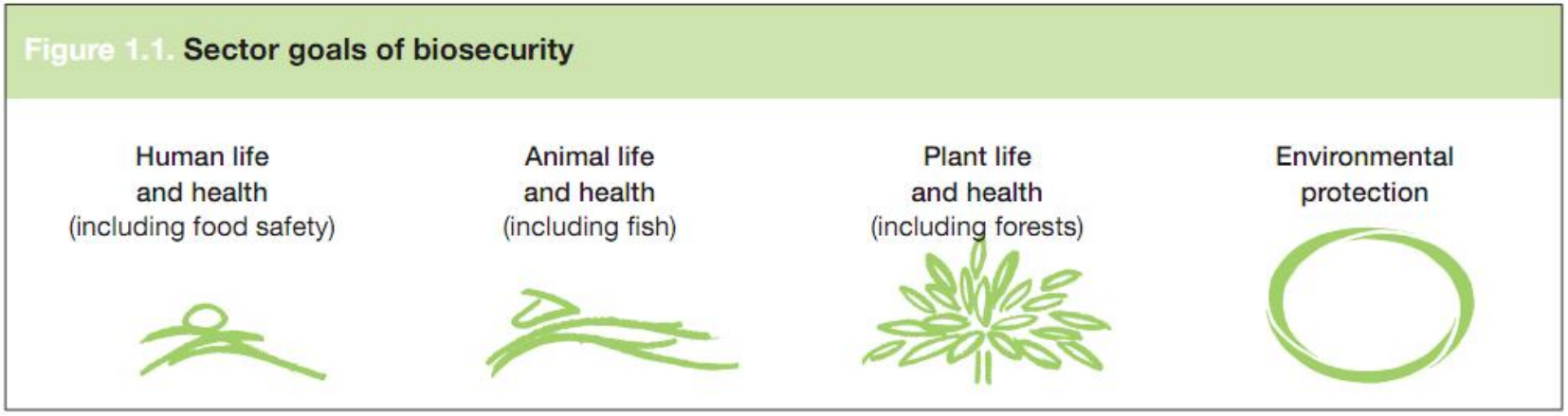
WHAT IS BIOSECURITY?

- **'Biosecurity'** is strategic and integrated approach for analyzing and managing relevant risks to human, animal and plant life and health and associated risks to the environment.
- The main goal of biosecurity is to prevent, control and manage risks to life and health.
- Biosecurity covers food safety, zoonoses, the introduction of animal and plant diseases.



(FAO biosecurity principles and components)

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FARM BIOSECURITY

Farm biosecurity can be considered as a part of the regional, national and international biosecurity. It is a downstream risk management!

- Aim – to protects the health of livestock by preventing the transmission of disease through physical barriers, and hygiene practices.
- Codes available(G.A.P., HACCP), developed by international and national organizations(WHO, FAO, OECD), governmental organizations(DEFRA, EFSA, USDA, etc) and NGO's.

A strategy of prevention!

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FARM BIOSECURITY

- Farm biosecurity planning is the thing we can control in order to prevent a disaster.

- When developing a farm-level biosecurity plan, the following three key points should be considered:

1. **External biosecurity – preventing introduction of infectious diseases.**

2. **Internal biosecurity – preventing spread of pathogens across the farm**

3. **Minimizing the incidence of spreading significant disease for the public health. Food safety.**

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1. External biosecurity:

Farm location, environment, isolation. Feed, water and equipment supply. Transport vehicles. Visitors. New pigs, semen material. C&D.

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2. Internal biosecurity:

Daily routine, production management (segregation, density, temperature, feeding, all in al out. Employee movement – young to old. Training. Buildings, roads, sewer system, silo maintenance. Manure management. Waste management. Dead animals. Depopulation. Rodents, pest and fly control. C&D.

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Walking to the hog barns in our coveralls
(photo by IFF)

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3. Minimizing the incidence of spreading significant disease for the public health. Food safety.

Country regulations. Information flow and prophylactic program. Isolation of new animals. Health status and production results. Sic animals management. Management of the medicines. Clever use of antibiotics. Slaughterhouse feedback.

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C & D

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Stalosan® Hygiene Solutions Concept

Stalosan Clean – heavy duty detergent

- For cleaning before disinfection

Stalosan Dez – glutaraldehyde+QUAC based disinfectant

- To disinfect inside the house(building and equipment)

Stalosan Oxy – oxidizing disinfectant

- To disinfect inside the house(building and equipment)

Stalosan Water – water pipe cleaner

- To remove biofilm and mineral salts

Stalosan F – powder disinfectant

- For disease control in presence of animals, foot baths.

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Cleaning and disinfection

CFU REDUCTIONS
(North Carolina State University 1998)

HOUSE STATUS	CFU/ sq inch	% reduction
dirty	3,000,000	
blown down (air)	2,900,000	3.4
washed w. water	500,000	75
washed w. soap	100,000	80
disinfected	< 1,000	> 99

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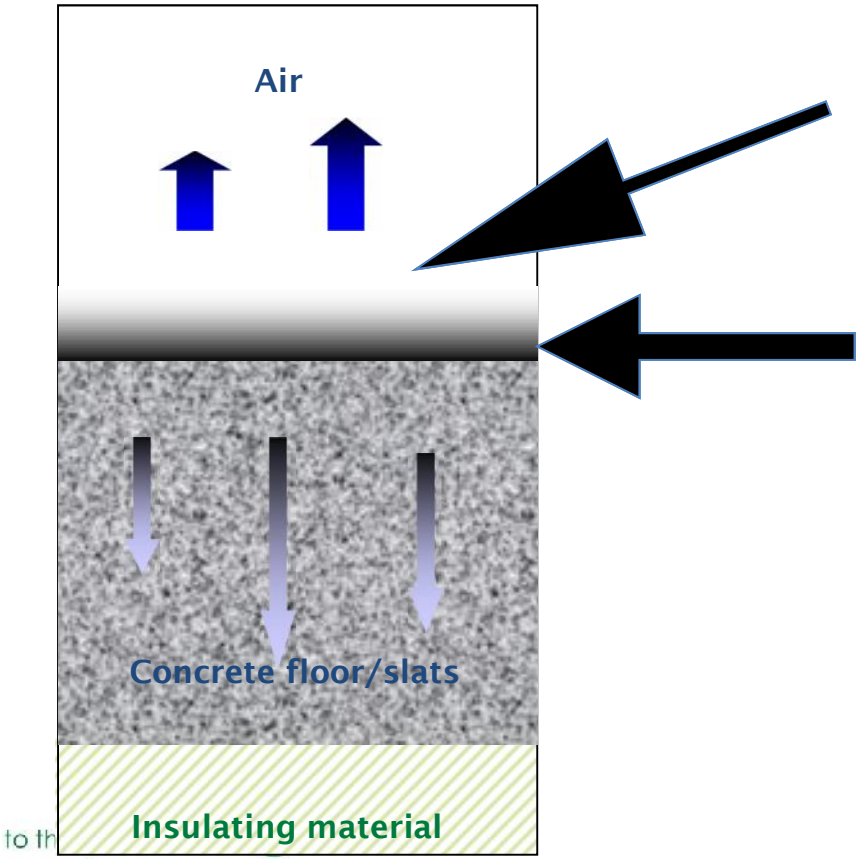
The influence of the fat and protein layer



- After a high pressure cleaning, the surface is still covered by a layer of fat and protein.

Fat and protein layer

- This layer is containing 15% of the microorganisms

- **If this layer isn't removed, it will keep the moisture in the concrete + it will make harder to dry out the concrete floor**

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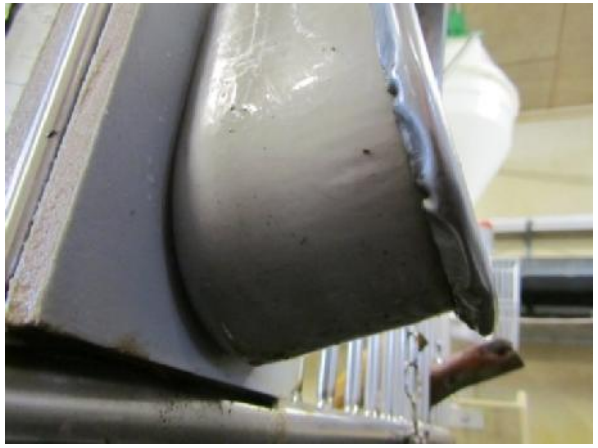
Stalosan Clean

Disinfectants don't clean. Soiling and organic matter must be removed before disinfection is carried out. Detergents make cleaning very efficient.



Alkaline product (pH 11) Dissolves fat and protein layer (organic material). Contact time – 10 to 25 minutes followed by rinse off with water. Non-corrosive. Suitable for all spraying systems. Dosage 1,5 – 3,0%

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Disinfection – important to know!

Empty houses without animals

- **Stalosan DEZ -** glutaraldehyde + QAC

- Broad spectrum activity, incl. spores. Tolerates traces of organic matter. Residual effect(app. 20 days).

- **Stalosan OXY -** oxidising product

- Works in low temperatures close to freezing point, hard water and all ranges of pH. Fast action – 100% efficacy within 30 seconds (tested EN 1040).

- **In DK rotation of the disinfectants is used in specific cases,** because there are different effect on some microorganisms, from one disinfectant to another. (Ex. streptococcus, clostridium, campylobacter, etc).

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Stalosan Water

Waterline cleaner. Removes biofilm. Removes calcium and magnesium. Effective reduction in microbial presence.

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Liquid disinfectant have a weak side!

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Stalosan F

- A broad spectrum powder ***disinfectant***.
- Especially formulated for application in presence of animals.
- Active in presence of organic materials for more than 7 days no matter of conditions.
- Non toxic for the animals and people. Safe for the environment.
- Non corrosive for the equipment(some metals may stain).

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Bacteria
Actinobacillus
Aerococcus
Bacillus subtilis
Campylobacter jejuni
Clostridium perfringens
Clostridium tyrobutyricum
Coliforme bacteria
Eschericia coli
Eschericia coli O 149
Eschericia coli O 157
Enterobacter agglomerans
Enterobacter cloacal
Enterococcus faecium
Eschericia coli
Fusobacterium necrophorum
Haemophilus
Micrococcus varians
Pasteurella multocida
Proteus
Proteus mirabilis
Pseudomonas aeroginosa
Pseudomonas fluorescent
Pseudomonas paucimobilis
Salmonella dublin
Salmonella enteritidis
Salmonella typhimurium DT 104
Salmonella typhimurium
Serratia marcescens
Staphyloccus hyicus
Staphyloccus epidermis
Streptococcus uberis
Streptococcus faecalis
Streptococcus pyogenes

Fungi
Alternaria
Aspergillus
Aspergillus flavus
Candida pendotropicalis
Candida ciferii
Candida lusitaniae
Candida parapsilosis
Candida pendotropicalis
Verticillum cinnabarium
Candida rogosa
Candida torulopsis
Cladosporium
Cladosporium herbarum
Cryptococcus laurentii
Verticillum cinnabarium
Fungi imperfecte
Fusarium
Heminthosporum
Maris torulopsis
Mucor
Mucor plumbens
Penicilium
Penicilium viridicatum
Pullularia
Rhodotorula slutinis
Saccharomyces cerevisiae
Trichoderma viride
Trichosporon beigelii
Staphyloccus aureus

Viruses
Avian Flu (H5N1)
Canine Parvovirus
Newcastle Disease Virus
Porcine Parvovirus
Reo-Virus
Vaccinal-Virus
PRRS
PED

Parasites
Ascarida galli
Heterakis gallinarum
Ascaris suum
Capillaria obsignata
Eimeria acervulina
Dermanisus Galinae

Fly-larvae

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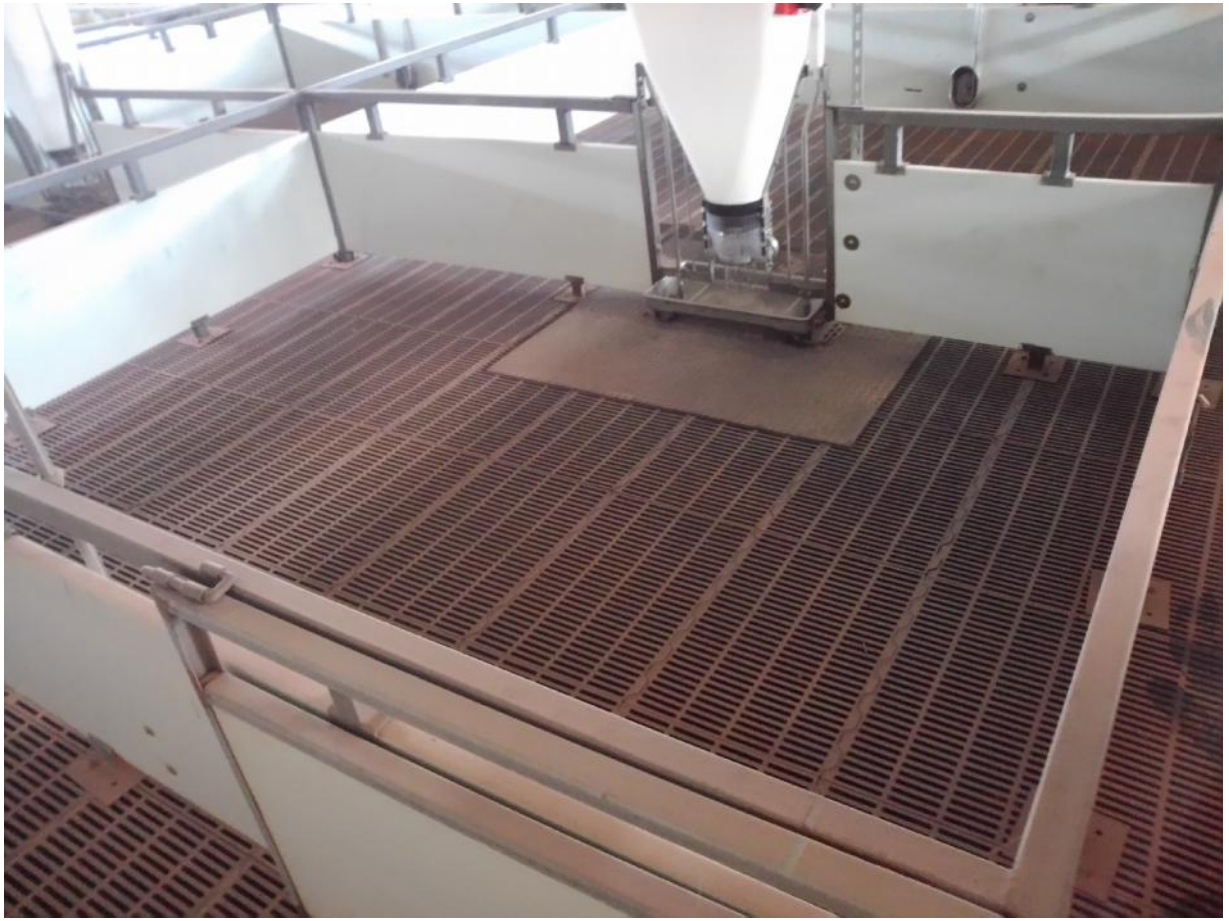
Stalosan F application



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Stalosan F efficacy in farrowing accommodation

- Trial carried out in a large commercial piggery in southern New South Wales, Australia, between June and November 2007 with 366 Large White x Landrace gilts and sows and their litters in individual farrowing pens.
- Standard farrowing shed C&D practice plus Stalosan F applied to the whole farrowing shed at 50 g/m², using a blower. 3 applications within the first week (one prior to sow entry to farrowing house and two more applications once the sows had entered the farrowing accommodation), and then the product was applied once per week thereafter until weaning.
- Control - Standard farrowing shed C&D practice and Bentonite added to creep areas (approximately 1 cup) once farrowing was completed and on a daily basis.

	Control	Stalosan F
Daily gain (kg/day)	0.215	0.225
Dead piglet (birth to weaning)	238/2045 piglets born alive (12% mortality)a	172/2034 piglets born alive (9% mortality)b
Number of piglet medical treatments	622/2045 piglets born alive	375/2034 piglets born alive

- Conclusion: Stalosan F is a powder disinfectant that can be implemented in the farrowing house to improve pre-weaning survivability.

QAF Meat Industries Pty Ltd, Rebecca Morrison, 10 December 2007

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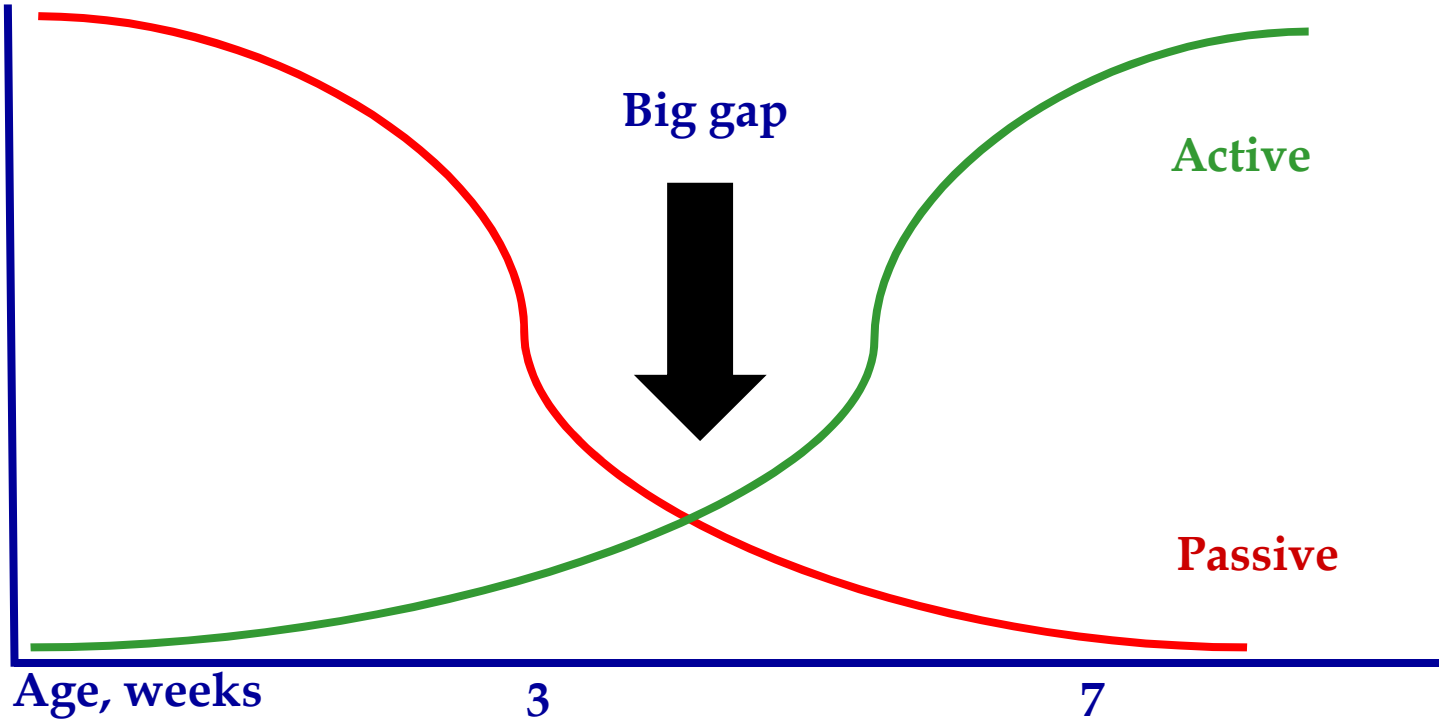
Post weaning diarrhoea: the immunological gap



Post-weaning diarrhea occurs within 10 days after weaning, often within 4-5 days. Affected pigs pass grayish, brownish, or water diarrheic feces with no traces of blood. Weaning is accompanied by the withdrawal of milk and the protective local antibody that it contains. The combination of withdrawal of milk antibody, the presence of less well-digested food in the gut and mixing animals results in an increase in pathogenic E. coli and leads to post-weaning diarrhea.

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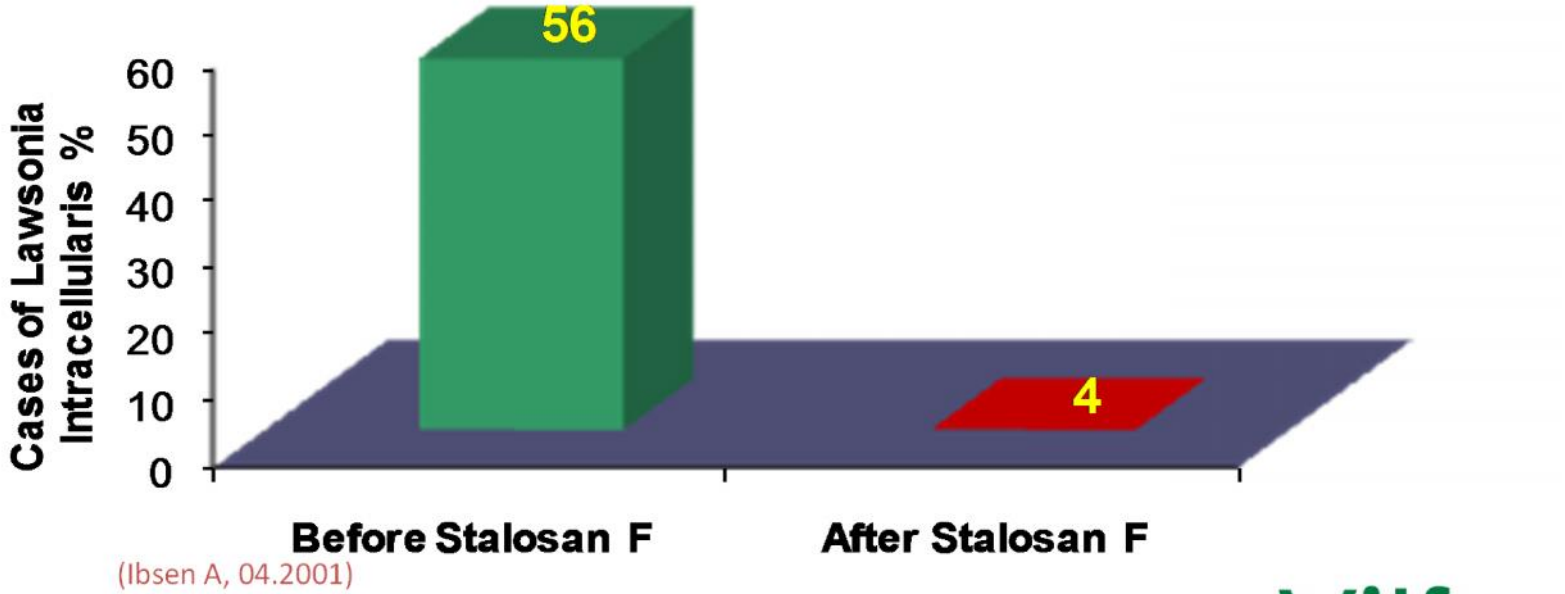
Lawsonia Intracellularis

Lawsonia intracelularis is causing diarrhoea. Feed conversion and daily gain are reduced. Some 10 – 20% of the pigs may die.

Lawsonia Intracellularis on four Danish farms



(Ibsen A, 04.2001)

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Deactivation of PRRS virus

- The test: Ingelvac PRRS MLV vaccine added to a sole of a boot in a typical infectious dose for oral and intranasal routes. Than boot was placed in Stalosan F and Synergize boot baths to simulate on farm conditions. The boots were sampled and PCR tested 1,3 and 5 minute post disinfection. Same test repeated with fecal matter and PRRS MLV vaccine.

Table 1: The effect of disinfectant over time in presence or absence of fecal matter at 30°C						
Fecal matter	**+**	**+**	**+**	**-**	**-**	**-**
Time(min.)	**1**	**3**	**5**	**1**	**3**	**5**
Product % PRRS PCR negative Time P>0.10; Fecal matter P=0.021; Trt P=0.26 Trt x Fecal matter P<0.0001						
Stalosan F	**100**	**83**	**100**	**83**	**92**	**67**
Synergize	**25**	**17**	**42**	**100**	**92**	**100**
Positive control	**+**	**+**	**+**	**+**	**+**	**+**

Table 2: The effect of disinfectant over time in presence or absence of fecal matter at - 13°C						
Fecal matter	**+**	**+**	**+**	**-**	**-**	**-**
Time(min.)	**1**	**3**	**5**	**1**	**3**	**5**
Product	**% PRRS PCR negative**		Time P>0.10; Fecal matter P>0.10			
Stalosan F	**92**	**100**	**100**	**100**	**100**	**75**
Synergize	**frozen**	**frozen**	**frozen**	**frozen**	**frozen**	**frozen**
Positive control	**+**	**+**	**+**	**+**	**+**	**+**

- Field conditions trial: boot baths placed with Stalosan F at the entry of the site and at the entrances of each barn. Boots sampled for PRRS vaccine virus. Results - 100% negative samples form boot soles

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Effect of Stalosan F on PEDv

Prof. Goyal, University of Minnesota, USA August 2015

Table 1. Effect of Stalosan F powder on PEDV

Sanitizer	Time of Contact	Virus Titer in:		Percent virus reduction
		Control	Stalosan F	
A	5 min	4.17	<1	≥ 99.93
	10 min	4.50	<1	≥ 99.96
	60 min	4.17	<1	≥ 99.93
	6 hour	4.83	<1	≥ 99.99
B	5 min	4.50	<1	≥ 99.96
	10 min	4.50	<1	≥ 99.96
	60 min	4.17	<1	≥ 99.93
	6 hour	4.83	<1	≥ 99.99

A: 10 mg Stalosan F powder
B: 20 mg Stalosan F powder

Control A: 10 mg beef extract powder
Control B: 20 mg beef extract powder

Table 2. Effect of Stalosan F powder on PEDV by surface test

Sanitizer	Time of Contact	Virus Titer		Percent virus reduction
		Control	Stalosan F	
A	5 min	4.83	<1	≥ 99.99
	10 min	4.50	<1	≥ 99.96
	60 min	4.50	<1	≥ 99.96
	6 hour	4.17	<1	≥ 99.93
B	5 min	5.17	<1	≥ 99.99
	10 min	4.50	<1	≥ 99.96
	60 min	4.17	<1	≥ 99.93
	6 hour	4.50	<1	≥ 99.96

A: 10 mg Stalosan F powder
B: 20 mg Stalosan F powder

Control A: 10 mg beef extract powder
Control B: 20 mg beef extract powder

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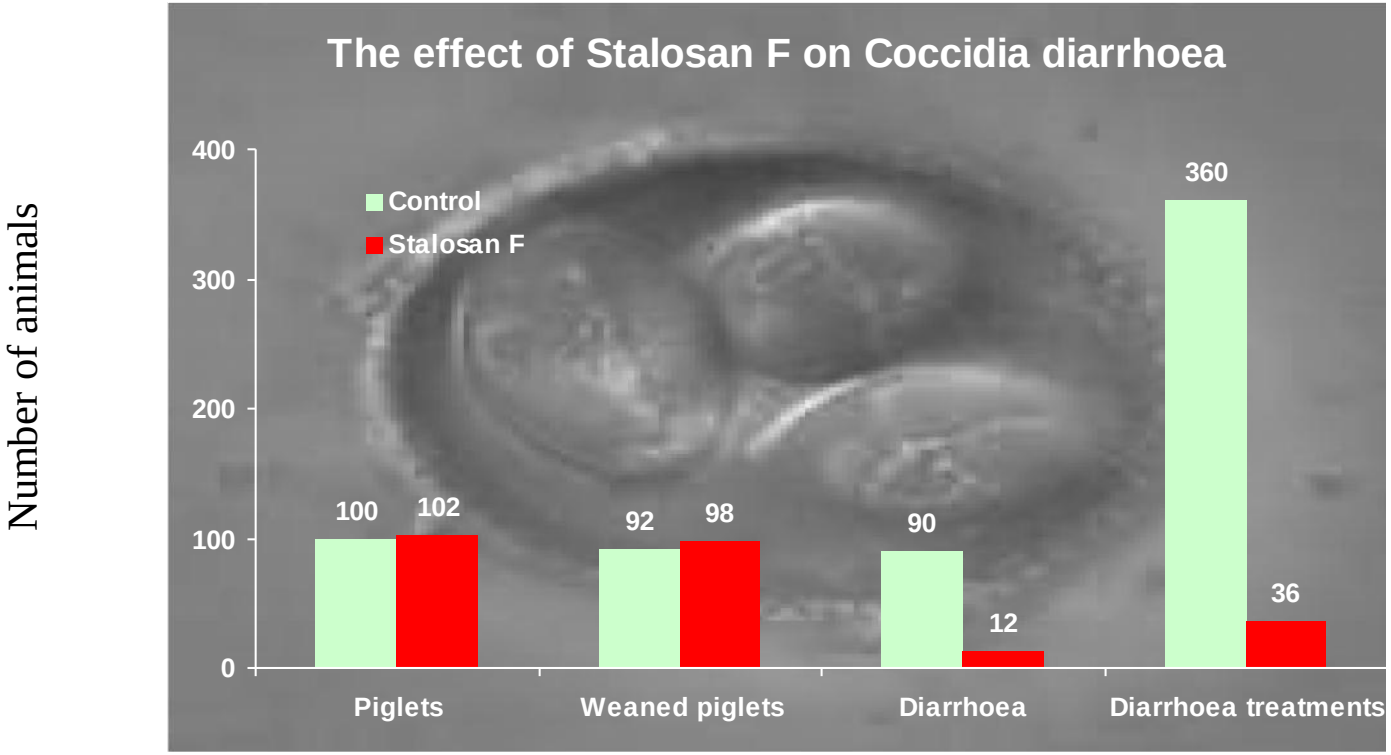
Coccidiosis

Coccidiosis is caused by I*sospora suis.* 5 -10 days old piglets are affected.
Symptoms - paste-like to very thin yellow diarrhoea. Most disinfectants have no effect on coccidia. Stalosan F blocks the coccidia life cycle and re-infection.



(Fishers Nutrition, England nov. 1999)

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Stalosan F for pregnant sows

- Stalosan F can be particularly effective in group management of pregnant sows:
  - Difficult to apply all in – all out management
  - Difficult to achieve a good hygiene
  - Many pathogens are persistent in the environment/mastitis, metritis/

- Service area: better hygiene – improved insemination rate

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Stalosan F for pregnant sows

Farm trial Bulgaria 2014

- 2500 DanBred sow farm
- Stalosan F applied 5 days after farrowing
- Service period - 1 day prior and 4 days after A.I.

Year	Number of serves	Litter/Sow/Year	Conception Rate %	Conception % on Returns	Non-preg. Days/ Litter	Pigs weaned/Lit	Replacement rate %
2013	4931	2.36	90.1	76.2	10.1	12.9	52
2014	4843	2.37	92.4	81.2	9.7	13.4	49

Benefits: Improved conception rate – 3% and Conception rate on returns – 5%, Reduced replacement rate – 3%. Extra ½ pig per sow per litter.

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Reduction of antibiotic use

Farm trial Betagro Co. Ltd., Hua Hin branch Thailand 2012.

	Control	Stalosan F
No. of piglets	54	47
No. of diarrhea incidence	8	3
Antibiotic treatments	8	3
% of piglets with diarrhea	14,81	6,38
Diarrhea reduction(%)	-	56,92

Results collected for 14 days from 5 control litters and 5 litters treated with Stalosan F. Application - on the floor of the farrowing pen and brooder box for piglets at 50 gr/m² 4 times. Diarrhea piglets treated with Enrofloxacin.

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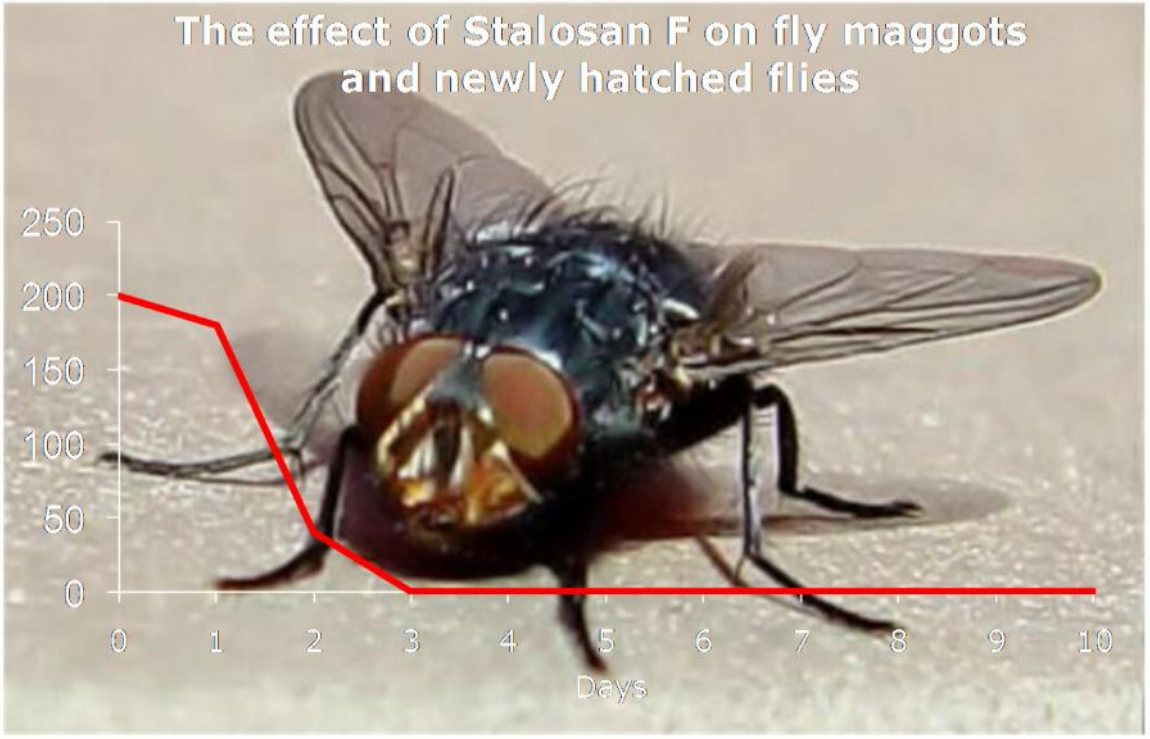
Fly control

Flies are important vector in disease transmission from other livestock and wild animals. Therefore, it is very important to keep them away.



(Qvist 01.06.92)

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BIOSECURITY ASSESMENT

Biosecurity is the cheapest way to optimize the animal production

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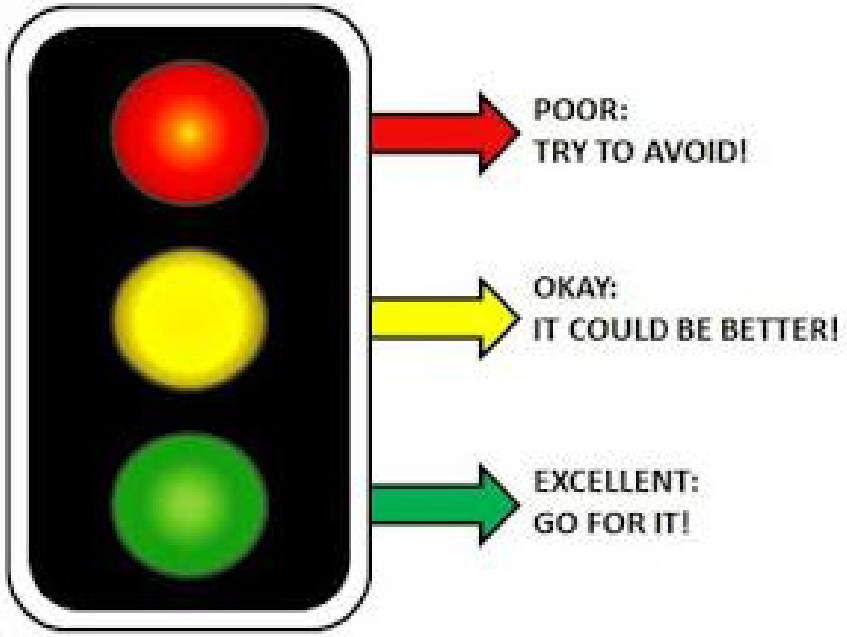
BIOSECURITY ASSESMENT

- Objective – the evaluation does not give possibility for individual interpretation of the facts and creates realistic picture of the current situation.



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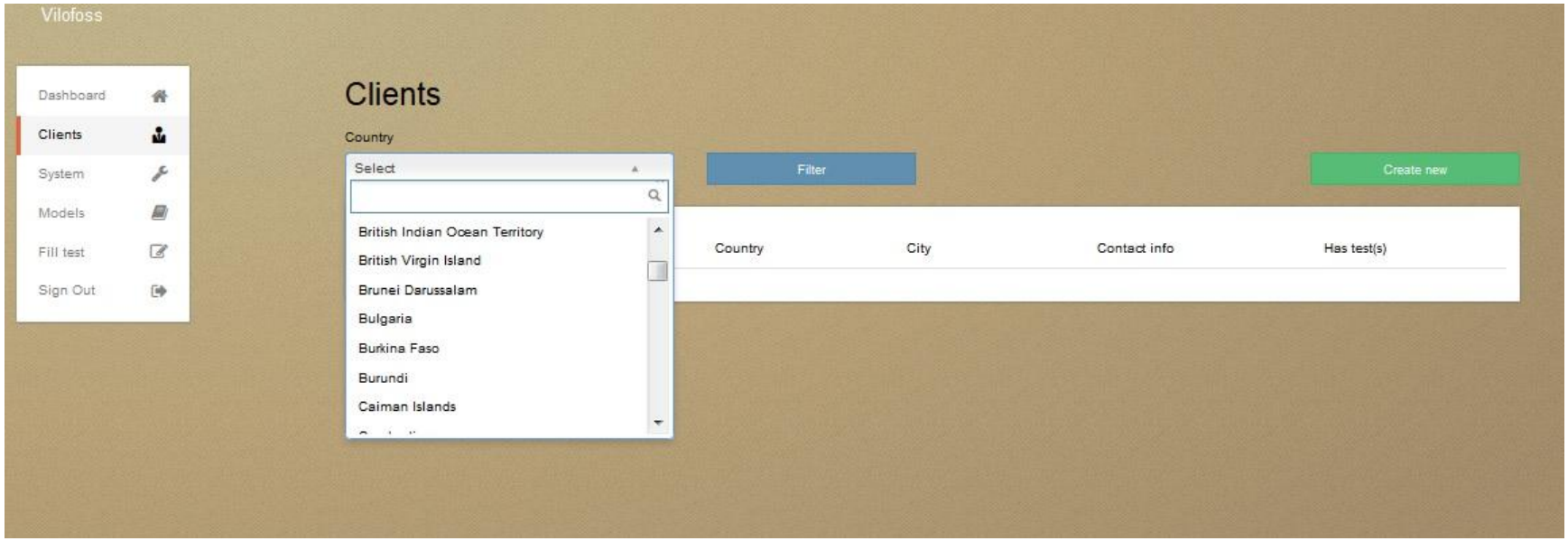
THE PROGRAM

- Therefore a software program was developed for ease of data processing.



- Modular – server and user(tablet) modules - no internet required during the assessment.
- Multispecies – can be used for biosecurity assessment of different animal species
- Global – can be used worldwide with multilingual support.

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THE BENFITS

- Assessment results are provided to the farmer with guidelines and advices in order to improve the farm biosecurity.

Section 1.Farm location and layout	15 / 15
Section 2. Operational Routine	43 / 43
Section 3. Animal health management	14 / 14
FARM CLEANING AND DISINFECTION EVALUATION	14 / 14

- An important service for the farm managers and owners to minimize the risk of production losses caused by diseases.

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THE BENFITS

- It is not only one assessment provided, but a service with consecutive meetings and further evaluation of the progress of implementing the necessary biosecurity measures.
- We consider the task is done when farm gets only adequate results during the following assessment.
- Vitfoss has assembled a team of experts to serve customers with Stalosan Hygiene Solutions concept, including biosecurity assessment, cleaning and disinfection strategy.

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Thank you for your attention !

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