



DEPARTMENT: AGRICULTURE  
REPUBLIC OF SOUTH AFRICA

**MOVEMENT CONTROL PROTOCOL IN CASE OF AN OUTBREAK OF SALMONELLA ENTERITIDIS OR SALMONELLA GALLINARUM/PULLORUM – Edition: 01**

Salmonella spp bacteria are numerous and occur in many host species, therefore almost all countries have adopted a Salmonella reduction plan. The aim is to integrate a series of actions to reduce the incidence of the organism as well as the incidence of disease in animals and man.

The control of especially *Salmonella* Enteritidis in commercial broilers or layers is most problematic, as there are human health considerations (zoonosis), as well as economic considerations for the poultry producer.

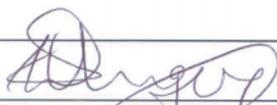
It is thus essential that control measures, as stipulated in the Salmonella reduction plan, are meticulously followed, to ensure that outbreaks and thus shedding of organisms do not occur in commercial broiler and layer flocks. Control should be successfully employed in the grandparent and parent flocks, to prevent outbreaks and prevalence in commercial poultry.

(See Salmonella Reduction Plan for details)

According to Section 31 of the Animal Diseases Act (Act 35 of 1984), the Minister of Agriculture prescribed the following control measures for the control of *Salmonella* Enteritidis and *Salmonella* Gallinarum/Pullorum. The following guidelines do not substitute but are to be read in conjunction with the above-mentioned government notice.

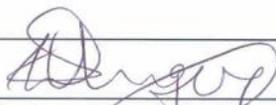
Table 2 of the Regulations of the Animal Diseases Act (Act 35 of 1984) prescribes the following:

Animal disease	Nature, causal organism and symptoms	Susceptible animals	Controlled veterinary act to be performed in respect of-		
			Susceptible animals	Contact animals	Infected animals
1	2	3	4	5	6
<i>Salmonella</i> Enteritidis	Contagious animal disease caused by the bacterium <i>Salmonella</i> Enteritidis and characterised by septicaemia in young poultry and a carrier state in older	Poultry and birds	Poultry and birds may be immunised by the responsible person with an efficient remedy	Contact animals may be immunised by the responsible person with an efficient remedy	Infected animals must be disposed of as determined by the director

  
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poultry					
Animal disease	Nature, causal organism and symptoms	Susceptible animals	Controlled veterinary act to be performed in respect of-		
			Susceptible animals	Contact animals	Infected animals
1	2	3	4	5	6
Salmonella Gallinarum (Fowl typhoid)	An infectious egg-transmitted bacterial disease caused by Salmonella Gallinarum, characterised by difficult breathing, diarrhoea, and high mortalities	Poultry	-	1. Contact poultry flocks shall be isolated by the responsible person and tested under supervision of an officer. 2. Grandparent and pedigree poultry flocks may not be immunised.	Infected poultry shall be isolated by the responsible person and destroyed under the supervision of an officer.
Salmonella Pullorum (Bacillary White Diarrhoea)	An infectious egg-transmitted bacterial disease caused by Salmonella Pullorum, characterised by difficult breathing, diarrhoea, septicaemia and high mortalities.	Poultry	-	1. Contact poultry flocks shall be isolated by the responsible person and tested under supervision of an officer. 2. Grandparent and pedigree poultry flocks may not be immunised.	Infected poultry shall be isolated by the responsible person and destroyed under the supervision of an officer.

  
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## CONTROL MEASURES IN CASE OF AN OUTBREAK OF SALMONELLA ENTERITIDIS

Until further notice, the following **control measures for SE** are applicable and approved by the Director: Animal Health (DAH) of the National Department of Agriculture (DoA), as part of a zoonotic pathogen reduction programme:

### 1. Background

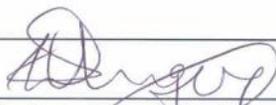
- 1.1 For the purpose of SE control and this protocol, **Salmonella Enteritidis** is defined as a “Contagious animal disease caused by the bacterium *Salmonella* Enteritidis and characterised by septicaemia in young poultry and a carrier state in older poultry”
- 1.2 ‘**Susceptible species**’ according to Table 2 of the Regulations of the Animal Diseases Act (Act 35, 1984) are ‘poultry’ and ‘birds’
- 1.3 ‘**Poultry**’ according to the Regulations of the Animal Diseases Act (Act 25,1984), Definitions (1) includes ‘pigeons, ducks, geese, fowl, turkeys, cage birds, muscovies, domesticated ostriches, tamed wild birds and wild birds kept in captivity’.
- 1.4 ‘**Infected**’ means poultry which are either showing clinical signs that are typical of *Salmonella* Enteritidis and/or from which a pathogenic phage type of *Salmonella* Enteritidis has been isolated or identified by polymerase chain reaction,
- 1.5 ‘**Suspect**’ means poultry that are showing signs of septicaemia or poultry that are showing a rise in antibody titres that are not consistent with the vaccination programme followed.
- 1.6 ‘**Free**’ poultry refers to poultry that appear healthy and free from symptoms that are typical of *Salmonella* Enteritidis infection, that are housed in independent free-standing houses and that have tested free on bacteriological monitoring and/or serology
- 1.7 This **protocol does not invalidate any other disease control measures** prescribed in accordance with the Animal Diseases Act 35 of 1984, the Regulations made thereunder.
- 1.8 Any **exemptions** from the requirements of this protocol (including exemptions in terms of Regulation 11 of the Animal Diseases Regulations) may be granted **only with written approval of the DAH (DoA)**. **Applications** for the granting of any exemptions from the requirements or any amendment of this protocol should be made in writing to the DAH (DoA).
- 1.9 *Salmonella* Enteritidis is a serious zoonosis and all attempts must be made to prevent transmission of the bacterium to humans through poultry meat or eggs.

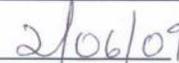
### 2. General

#### 2.1 Immunization:

According to the Regulations of the Animal Diseases Act (Act 35 of 1984), ‘susceptible animals’ and ‘contact animals’ *may be immunised by the responsible person with an efficient remedy*. Immunization is a very valuable tool in the prevention of outbreaks in commercial layers and breeders and should be compulsory at all commercial levels at the correct stages of production.

In terms of the above, the ‘responsible person’ has to ensure that vaccination has been carried out to ensure ‘immunization’. Vaccines have to be transported and stored to ensure that the ‘cold chain’ is

  
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maintained. The administration of the vaccine have to be done with extreme care to ensure that immunization (manufacture of antibodies by the body) takes place.

The 'responsible person' should also carry out the applicable tests (bacteriological monitoring) to monitor the efficacy of vaccination (whether immunization has taken place).

## 2.2 Reporting:

According to Section 12 of the Regulations of the Animal Diseases Act (Act 35 of 1984), *All outbreaks or suspected outbreaks of Salmonella Enteritidis have to be reported to the nearest state veterinarian or animal health technician (in terms of the Animal Diseases Act, Act 35 of 1984).*

Section 12 (4) further states that *'The provisions of subregulations (1) and (2) shall mutatis mutandis apply to the person in charge of any laboratory or other institution at which a controlled animal or thing is examined for diagnostic purposes.*

This implies that any laboratory that isolates or identifies a *Salmonella Enteritidis* bacterium or identifies a suspicion of an outbreak (for example an unusual titre development in an unvaccinated vaccinated flock), has to report its finding to the nearest state veterinarian or animal health technician.

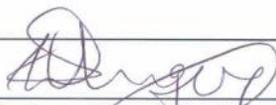
## 3. Control measures in case of an outbreak of Salmonella Enteritidis

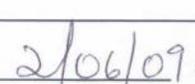
### BROILERS

#### 3.1 Quarantine:

- (i) In terms of the Animal Diseases Act, Table 2, Section 11, the state veterinarian will place the production unit or premises under official quarantine on suspicion of an outbreak of *Salmonella Enteritidis*.  
It is counter-productive to wait until confirmation and pathogenicity studies have been completed, as this will allow the bacterium to spread and possibly endanger human health.
- (ii) Notice of quarantine must be issued by the State Veterinarian to the owner of the poultry.
- (iii) A register of all birds on the holding must be drawn up and records kept of production parameters and mortalities.
- (v) All susceptible species, poultry and domesticated confined birds must be isolated and strict measures introduced to prevent the spread of the bacterium. This must include control of movement of people, equipment, vehicles, feed and other chicken materials (eggs, manure etc) off the farm.

Nothing is allowed to be moved off the farm without the permission of the State Veterinarian. Such movement will be by way of a Red Cross Permit under veterinary supervision.

  
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- (vi) Lifting of quarantine:
- (a) Quarantine may only be lifted when:
- (i) All birds have been removed off the farm, either because of death or because they have all been slaughtered. Slaughter has to be arranged for day after withdrawal period when treated with a suitable medication.
- AND
- (ii) All the houses on the farm have been properly cleaned and disinfected with a registered disinfectant. Cleaning has to include the removal of all litter/bedding material, equipment (feeders, waterers etc for cleaning and disinfection outside the house) and disinfection has to be done after the houses have been cleaned.

### 3.2 Other measures:

#### 3.2.1 Handling of culls and mortalities:

Diseased culls and mortalities must be destroyed on the farm by burial, composting or incineration or moved after death in closed leak-proof containers under a red cross permit to an approved rendering plant. In all cases minimal risk in contaminating the environment has to be ensured and there must be NO possibility for humans to have access to the carcasses.

#### 3.2.2 Handling of live sick birds:

3.2.2.1 No trade of live birds are to be allowed

3.2.2.2 The handling of sick, live birds is aimed at cost recovery.

3.2.2.3 Treatment

Treatment with a suitable antibiotic has to be instituted as soon as the production unit or premises is put under quarantine. Treatment to do carried out for the recommended period on the label. (4 days in the case of quinolones).

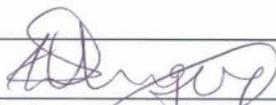
In the case of boilers, treatment will depend on the age of the birds, e.g. immediate compulsory treatment, followed by another round of compulsory treatment approximately 7 days before slaughter. The withdrawal period of the antibiotic has to be strictly observed in all cases.

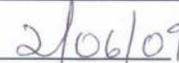
3.2.2.4 Monitor success of treatment by bacteriology

3.2.2.5 If the birds are of slaughter age, they could be moved to an abattoir under cover of a red-cross permit for slaughter after the withdrawal period for the medication used, has been observed. (4 days in the case of quinolones)

- A seal has to be placed on the truck to ensure that the load is not tampered with *en route* to the abattoir.

- Broilers are to be starved for 6-12 hours (average 8 hours) prior to transport and slaughter, to decrease the presence of faeces in the intestinal tract and thus decrease the spread of the bacterium. Starvation for longer will result in more watery faeces, which will lead to increased contamination of the road and thus the increased spread of the bacterium.

  
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- Broilers are to be moved under cover of a Red Cross Permit to the abattoir, without any stops and along roads where there is the lowest risk to other poultry owners.
- The transport of birds early in the mornings is recommended, provided that they will be slaughtered immediately on arrival at the abattoir. Potentially sick birds are usually slaughtered at the end of the day's shift, so this may not be practical.
- Samples for microbiology has to be taken and processed as soon as possible.
- Transport trucks (catching trucks) to be thoroughly cleaned and disinfected after use.

3.2.3 Establishment of the source of infection

It is extremely important to determine the possible source of the infection, as the chicken is not a natural host for the bacterium and the bacterium is thus introduced into the flock by one of the following means:

- (a) infected parents (infected day-old chicks)
- (b) rats and mice
- (c) people (workers)
- (d) calves
- (e) other poultry
- (f) feed

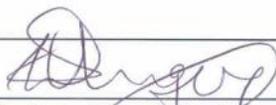
3.2.4 The meat has to be frozen (not always practical) while the laboratory results are awaited.

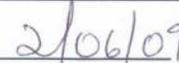
A rapid diagnostic method would be most useful, as conventional laboratory results may take 96 hours.

3.2.5 The 'mala' (intestines, livers and gizzards) must be rejected and destroyed. This is an extremely important action to protect human health.

3.3 Handling of manure:

- (i) Manure of infected birds may not be removed to a site within a 3 km radius from another poultry unit. It may also only be moved under cover of a Red Cross Permit issued by the State Veterinarian of the area and only for the purpose of heat treatment for a minimum period of 28 days. This is to ensure that no live bacterium will be present in the manure before it is used for any purpose.
- (ii) Heat treatment can be accomplished by composting (ideal method) or by piling it up and covering it (if possible).
- (iii) If there is too much manure to allow it to be covered, it must be watered and covered with 'raw' lime to form a crust on the outside.
- (iv) Manure/litter that has been either composted or piled up and covered or watered to form a crust, is normally considered safe after a period of 28 days has lapsed since the outbreak ended.

  
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**LAYERS****3.1 Quarantine:**

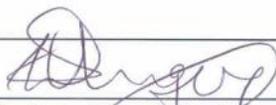
- (i) In terms of the Animal Diseases Act, Table 2, Section 11, the state veterinarian will place the production unit or premises under official quarantine on suspicion of an outbreak of *Salmonella* Enteritidis.  
It is counter-productive to wait until confirmation and pathogenicity studies have been completed, as this will allow the bacterium to spread and possibly endanger human health.
- (ii) Notice of quarantine must be issued by the State Veterinarian to the owner of the poultry.
- (iii) A register of all birds on the holding must be drawn up and records kept of production parameters and mortalities.
- (iv) All susceptible species, poultry and domesticated confined birds must be isolated and strict measures introduced to prevent the spread of the bacterium. This must include control of movement of people, equipment, vehicles, feed and other chicken materials (eggs, manure etc) off the farm.  
Nothing is allowed to be moved off the farm without the permission of the State Veterinarian. Such movement will be by way of a Red Cross Permit under veterinary supervision.
- (v) Treatment with a suitable antibiotic has to be instituted as soon as the production unit or premises is put under quarantine. Treatment to be carried out for the recommended period on the label. (4 days in the case of quinolones).
- (vi) Lifting of quarantine:
  - (a) Quarantine may only be lifted when:
    - (i) All birds have been effectively treated and bacteriological results indicate that there is no infection present any more.
    - AND
    - (ii) The withdrawal period of the medication that had been complied with.

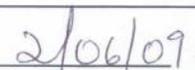
**3.2 Other measures:****3.2.1 Handling of culls and mortalities:**

Diseased culls and mortalities must be destroyed on the farm by burial, composting or incineration or moved after death in closed leak-proof containers under a red cross permit to an approved rendering plant. In all cases minimal risk in contaminating the environment has to be ensured and there may be NO possibility for humans to have access to the carcasses.

**3.2.2 Handling of live birds (sick or not) and eggs**

- 3.2.2.1 No trade of live birds are to be allowed
- 3.2.2.2 No trade of fresh eggs are to be allowed.
- 3.2.2.3 The handling of eggs is aimed at cost recovery.

  
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- 3.2.2.4 Treatment  
Treatment with suitable antibiotics, e.g. quinolones for the recommended period on the label. (4 days in the case of quinolones)
- 3.2.2.5 Monitor success of treatment by bacteriology
- 3.2.2.6 Eggs could serve as an important source of infection to consumers. Eggs are therefore not allowed to be sold fresh, but could be sent for heat treatment. Eggs cannot be sent for heat treatment however, while antibiotic treatment is taking place. This predicament highlights, once again, the importance of a salmonella reduction programme in the grandparent and parent flocks.

### 3.2.3 Establishment of the source of infection

It is extremely important to determine the possible source of the infection, as the chicken is not a natural host for the bacterium and the bacterium is thus introduced into the flock by one of the following means:

- (a) Infected parents (infected day-old chicks or point of lay pullets)
- (b) rats and mice
- (c) people
- (d) calves
- (e) other poultry
- (f) feed

3.2.4 In the case where a layer/breeder flock becomes infected at point of culling, these chickens cannot be sold live, but must be treated and monitored.

- These birds could be slaughtered after treatment and observation of the withdrawal period, if a suitable abattoir is available. The same procedures as for broiler meat would apply (heat treatment, discarding of 'mala').
- These birds are usually sold live and quarantine should remain until treatment has been successfully completed and the withdrawal period for the medication observed.

### 3.2.5 Rearing farms

Chickens (pullets and breeders) that have been reared until age of placement, cannot be kept indefinitely on the rearing farm, due to the logistics of placement at layer/breeder farm, cleaning and disinfection of the rearing site prior to receiving the next batch of day-old chicks. It is however, not in the receiving farm's interest to receive infected chickens.

Infected chickens have to be treated and intensively monitored.

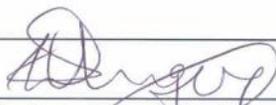
Only after monitoring indicates there is no further infection, could the quarantine be lifted and the chickens moved.

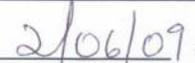
The receipt farm need to be monitored intensively on a monthly basis to ensure that there is no further infection.

### 3.2.6 Handling of hatching and table eggs:

The handling of hatching and table eggs once again demonstrates that 'Prevention is better than cure'.

Vertical transmission via the hatching eggs have to be prevented at all costs and table eggs pose a very high risk for human health.

  
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- (i) In the case of layer and breeder farms,

Hatching eggs:

- Cannot be used for hatching, as the bacterium could be vertically transferred to the off-spring.
- Infected flock to be treated as in 3.2.2.3
- Infected flock to be monitored as in 3.2.4
- Eggs to be sent for heat treatment as in 3.2.5

Table eggs:

- The risk that table eggs for human consumption pose, is high.
- Infected flock to be treated as in 3.2.2.3
- Infected flock to be monitored as in 3.2.4
- Eggs to be sent for heat treatment as in 3.2.5

#### 4. Cleaning, disinfection and resting

The property must be rendered safe from a disease point of view by proper cleaning and disinfection by using an effective approved disinfectant and by allowing it (the affected shed or site) to lie empty for at least one (1) week. It is important that proper dry cleaning be done to prevent the contamination of the environment during the washing process.

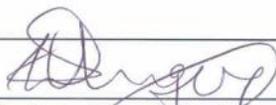
#### 5. Export

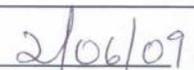
Veterinary health certification, as determined by the importing country, should be observed as regards freedom from *Salmonella* Enteritidis.

**NOTE: STATE VETERINARY MOVEMENT PERMITS**

*The purpose of state veterinary movement permits is to control movements which pose or potentially pose animal health risks by allowing such movements only on risk-mitigating conditions specified in such a permit as well as to keep records of movements for tracing and reporting purposes. Two types of permits are issued:*

- **RED CROSS PERMIT:** *A red cross permit is only used where animals or products to be moved are potentially infected (for example if they originate from infected or potentially infected areas) and therefore subject to one or more restrictions en route or at destination. In terms of this movement control protocol, red cross permits are thus issued only for movements poultry out of the SE control area for direct slaughter. Such poultry must be moved in a truck with a seal.*
- **ORDINARY MOVEMENT PERMIT:** *An ordinary movement permit is used for all other movements that are subject to state veterinary movement permit control. A seal may be required for such movements if these take place through a Controlled Area to ensure that the animals or products are not tampered with during the journey.*

  
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## 6. Control measures in case of an outbreak of *Salmonella Gallinarum*

This disease mostly occurs in chickens of 8 weeks and older. It is thus not really a problem in broilers. The causative pathogen is host-specific and it is thus poses no health threat to human beings (not a zoonosis).

*Salmonella Gallinarum* is a controlled disease in terms of the Animal Diseases Act (Act 35 of 1984) which means that any outbreaks or suspicion of an outbreak must be reported to the veterinary authorities.

According to Section 12 of the Regulations of the Animal Diseases Act (Act 35 of 1984), *All outbreaks or suspected outbreaks of Salmonella Gallinarum have to be reported to the nearest state veterinarian or animal health technician (in terms of the Animal Diseases Act, Act 35 of 1984).*

Section 12 (4) further states that *'The provisions of subregulations (1) and (2) shall mutatis mutandis apply to the person in charge of any laboratory or other institution at which a controlled animal or thing is examined for diagnostic purposes.*

This implies that any laboratory that isolates or identifies a *Salmonella Gallinarum* bacterium or identifies a suspicion of an outbreak (for example an unusual titre development in an unvaccinated vaccinated flock), has to report its finding to the nearest state veterinarian or animal health technician.

### 6.1 GRANDPARENT AND PEDIGREE FLOCKS:

These flocks are not allowed to be immunized.

Regular monitoring is essential.

If routine monitoring shows a flock to be infected, the flock has to be disposed of, as the bacterium is vertically transmitted to the off-spring (parents).

The flock could be slaughtered, but no live sales to be allowed.

### 6.2 PARENT LAYER AND PARENT BROILER FLOCKS:

These flocks HAVE TO BE IMMUNISED during rearing.

If routine monitoring shows a flock to be infected, the flock has to be disposed of, as the bacterium is vertically transmitted to the off-spring (commercial broilers and layers).

The flock could be slaughtered, if facilities exist, but no live sales to be allowed.

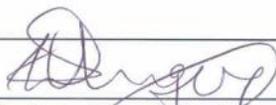
Point of lay pullets and broiler breeders should be tested by bacterial culture by an accredited laboratory and certified free of SG before transfer from the rearing farm.

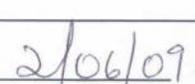
### 6.3 LAYERS

#### 6.3.1 Quarantine:

- (i) In terms of the Animal Diseases Act, Table 2, Section 11, the state veterinarian will place the production unit or premises under official quarantine on suspicion of an outbreak of *Salmonella Gallinarum*.

It is counter-productive to wait until confirmation, as this will allow the bacterium to spread.

  
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- (ii) Notice of quarantine must be issued by the State Veterinarian to the owner of the poultry.
- (iii) A register of all birds on the holding must be drawn up and records kept of production parameters and mortalities.
- (iv) Antibiotic medication should commence immediately in the affected flock.
- (v) Lifting of quarantine:
  - (a) Quarantine may only be lifted when:
    - Treatment has been successfully completed (as proven by monitoring). Important to ensure that no chronic carriers- it may thus be better to slaughter, rather than to sell live culls.

OR

  - All birds have been removed off the farm, either because of death or because they have all been slaughtered. Slaughter has to be arranged for day after withdrawal period when treated with a suitable medication.

AND

  - All the houses on the farm have been properly cleaned and disinfected with a registered disinfectant. Cleaning has to include the removal of all litter/bedding material, equipment (feeders, waterers etc for cleaning and disinfection outside the house) and disinfection has to be done after the houses have been cleaned.

6.3.2 Other measures:

6.3.2.1 Handling of culls and mortalities:

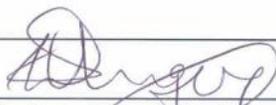
Diseased culls and mortalities must be destroyed on the farm by burial, composting or incineration or moved after death in closed leak-proof containers under a red cross permit to an approved rendering plant. In all cases minimal risk in contaminating the environment has to be ensured.

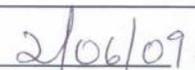
6.3.2.2 Handling of live sick birds:

- (i) No trade of live birds are to be allowed
- (ii) The handling of sick, live birds is aimed at cost recovery.
- (iii) Treatment  
Treatment with suitable antibiotics, e.g. quinolones for the recommended period on the label. (4 days in the case of quinolones).
- (iv) Monitor success of treatment by bacteriology

6.3.3 Establishment of the source of infection

It is extremely important to determine the possible source of the infection, as the chicken is the natural host for the bacterium and the bacterium is thus introduced into the flock by means of vertical transmission through the egg from infected parents or possibly other infected poultry.

  
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### 6.3 Handling of manure:

- (i) Manure of infected birds may not be removed to a site within a 3 km radius from another poultry unit. It may also only be moved under cover of a Red Cross Permit issued by the State Veterinarian of the area and only for the purpose of heat treatment for a minimum period of 28 days. This is to ensure that no live bacterium will be present in the manure before it is used for any purpose.
- (ii) Heat treatment can be accomplished by composting (ideal method) or by piling it up and covering it (if possible).
- (iii) If there is too much manure to allow it to be covered, it must be watered to form a crust on the outside.
- (iv) Manure/litter that has been either composted or piled up and covered or watered to form a crust, is normally considered safe after a period of 28 days has lapsed since the outbreak ended.

6.3.4 In the case where a layer/breeder flock becomes infected at point of culling, these chickens cannot be sold live, but must be treated and monitored.

- These birds could be slaughtered after treatment and observation of the withdrawal period, if a suitable abattoir is available.
- These birds are usually sold live and quarantine should remain until treatment has been successfully completed and the withdrawal period for the medication observed.

### 6.3.5 Rearing farms

Chickens (pullets and breeders) that have been reared until age of placement, cannot be kept indefinitely on the rearing farm, due to the logistics of placement at layer/breeder farm, cleaning and disinfection of the rearing site prior to receiving the next batch of day-old chicks.

It is however, not in the receiving farm's interest to receive infected chickens.

Infected chickens have to be treated and intensively monitored.

Only after monitoring indicates there is no further infection, could the quarantine be lifted and the chickens moved.

The receipt farm need to be monitored intensively on a monthly basis to ensure that there is no further infection.

### 6.3.6 Handling of hatching and table eggs:

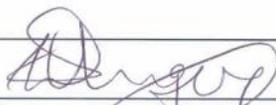
The handling of hatching and table eggs once again demonstrates that 'Prevention is better than cure'.

Vertical transmission via the hatching eggs have to be prevented at all costs.

- (i) In the case of layer and breeder farms,

#### Hatching eggs:

- Cannot be used for hatching, as the bacterium could be vertically transferred to the off-spring.
- Infected flock to be treated as in 3.2.2.3
- Infected flock to be monitored as in 3.2.4
- Eggs to be sent for human consumption only (monitor)

  
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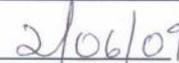
  
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Table eggs:

- The risk which table eggs for human consumption poses, is negligible.
- Table eggs could thus be sold for human consumption.

**7. Control measures in case of an outbreak of Salmonella Pullorum**

This disease is also a controlled disease in terms of the Animal Diseases Act (Act 35/1984). Any outbreak or suspicion of an outbreak thus has to be reported to the veterinary authorities.

Control measures recommended elsewhere in the document should result in the effective control of *Salmonella Pullorum* as well.

*Salmonella Pullorum* is a host-specific disease and poses no direct threat to human health.

**8. EXPORT**

Veterinary health certification, as determined by the importing country, should be observed as regards freedom from *Salmonella* Enteritidis, *Salmonella Gallinarum* and *Salmonella Pullorum*.

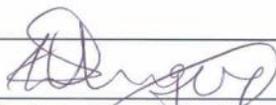
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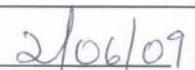
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**THE SALMONELLA REDUCTION SCHEME**

Salmonella bacteria are so numerous and occur in so many host species that almost all countries have adopted a Salmonella reduction plan. The aim is to integrate a series of actions to reduce the incidence of the organism as well as the incidence of disease in animals and man. The reduction scheme focuses on *Salmonella* Enteritidis, as it is a multi-host pathogen. *Salmonella* Gallinarum and *Salmonella* Pullorum are host-specific to the chicken.

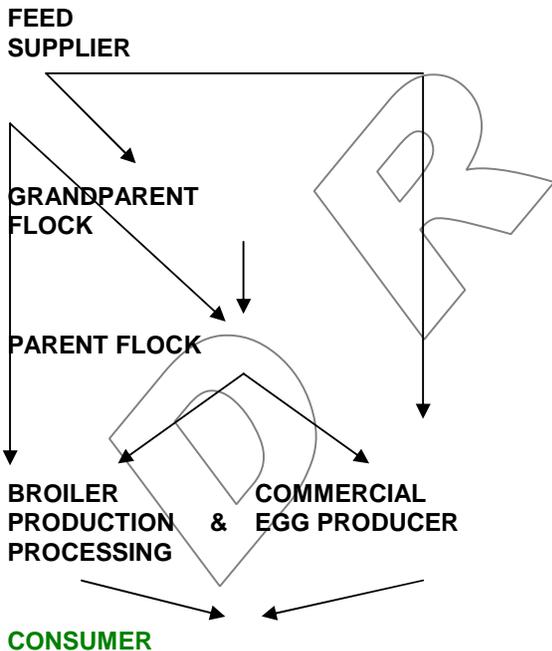
The Salmonella reduction plan adopted by the South African Poultry Association followed in many respects the scheme adopted in the European Union. The main activities incorporated in the plan are:

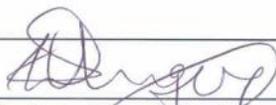
- Strict control to maintain SE free status in pureline breeding stock.
- Application of bio-security steps at all levels of the poultry production system.
- A monitoring system of the full range of poultry production systems and of poultry products.
- Application of sound kitchen hygiene and cooking practices to constitute safe and sound food handling and food preparation routines in all households.
- Effective communication between poultry producers, consumers and relevant state authorities to promote the success of the Salmonella reduction plan.

**PRACTICAL APPLICATION OF THE SE REDUCTION SCHEME**

The aim of this section is to supply information on the key control sites or elements in the production and marketing chain of poultry products.

These key sites can be summarised in the diagram below:



  
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The primary aims of the SE reduction scheme are the following:

1. Maintaining a negative SE status in Grand Parent and Parent flocks.
2. Maintaining a negative SE status in commercial flocks by an integrated scheme.
3. Integrating sound production systems.
4. Application of modern hygiene measures and bio-security.
5. Use of recently developed vaccines.
6. Judicious use of anti-microbial drugs.

The practical application of this scheme, in summary, is as follows:

**With reference to the elements of control:**

**A MONITORING OF FEED RAW MATERIALS AND FEED BY MILLS**

1. Known pathogenic Salmonella serovars are rarely isolated from feeds and fed raw materials, but feed must be considered as a primary source of infection. Regular bacteriological control must be carried out to detect sources of contamination.
2. Efficient rodent and wild bird control at storage facilities at the feed mill is essential.
3. Storage of feed on the farm should be limited and strictly controlled to prevent contamination of the feed from rodents and wild birds.

**B MAINTAIN NEGATIVE SE STATUS IN GRAND PARENT AND PARENT FLOCKS**

1. **Measures during rearing:**

All in – all out management.

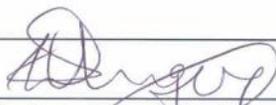
- Clean and disinfect houses, anterooms and surroundings on farm (rodent and insect control).
- Vaccinate with live- and/or inactivated vaccines.
- Use decontaminated feedstuffs.
- Monitor employees.

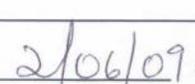
2. **Measures during production:**

- As above and the following: -
- Good litter management
- Nest hygiene to guarantee clean eggs
- Frequent collection of hatching eggs (4 x a day)
- Formalin fumigation of eggs on farm after collection

3. **Measures in the hatchery:**

- Use only clean hatching eggs
- Eliminate eggs from infected flocks
- Judicious use of formalin fumigation.
- Monitor employees

  
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#### 4. **Maintain modern Hygiene and Bio-security measures:**

##### **What is Farm Bio-security?**

- Bio-security is short for Biological Security. It is a variety of procedures used to establish sanitation barriers between unwanted organisms and flocks.
- The first basic requirement for effective Bio-security is to create a barrier zone around the poultry operation to help stop unauthorised movement in and out of the operation. An appropriate sign could be put up on the perimeters.
- The second basic requirement for effective Bio-security is to establish 'restricted' and 'unrestricted' zones on your premises. Restricted zones can be defined as those areas restricted to personnel wearing appropriate attire. Unrestricted zones are free areas in which vehicles and service personnel are allowed to work and move about without restriction. Access to restricted zones should be limited to essential staff only.

##### *"Start Clean – Stay Clean"*

- **Visitors and Staff**

All visitors, staff and service personnel should change into protective clothing (coveralls, boots, hats/bonnets) when moving into a restricted zone. Spare clothing should be on hand for individuals who do not provide their own clean, protective clothing. Having showers available for people to use when entering and leaving a 'restricted' zone will also help to ensure bio-security.

Management should ensure that all staff, including relief staff, understand the importance of personal hygiene and the means by which infections can be spread.

- **Goods and vehicles**

Vehicles, e.g. feed trucks, that travel from farm to farm can transmit diseases as can goods.

Access of vehicles to farms should be restricted. "Wheel baths" and/ or spraying of vehicles with a suitable disinfectant at the farm entrance can help to improve bio-security.

- **Bio-security in the buildings**

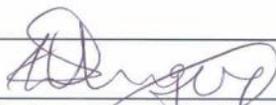
All building surfaces should be smooth and impervious to facilitate effective cleaning and disinfection.

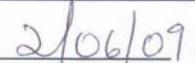
a) **Exterior**

Regular housekeeping will help to eliminate breeding areas for flies and rodents. All repairs to the exterior of the building should be completed before cleansing and disinfecting of the interior.

All houses to be constructed in such a way to prevent access by birds, rodents and snakes.

- i) Implement a rodent and fly/insect control plan.
- ii) Restrict access of birds and other animals into the houses. They have the potential to carry in disease.
- iii) Repair any damaged screens promptly.
- iv) Keep the area around the buildings clean, tidy and free of rubbish.
- v) Ensure adequate drainage of water away from the area to prevent pools of stagnant water that could act as breeding sites for micro organisms and insects.

  
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- vi) Areas around manure pits should be kept trimmed and preferably a cover should be provided for the pit. For other manure handling systems, provide for the minimisation of odour, rodent and/or insect prevalence.
- b) Interior
- i) Separate footwear should be worn and stored in each production unit.
- ii) Any person entering the facility who has been suffering from diarrhoea should take extra care in personal hygiene (i.e. hand washing).
- iii) Depopulated houses should be cleansed and sanitised before restocking. An incomplete job is a waste of time and money and creates a false sense of security. Cleaning, drying, disinfecting and airing out should take a minimum of seven days.
- Remove all manure and preferably spread only on cultivated land and not adjacent to the poultry house. Tractors and equipment used for handling manure should be thoroughly cleaned and disinfected before being used for other operations. If manure is to be spread on lands that will be grazed by livestock, it should be stacked for 4 weeks before spreading.
  - Walls, ceilings, rafters, fans, heaters, cages, drinkers and feed troughs should be pressure washed and sanitised with disinfectant. Waterlines should be flushed and disinfected.
  - Dry and disinfect.
  - Air out.
  - If litter is used, ensure that it is of good quality and sterilised.
  - Proper management of litter during production is important to ensure acceptable dry status and siring thereof.
- iv) Ventilation – air temperature, moisture content, direction, speed, volume and transported products such as gases, dust odours and organisms are normally controlled by ventilation systems. Proper management and maintenance of this system will improve the environment surrounding your flock.
- v) Clean feed bins, troughs and pipes regularly as residues in these locations are favourite sites for Salmonella contamination.
- vi) Check water drinkers regularly for leaking or overflowing. Excessive moisture can promote bacterial growth. Litter management is important.
- vii) Spilled feed below bins should be cleaned up.

5. **Ensure good water quality**

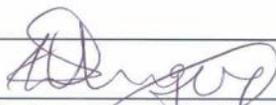
Your water source should be clean and not accessible to wild birds or water fowl. Untreated surface water should not be used. Water should be tested biannually pre- and post rain seasons for general quality and bacterial levels with emphasis on SE.

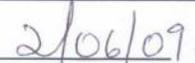
C. **DIAGNOSTIC MONITORING PROCEDURES**

Monitoring should be done in an approved laboratory.

• **Grandparent and Parents Flocks:**

1. Rearing
- 1.1 Bacteriology

  
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Direct Control

- a) Check liners on arrival: 3 single in 1 pool per 1 000 chicks.
- b) Dead birds.
  - Pedigree lines: all mortalities (deep frozen)
  - Grandparent: Mortality of 2 days per week. Bacteriological test of organs. Pools of maximum 5 singles.
- c) Drag swabs or faecal samples at 4 week intervals.  
Drag swabs: 2 per house  
Faecal samples: 30 singles per house in 3 pools with 10 each (front, middle, back)

1.2 Serology

32 Serum samples/flock at 12 weeks, for SE ELISA from identified birds for screening.

2. Adult Breeders in lay:

2.1 Bacteriology:

Direct Control

- a) As in rearing for mortalities and swabs.
- b) Fresh eggs for bacteriology  
150 eggs per flock at peak production  
Pool 5 eggs i.e. 30 groups  
Repeat 3 times with 2 week intervals  
Suspect flocks: Continuously every 2 weeks

2.2 Serology

32 Serum samples/flock at 25 weeks and 40 weeks. (Birds should be numbered for reference to serum samples).

• Hatchery

1. Dead in shells

90 eggs per flock with first hatch,  
Then 90 eggs per flock at peak production. Repeat 3 times with 2 week intervals.

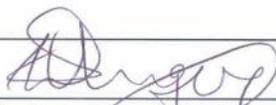
2 Pools of 30 eggs.

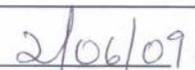
2. Meconium

Weekly per flock 250 singles in 1 to 2 pools.

3. Fluff samples

5 samples pooled per hatchery per month.

  
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- **Commercial Broilers and Layers**

1. **Bacteriological Monitoring**

- 1.1 Increased first two week mortalities with septicaemia. Pools of maximum 5 singles.
- 1.2 Monitoring each batch egg pulp in layer units for SE.
- 1.3 Abattoir monitoring. Refer to Directorate Veterinary Quarantine and Public Health.

- **General Monitoring**

1. **Rodents**

Trap in depopulated houses for bacteriology.

2. **Staff**

Refer to Department of Health. Monitoring staff should be a prerequisite, as SE is primarily a human pathogen and humans may act as SE carriers.

- D. **IMMUNISATION SCHEDULES**

The use of vaccines in Broiler parents, layer parents and commercial laying flocks is compulsory.

Discuss the practical details with your poultry vet.

- E. **ANTIMICROBIAL THERAPY AND PROBIOTICS**

- **Antimicrobials**

Antimicrobials (antibiotics), especially the newer generation broad spectrum groups, can play a significant role in SE control. Provided that all aspects of the control program are in place, they can lead to a significant decrease in the level of bacterial infection in the flock. Treated flocks may remain carriers of the infection after treatment. The birds can, however, still be re-infected from the environment or from other infected birds. This means that antimicrobial therapy alone cannot eradicate an infection. If it is used it is important to use it at the correct dose and for the correct period of time. The environment (chicken houses) cannot be 'treated' during production and remain contaminated. The birds could therefore become re-infected.

While antimicrobials are useful in a control program, it must also be remembered that excessive use may lead to problems of drug resistance developing.

There also exists an ethical situation when 'last resort drugs' for certain human conditions are used.

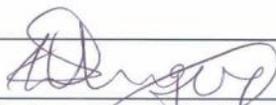
- **Probiotics**

A probiotic is a culture of 'good' bacteria. The principle behind their use is that these bacteria establish themselves in the intestines and therefore prevent the SE from establishing. This would be of particular importance after the use of antimicrobials.

In practice, however, their use has had variable results (from excellent to poor).

Before using these treatments it is important to obtain professional advice.

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## **CONTROL MEASURES AGAINST SALMONELLA GALLINARUM**

### **1. General**

Salmonella Gallinarum is a host specific Salmonella sp of chickens and is responsible for a disease known as fowl typhoid. Symptoms associated with the disease in chickens include diarrhoea, difficulty breathing and acute mortality. On post mortem examination, birds show a dramatically swollen liver with bronze discolouration as well as enlarged spleen and fluid in the lungs. Diagnosis is confirmed by bacterial culture.

The disease can be effectively controlled through the use of live and inactivated vaccines. In outbreaks, antimicrobial therapy is used but only serves to suppress the symptoms and usually fails to eliminate the infection from the flock.

Note: This disease poses no health threat to human beings.

### **2. Control Measures**

No grandparent or pedigree flocks may be vaccinated against any Salmonellae and should be regularly tested serologically to ensure they are clear of Salmonella infections.

Parent flocks and laying flocks should be vaccinated against Salmonella in rearing, preferably with vaccines with known efficacy against Salmonella Gallinarum.

Point of lay pullets and broiler breeders should be tested by bacterial culture by an accredited laboratory and certified free of SG before transfer from the rearing farm.

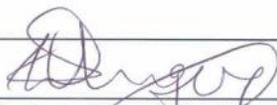
Salmonella Gallinarum is a controlled disease in terms of the Animal Diseases Act (Act 35 of 1984) which means that any outbreaks or suspicion of an outbreak must be reported to veterinary authorities. On positive diagnosis of Salmonella Gallinarum infected flocks will be dealt with as determined by the director.

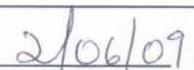
## **SALMONELLA PULLORUM**

This disease is also a controlled disease in terms of the Animal Diseases Act (Act 35/1984). Any outbreaks or suspicion of an outbreak has to be reported to the veterinary authorities and the affected flocks destroyed.

Control measures recommended elsewhere in this document should result in the effective control of SP too.

SP is a host specific disease which poses no direct threat to human health.

  
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