2DA EDICIÓN

PROTEINAVIVA

La industria de alimentos en el centro del mundo

CONDICIONES SUBOPTIMAS DE GRANJA AFECTAN EL USO DE ENERGÍA Y LA RENTABILIDAD

CON EL AUSPICIO DE:

MONTANA

JUNTOS CREAMOS BIENESTAR

13, 14 Y 15 DE MAYO 2026

CENTRO DE CONVENCIONES METROPOLITANO

QUITO - ECUADOR

Suboptimal farm conditions impair cell function that limits energy utilization and thus performance

Impextraco®
Optimizing feed ingredients

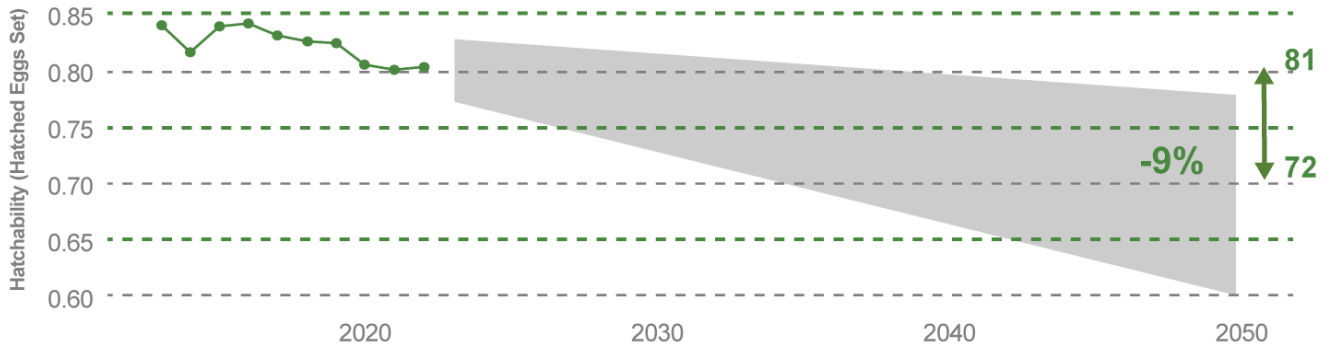
Edita Sostaric Zandee
Global product manager polyphenols
Impextraco, Belgium

Global trend: challenge in breeder fertility

Source: Cash *et al.* (2025), USDA, Poultry Sci.

- **Globally fertility of broiler breeder is declining:**
  - **Decrease** (2013-2022)**:**
    - hatchability ~5%
    - production efficiency ~7%
  - **Further sig. decline expected (until 2050)**

Projected Hatchability with 95% Credible Intervals

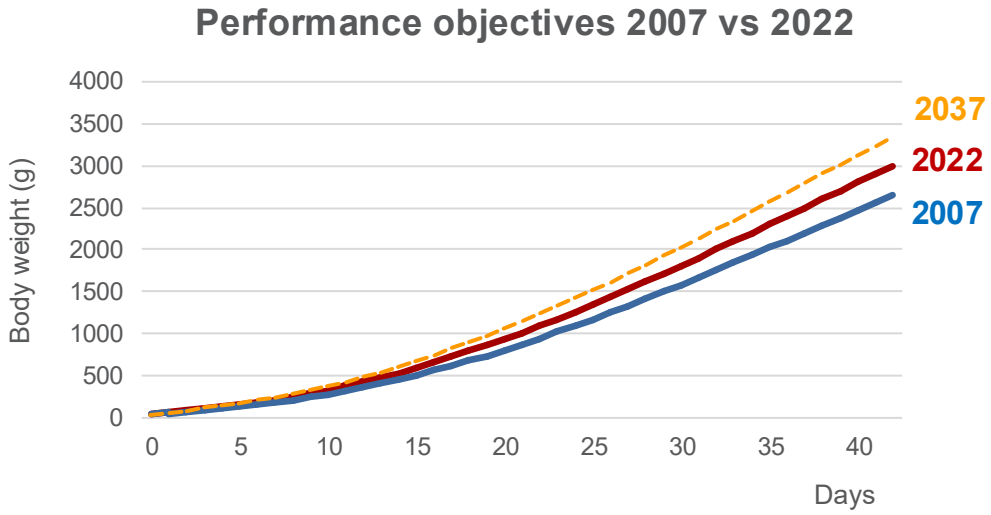


- **Need to maintain maximum metabolism for optimal organ function**

•• Maintaining cell function is key ••

How can we explain this?

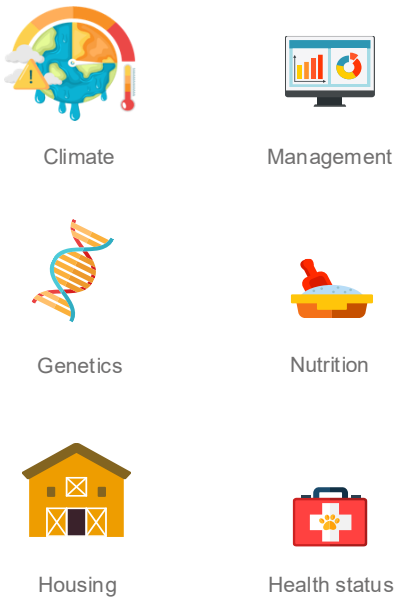
- **Breeder body weight potential has increasing**
  - **FI capacity as well**
- **FI has not changed**
  - **Are breeders underfed?**
- **Effect on body condition?**
  - **Birds too lean**
- **Effect of strong fasting**
  - **Increased stress** (increased oxidation)
  - **Higher early and late embryonic mortality**
  - **DOC quality?**

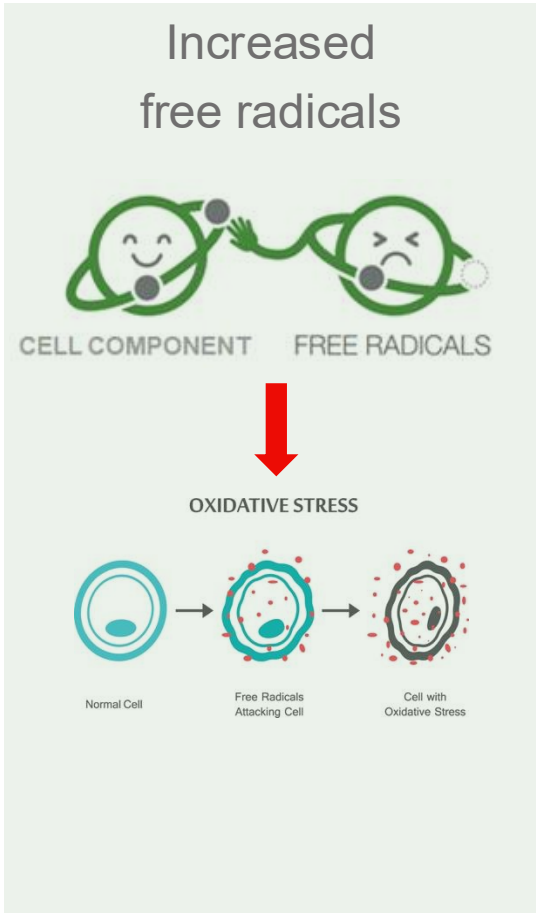


Source: *Cash et al.* (2025), *Romero-Sanchez et al.* (2025), Aviagen (2007, 2022)

Reduced cell function due to oxidation

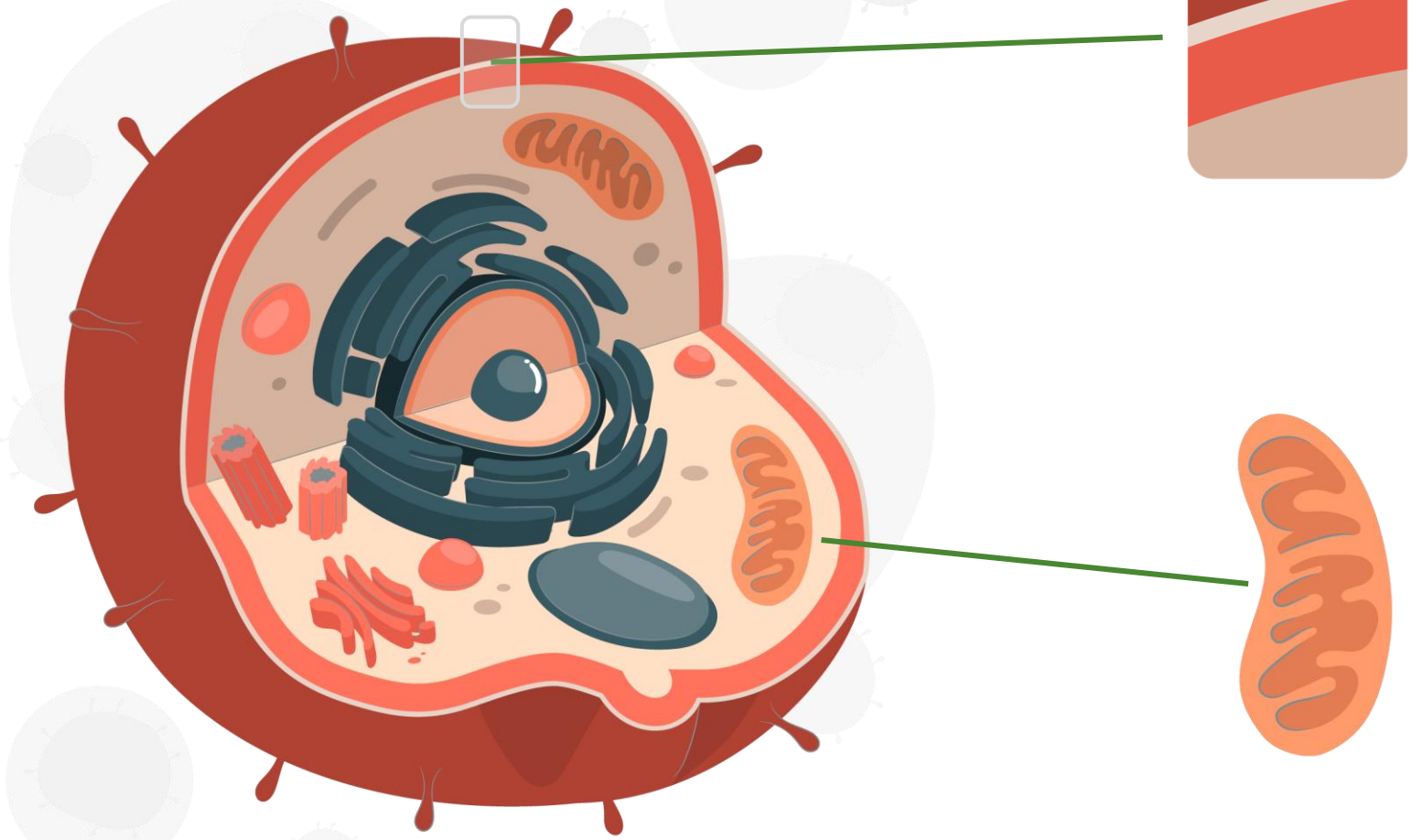
Cell oxidation is an **imbalance** between **free radicals** and the ability of **antioxidants** to neutralize them





- Lower utilization nutrients
- Reduced organ function
- Reduced cell function
- Inefficient energy utilization

Oxidation in body cells



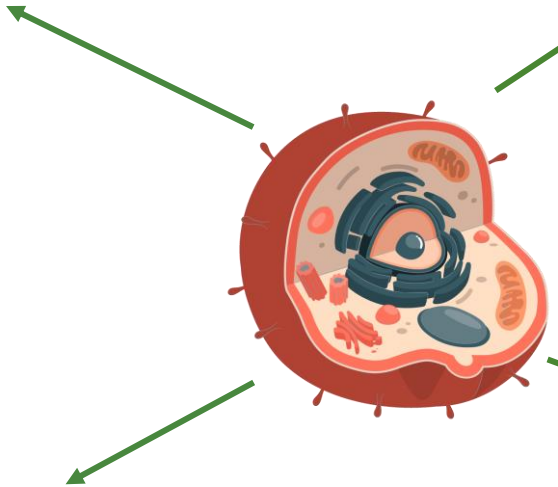
Cell Membrane
Vitamin E (as potential antioxidant)

Cell Mitochondria
Vitamin C (as potential antioxidant)

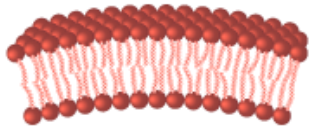
Impact of oxidation in body cells on animal performance

Zootechnical & Meat Yield

↓ **Fertility, ↓Lay%, Mortality** ↑
FCR ↑, ADG ↓, Carcass dressing ↓,
Meat:Fat ratio ↓



Cell Mitochondria
(zootechnical properties)



Cell Membrane
(egg and meat quality)

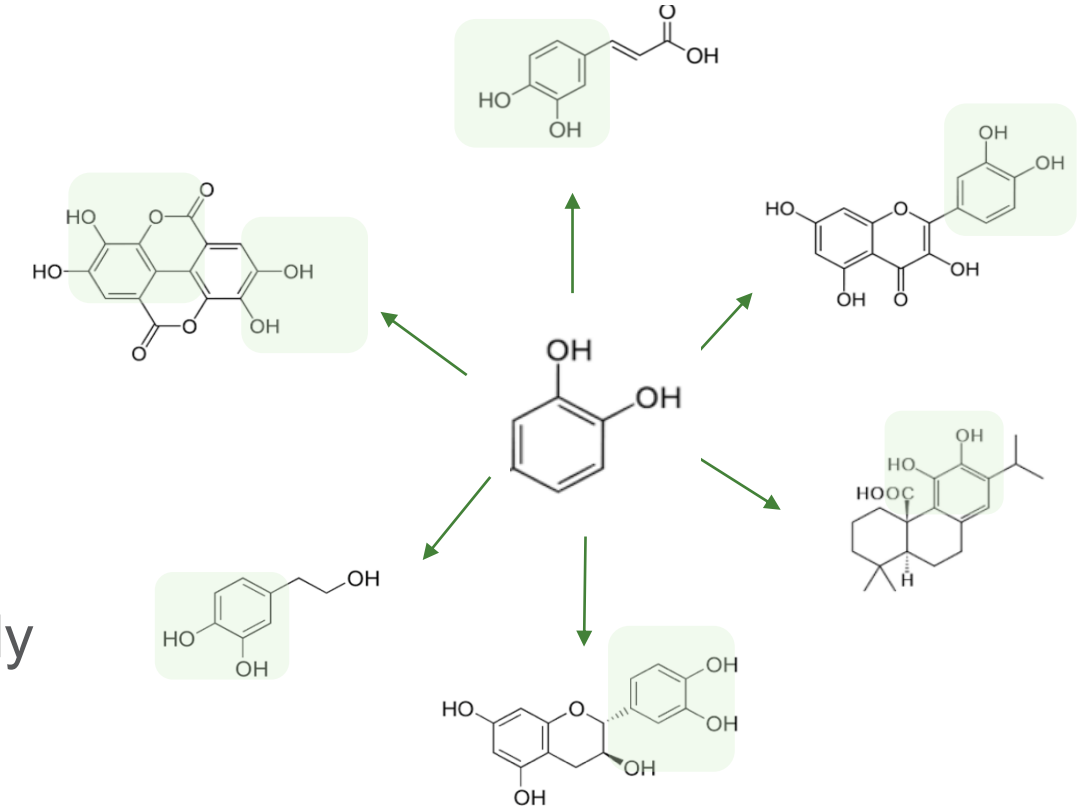
Meat / Egg Quality

Shelf-life ↓ (e.g. TBARS fat oxidation ↑),
Preservation of pigmentation ↓
Drip Loss ↑

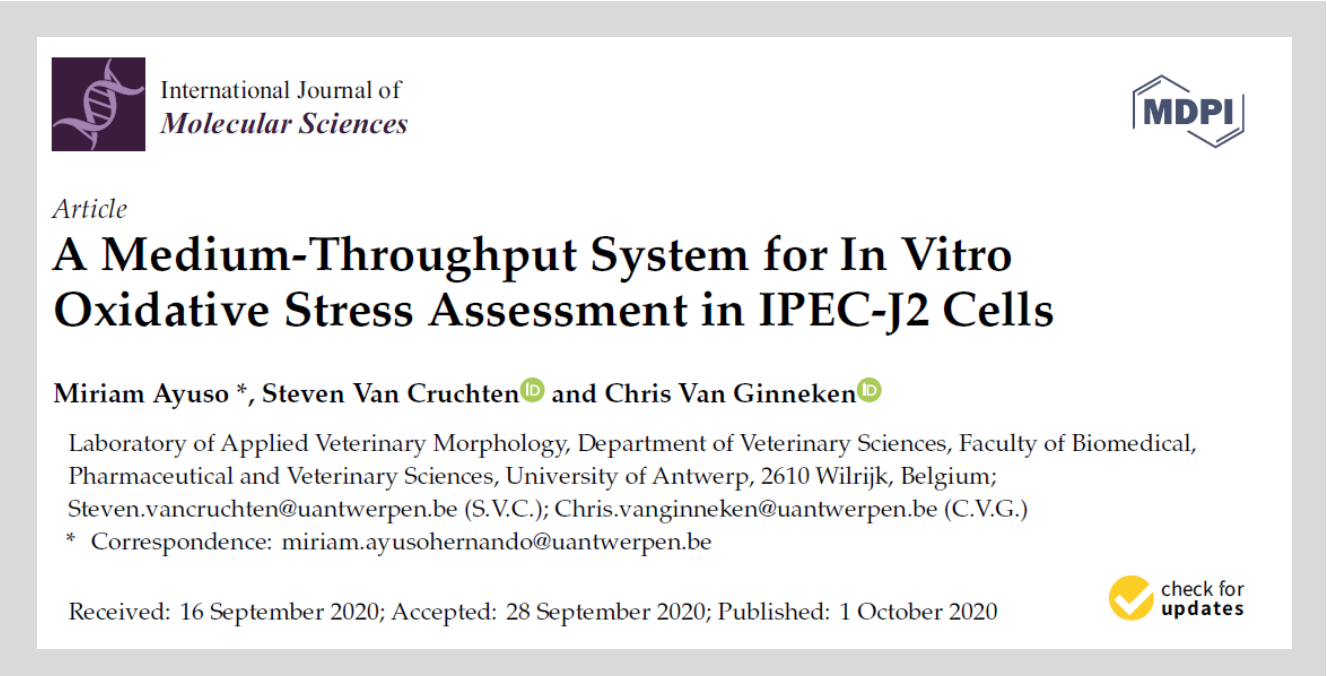
Which polyphenols?

- Very large family
  - > 8000 molecules
  - Different activities

- What to select?
  - Bioavailable > active in gut and in body
  - Water-soluble > Intracellular activity
  - Small molecules > strong antioxidants



International Journal of Molecular Sciences



International Journal of
Molecular Sciences

MDPI

Article

A Medium-Throughput System for In Vitro Oxidative Stress Assessment in IPEC-J2 Cells

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check for updates

Objectives:

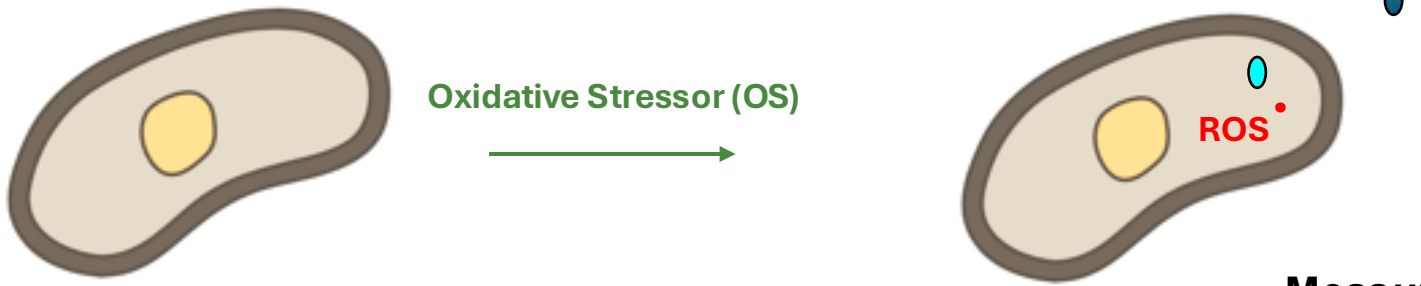
1. Proof that Specifically selected polyphenols (SSPs) are active within cells
2. Show the replacement ratio to vitamin E

IntraCellular Oxidative Stress (ICOS)

Reduced Probe

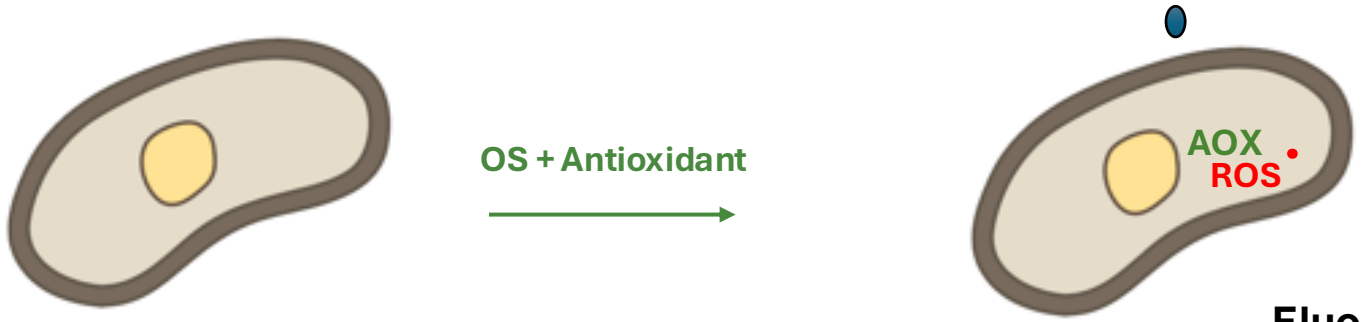
Oxidised Probe

CASE #1



Measured by Fluorescence

CASE #2



NO Fluorescence

Oxidation response: The HIGHER the OXIDATION, the HIGHER the fluorescence reading.

Antioxidant capacity of selected polyphenols

Reduction of radicals (ROS) in (gut) cells

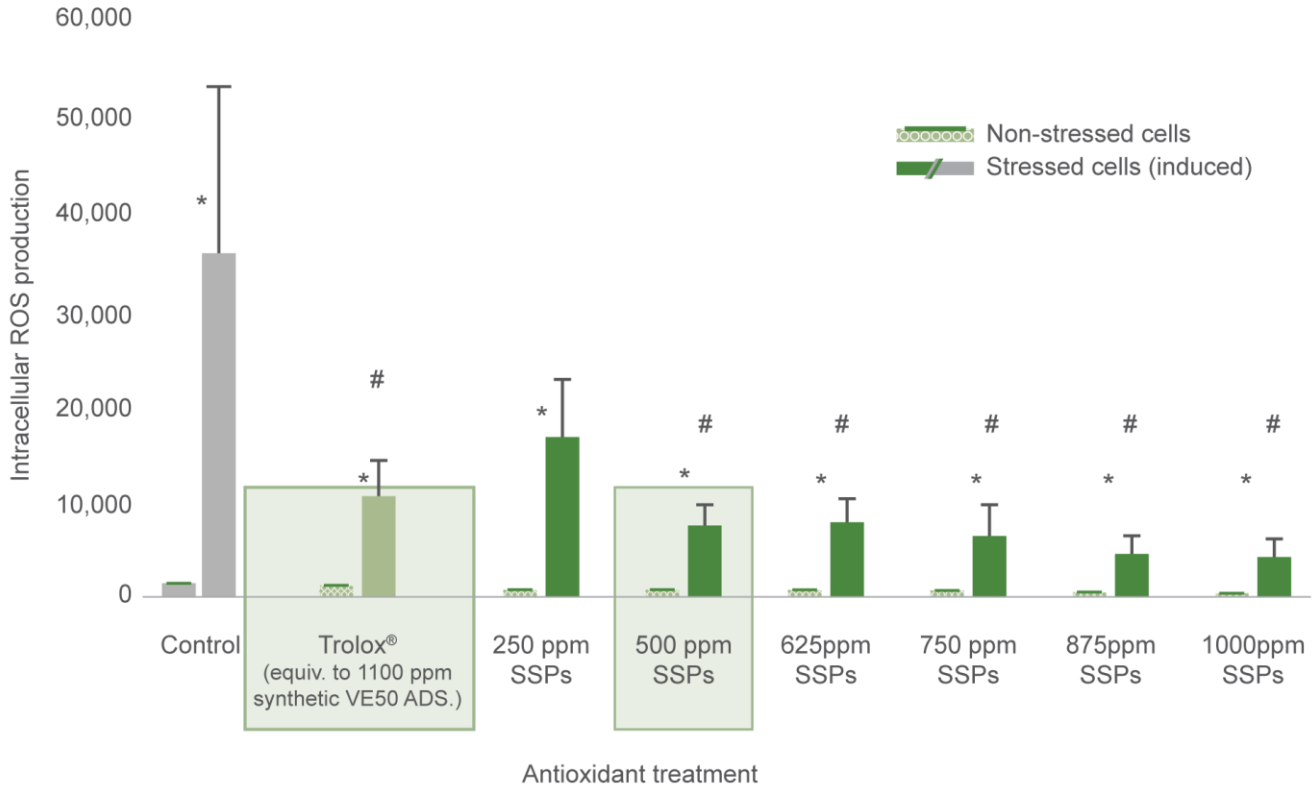


Figure 5. *Dose-response decrease in ROS content inside animal gut cells after antioxidant administration, with (solid bars) or without (dotted bars) an oxidative challenge. Adapted from Ayuso et al. (2020)".*
** statistically significant differences (at p‹0.05) in ROS content between non-stressed and stressed cells (i.e. stressor effect)*

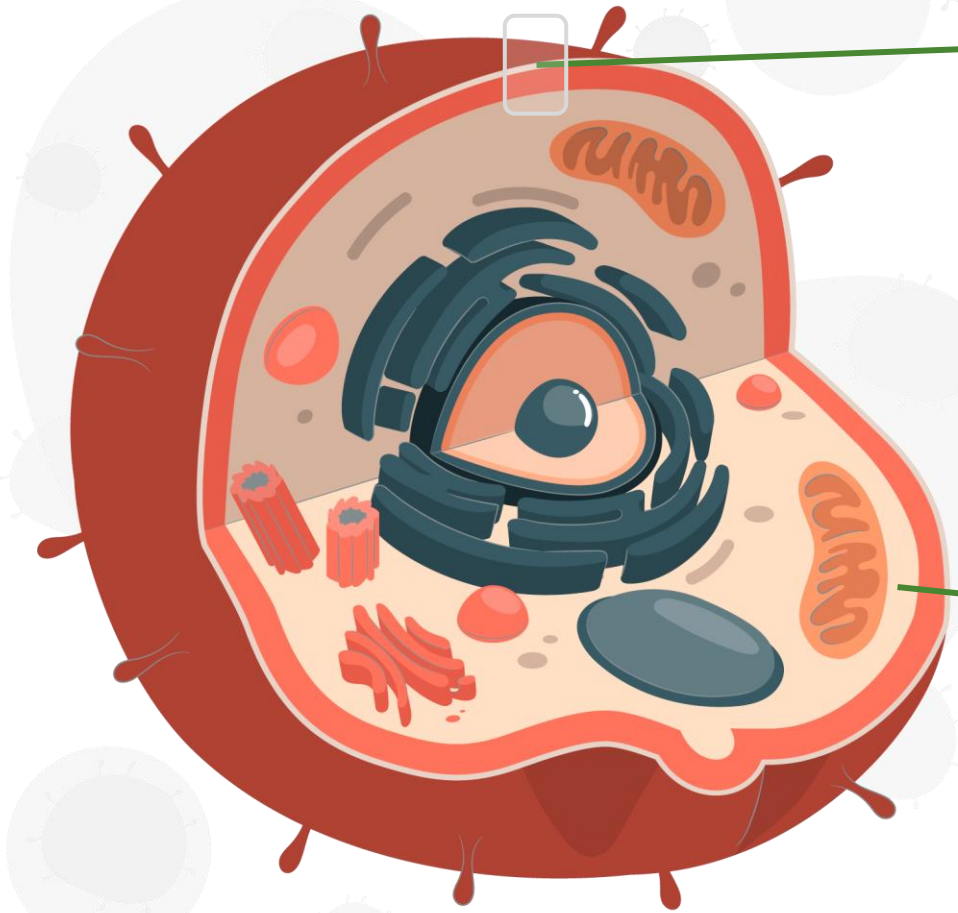
 # statistically significant decrease (at p‹0.05) in ROS content after treating cells with Trolox® water-soluble Vit E or with SSPs, when compared to untreated control cells file, antioxidant etfect)

Ayuso, *et al.* 2020

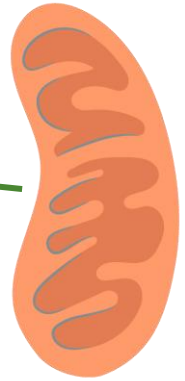
Specifically selected polyphenols (SSPs)

- Penetrates the cell wall
- Has a high antioxidant capacity
- Has a linear dose response

Oxidation in body cells



Cell Membrane
Vitamin E (**SSPs**)



Cell Mitochondria
Vitamin C (**SSPs**)

BENEFITS in **BROILER BREEDERS**

Global efficacy trials with specifically selected polyphenols

Trial 1: Collaboration with commercial hatchery (Ross308 broiler breeders)

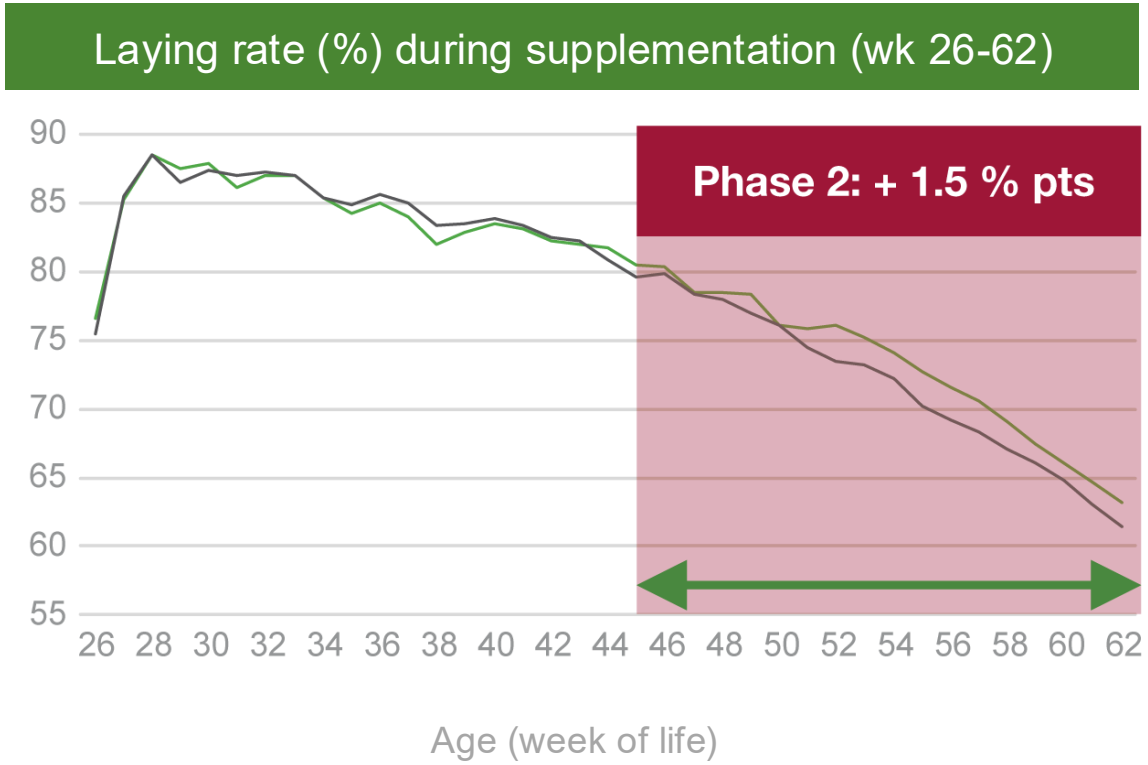
Trial 2: University fertility project (pure lines of layer breeders)

+ Trial 3: Research institute trial in sow

Research collaboration with Belgabroed

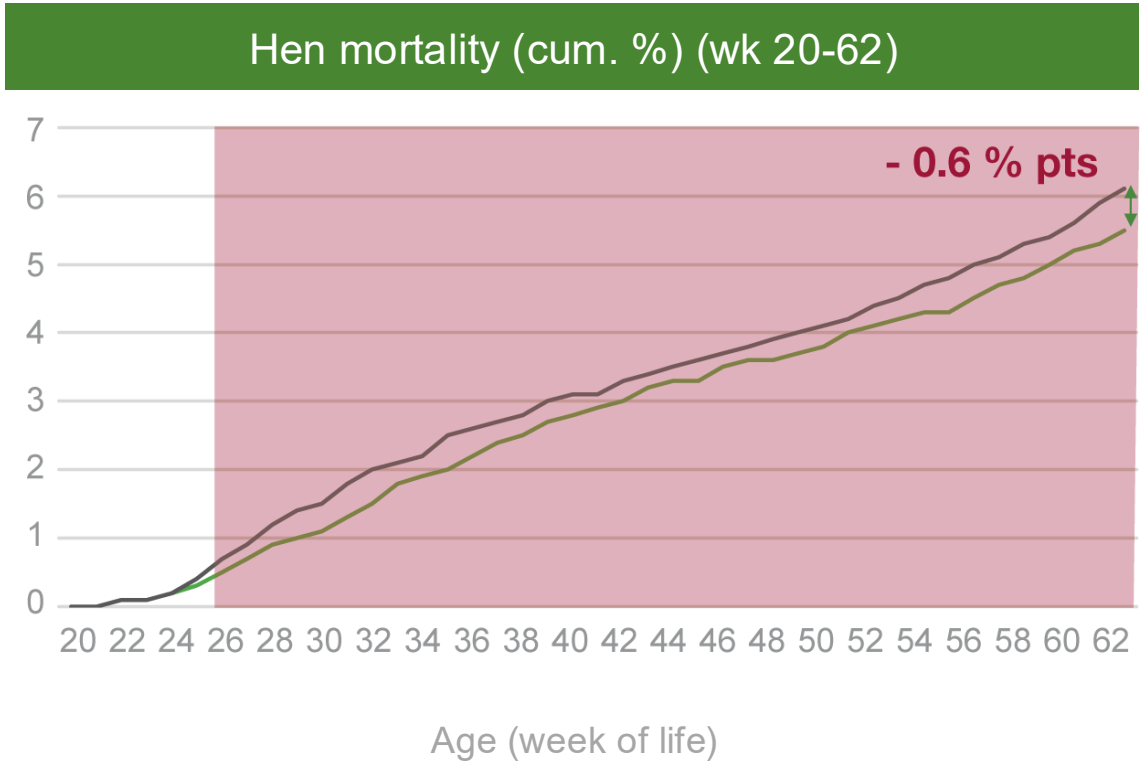
- **Trial set-up**
  - Control (Ross Aviagen)
  - SSPs dose 1kg SSP/MT
- **Feed**
  - Vitamine E: 110 IU/kg
  - European max. of Se (0.3 ppm)
  - Plus Carophyl red
- **Measured parameters**
  - Laying persistency
  - Fertilized eggs after 18 days
  - Hatchability

SSPs improves breeder performance



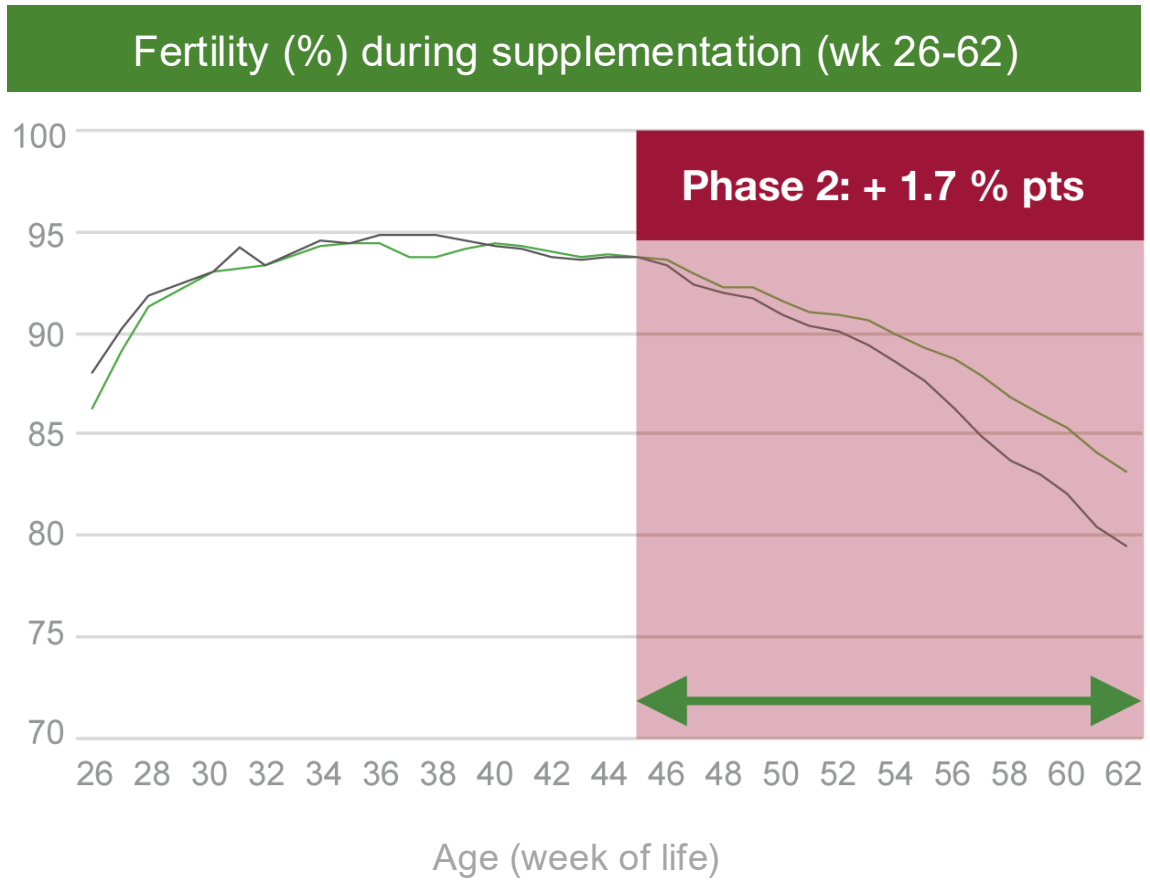
- Improved laying rate
  - consistently after wk 45
  - avg +1.5% wk 45-62 (breeder II)

SSPs improves breeder performance



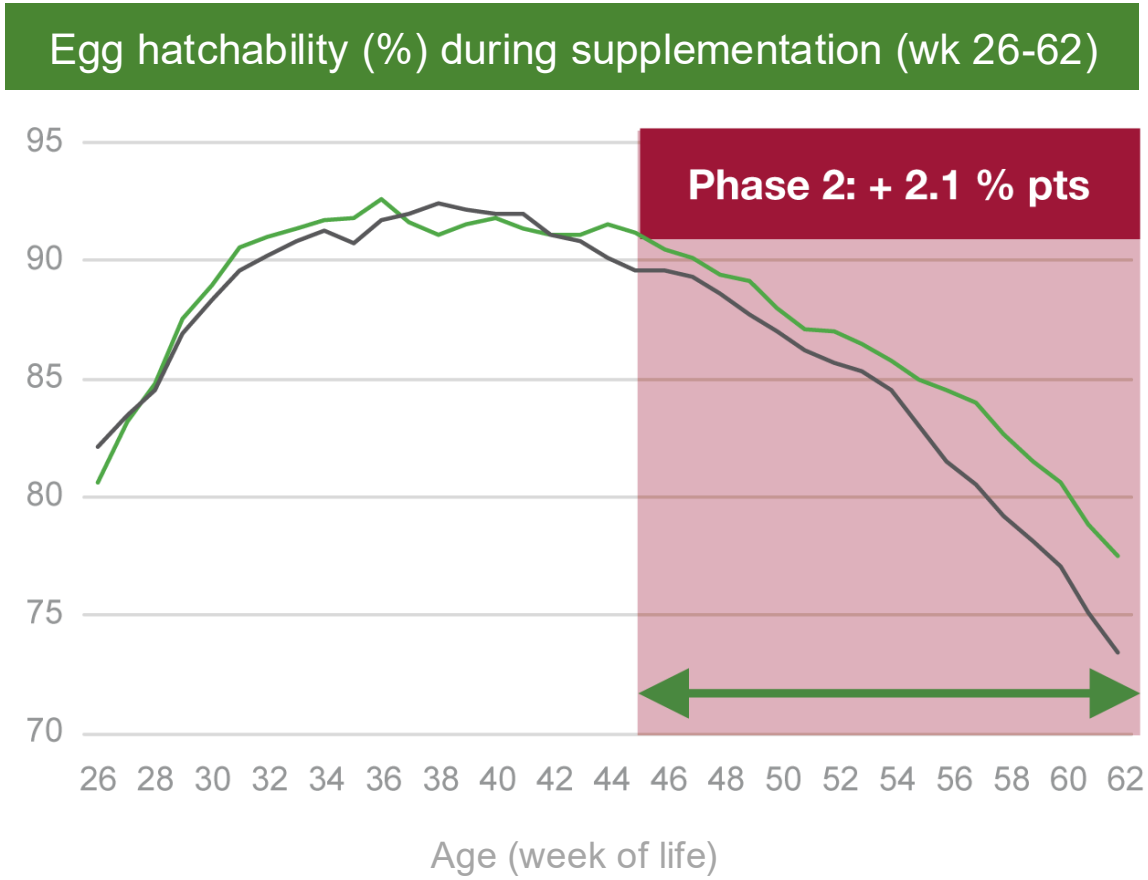
- Lower mortality of hens
  - avg -0.6% wk 26-62

SSPs improves breeder II performance



- Improved fertility
  - increased fertilized eggs
  - consistently after wk 45
  - avg +1.7% wk 45-62 (breeder II)

SSPs improves breeder II performance



- Improved hatchability
  - avg +2.1% wk 26-62

→ SSPs group has > 3 DOC per hen more

Summary results

Avg. Egg production	SSPs	Control	Diff.
Week 45-62	72,60 %	71,17 %	**+1,5 %**

Fertility	SSPs	Control	Diff.
Week 45-62	89,45 %	87,77 %	**+1,7 %**

Avg. Egg production	SSPs	Control	Diff.
Week 45-62	85,52 %	83,41 %	**+2,1 %**

SSPs at 1 kg/MT > 3 DOC per hen extra!

University project UFSM

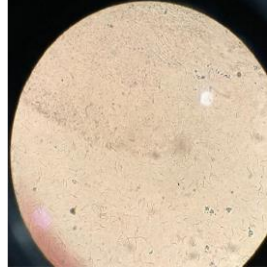
- **Main objective**
  - Impact of SSPs antioxidant on bird fertility (and egg hatchability)
  - Both in males and females

- **Set-up**
  - Genetics : pure lines of layer breeders (brown eggs)
  - Period : phase 2 of production (wk 54-70)
  - Supplementation : SSPs dose-response 0 - 0.5 - 1 kg/t
  - # replicate cages/treatm. : 10 with 7 hens each, 10 others with 1 rooster each

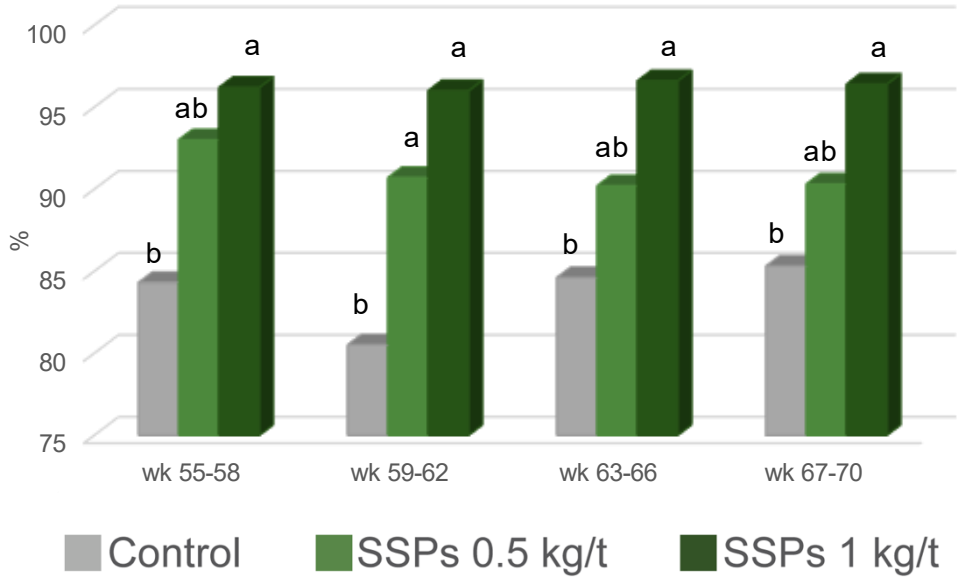
- **Feed**
  - Mash (corn-soy based), ad lib (like water)
  - 44 IU/kg Vit. E, 0.3 ppm Se

- **Measured parameters**
  - Rooster semen quality
  - Hatchability
  - Embryo quality (mortality during incubation)

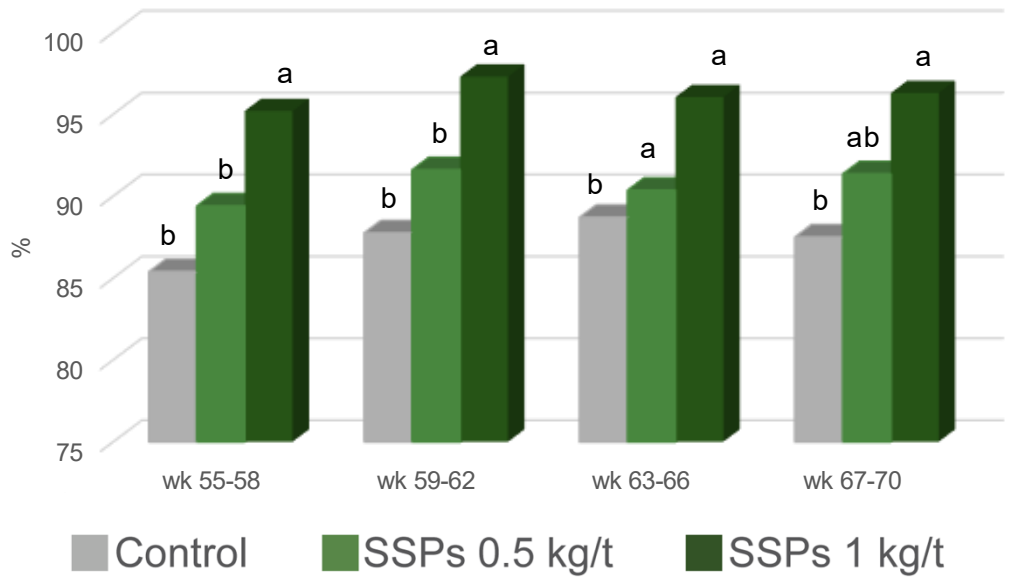
SSPs improves semen quality



Semen motility



Semen normal morphology

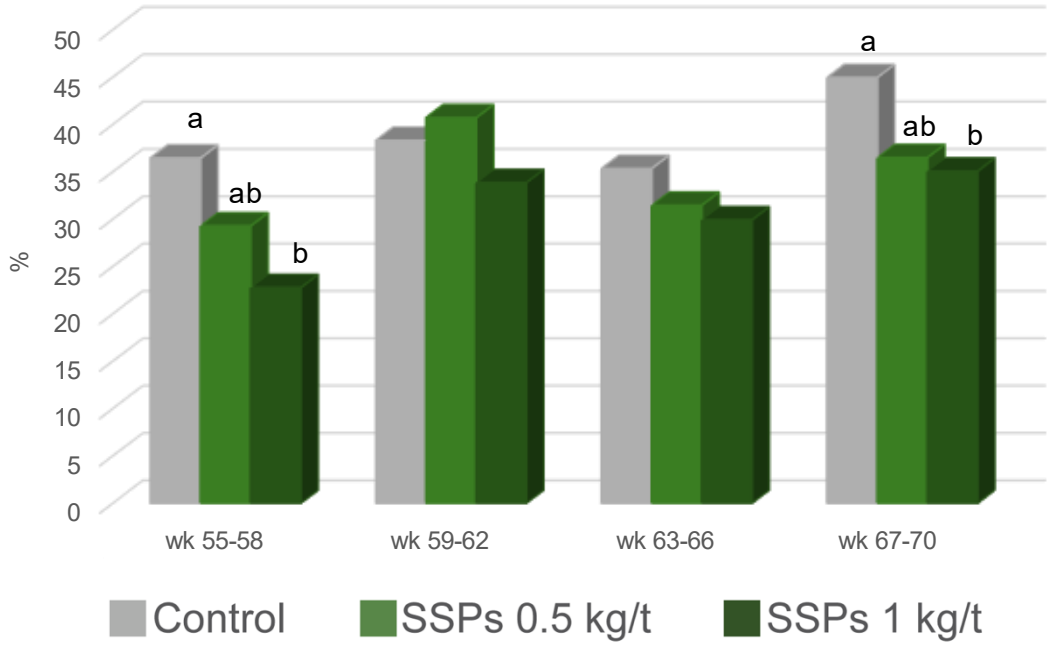


n = 10 individually caged roosters | a,b at P < 0.05

SSPs known effects on hatchability might partly be explained through its **benefits on male fertility**

SSPs reduces embryonic death (early stage)

Early embryonic mortality (0-48h)



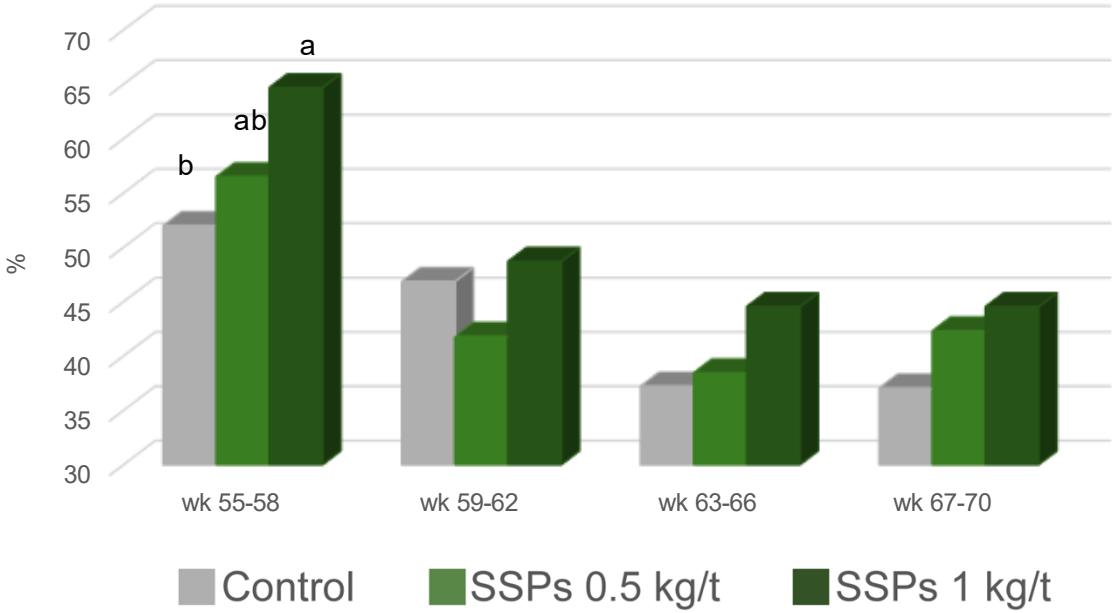
n = 10 cages of hens, per 7
a,b at P < 0.05

	Control	SSPs 0.5 kg/MT	SSPs 1.0 kg/MT
Period 54-70 weeks	38.76[a]	34.49[ab]	30.40[b]

SSPs significantly reduces early embryonic death over the whole period (wk 55-70)

SSPs improves egg hatchability

Hatchability of total eggs set



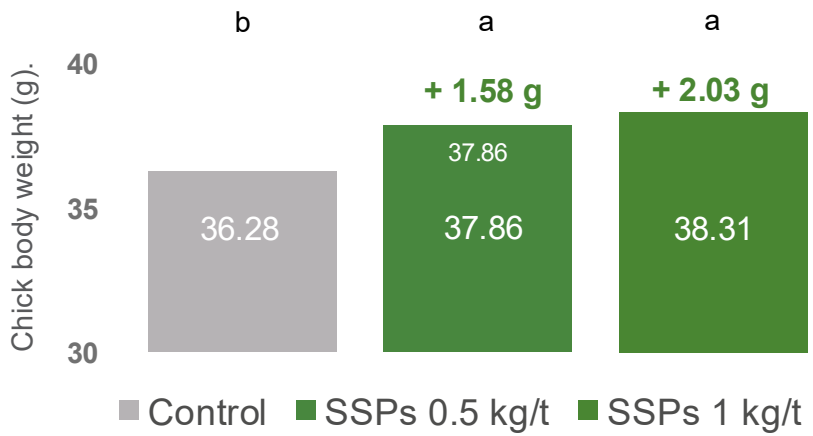
n = 10 cages of hens, per 7
a,b at P < 0.05
A,B at P < 0.10

	Control	SSPs 0.5 kg/MT	SSPs 1.0 kg/MT
Period 54-70 weeks	43.28^{A}	44.76^{AB}	50.62^{B}

Combining its effects on breeder fertility and embryo quality, **SSPs improves hatchability**

SSPs improves DOC weight

Chick body weight (wk 54-70)



n = 10 individually caged roosters
a,b at P < 0.05

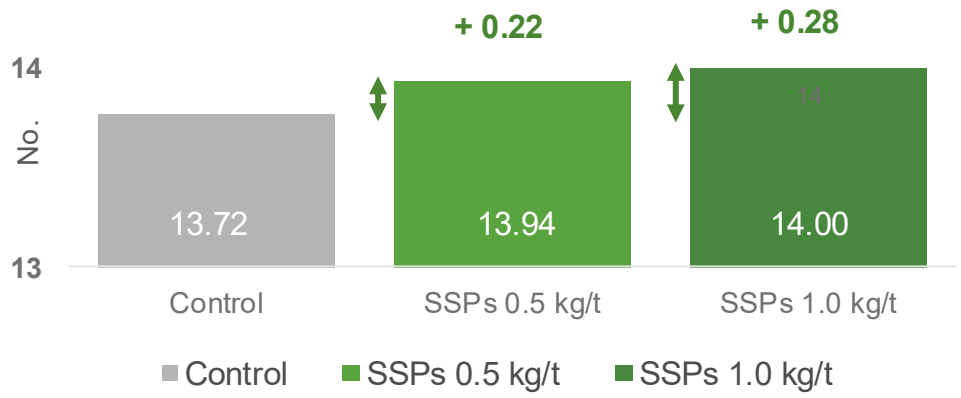
SSPs significantly improves weight of day-old chick

Research institute trial

- **Main objective**
  - Impact of SSPs on sow performance
- **Set-up**
  - Genetics: TOPIGS (TN Duroc, TN70) average parity 3.27±1.01
  - 173 sows divided into three groups of 59, 59 and 55
  - Treatments:
    - Control: standard mash diet
    - Supplementation SSPs: 0.5kg/t gestation and 0.5 or 1 kg/t lactation
- **Feed**
  - Mash (corn-soy based), ad lib (like water)
  - Vitamine E: 58 IU/kg (gestation) and 56 IU/kg (lactation)
  - Se: 0.3 ppm

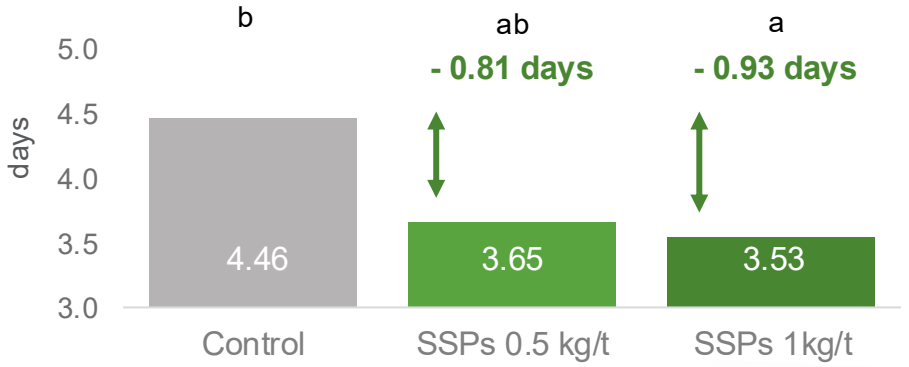
Effect of SSPs on piglets and sow

No. of weaned piglets/ sow/ litter



Significance:
** is P < 0.05 | a,b at P < 0.05

Wean-to-estrus interval (WEI)



SSPs reduce piglet mortality, **improving litter weight** at weaning and shorten WEI

Focus positioning SSPs in layers & breeders

Layers and breeders

Zootechnical benefits

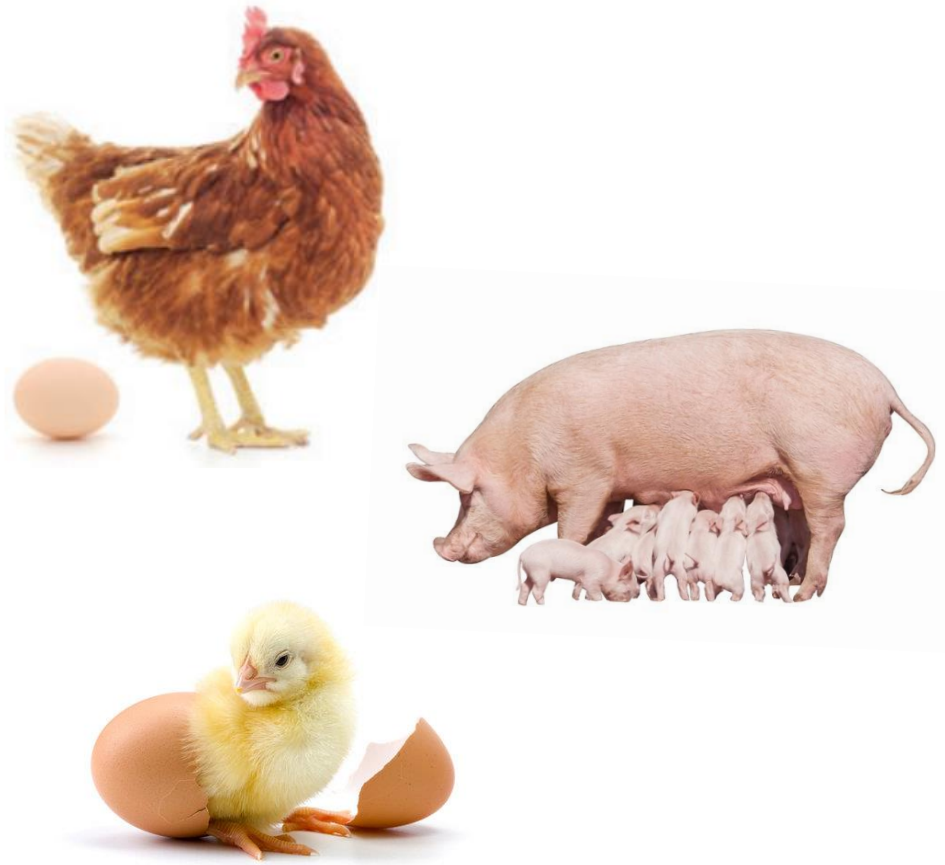
- Improve laying persistency (+1.5%)
- Increase hatchability (+2%)
- Increase No. of weaned piglets (+0.22)
- Improve wean-to-estrus interval (-0.81)

Extra benefits

- Egg quality
- Reduced oxidative status

Dosing

- 500 g/MT in layer feed II
- 1000 g/MT in breeder feed II
- 500 g/MT in sow



Thank you

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