



Selisseo®

## HOW SELISSEO® HELPS INCREASING PROFIT IN POULTRY PRODUCTION

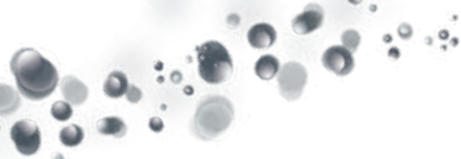


| Selisseo®, the pure source of organic selenium



[www.adisseo.com](http://www.adisseo.com) | [feedsolutions.adisseo.com](http://feedsolutions.adisseo.com)

**ADISSEO**  
A Bluestar Company



Selenium (Se) is an essential nutrient for life, with established requirement from 0.1 – 0.3 ppm to support basic functions.

While inorganic Se is commonly used for feed supplements, recent research has firmly confirmed that organic Se, specifically selenomethionine (SeMet) or hydroxy-selenomethionine (OH-SeMet), is much easily integrated into body metabolism.

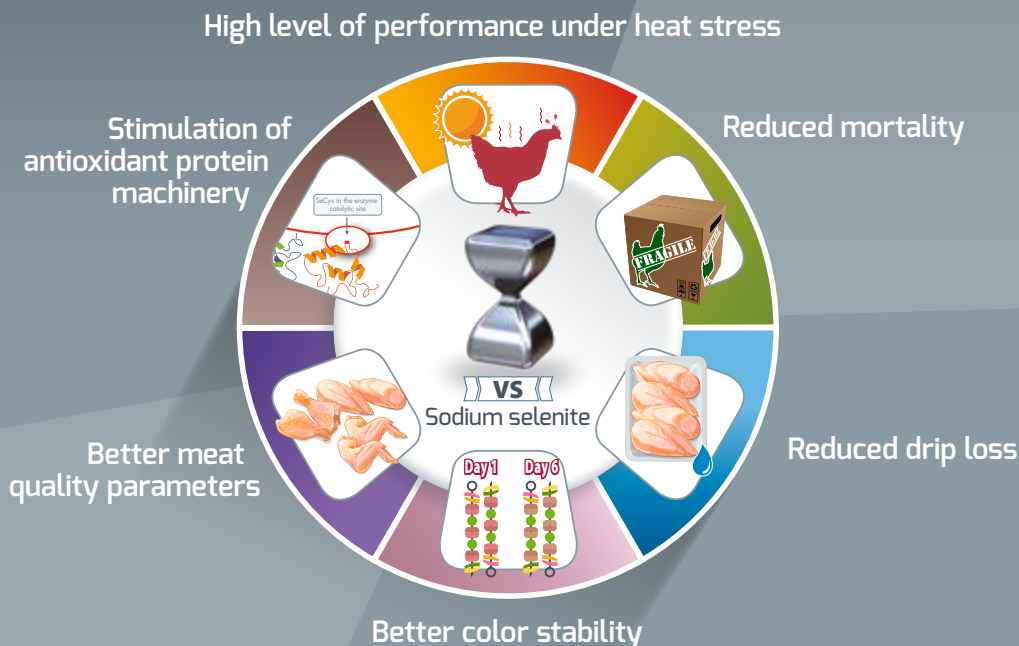
Selisseo® contains 100% hydroxy-selenomethionine, a pure and highly available form of organic selenium.

Under oxidative stress situations, animals have the capacity to respond through enhanced production of selenoproteins, thus needing high supply of Selenocysteine (SeCys). Selisseo® with its greater induction of SeCys synthesis is key to improve the ability of animals to withstand stressful physiological events such as birth or reproduction, but also challenged environment and health issues.

Batch-after-batch, Selisseo® supplies the same level of OH-SeMet; it is stable even under extreme feed processing conditions such as extrusion. It is also easy-to-use and safe for workers thanks to an optimal particle size without fines. Its efficacy is demonstrated by both higher SeMet deposition in all tissues for storage purpose and higher SeCys synthesis for the constitution of functional selenoproteins.

# Selisseo® has demonstrated several benefits in poultry production

- 1 High level of performance under heat stress
- 2 Reduced mortality
- 3 Reduced drip loss of broiler meat
- 4 Better color stability of turkey meat
- 5 Better meat quality parameters (selenium and protein contents)
- 6 Enhanced stimulation of antioxidant protein machinery in broilers



# HEAT STRESS



HEAT STRESS  
IMPACTS BROILER BEHAVIOUR

REDUCING PERFORMANCE  
AND PRODUCERS' PROFITS

## HOW TO ALLEVIATE HEAT STRESS IMPACT?

**BWG:**



**VS**

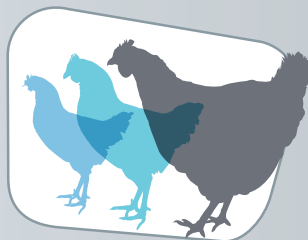
Sodium  
selenite



50g per broiler



€45,000 for a production of  
**1 million** broilers



**SELISSEO<sup>®</sup>, PURE ORGANIC SELENIUM**



HELPS BROILERS PERFORMING  
under hot conditions, which translates  
INTO HIGHER PROFITS FOR PRODUCERS

# 1

## HELPING BROILERS PERFORMING UNDER HEAT STRESS

Growing birds in hot conditions is a major challenge of ours for today and tomorrow. Heat stress is a multifactorial challenge but exhibits oxidative components. At a cellular level, heat induces an overproduction of free radicals, from which the cell needs to be protected. In case of chronic heat stress, the body mobilizes a lot of energy to activate its antioxidant mechanisms and achieve thermo-regulatory adaptations. Contemporary, heat stress impacts the behaviors of animals which will eat less, and thus have a slower growth. In that case, the genetic potential of broilers is often not reached. Consequently, profitability is reduced.

**Selisseo® has high potential for counteracting the negative effects of oxidative stress.**

In a recent study led by INRA-URA, France<sup>(1)</sup>, Selisseo® was compared to sodium selenite. Broilers were subjected to a thermoneutral environment or a heat stress environment. Heat stress induced a drop of performance for both selenium treatments. Nevertheless, for Selisseo® fed broilers, this drop was alleviated, as they performed better compared to the sodium selenite group: **+ 50 g / broiler and - 1 pt FCR**. By extrapolating this extra weight gain to a production of 1 million broilers, this is equivalent to an **additional profit of 45,000 €**.

Using Selisseo® in broiler feed helps reducing the impacts of heat stress, since broilers can better withstand oxidative stresses and thus perform better. This directly translates into higher profit for producers.



(1) Trial conducted in INRA-URA, France, 2016



# MORTALITY IN BROILERS



TRANSPORTATION, DISEASES,  
HOT CLIMATE...  
ARE CHALLENGES IN BROILER  
PRODUCTION

RESULTING IN HIGHER MORTALITY

## HOW TO REDUCE MORTALITY IN BROILER REARING?



» VS «  
Sodium  
selenite

1%

improvement in  
mortality rate

=

+

7,800 Live birds for  
a production of 1 million



+

€13,200 profit

**SELISSEO® , PURE ORGANIC SELENIUM**



HELPS REDUCE MORTALITY RATE  
under in broiler production, which translates  
INTO HIGHER PROFITS FOR PRODUCERS



## REDUCING MORTALITY IN BROILERS PRODUCTION

Birds are challenged all along the production cycle: hatching, transportation, high temperature, high density, diseases... These stresses affect performance and can result in increased mortality.

Mortality in broiler flocks represents lost income to growers and integrators. Improving the antioxidant capacity of animals through nutrition is a solution to be considered to reduce mortality in flocks.

The Bangkok Animal Research Center, Thailand<sup>(1)</sup>, led a study aiming at comparing the efficacy of Selisseo® and sodium selenite on performance parameters of broilers raised in tropical conditions. Broilers fed Selisseo® had higher resistance to stress thanks to enhanced antioxidant capacity.

**1% improvement in mortality rate** was observed in the Selisseo® group compared to the sodium selenite group. At a production scale of **1 million broilers, this 1% improvement in mortality represents 7,800 additional live birds**. Consequently, producers can make **an additional profit of 13,200 €**.

Using Selisseo® in broiler rearing helps alleviating the impacts of stress, which translates into higher profits for producers.



(1) Trial conducted in Bangkok Animal Research Center, Thailand, 2015  
Mickaël Briens et al. (2016), *World Poultry Congress*



# DRIP LOSS



DRIP LOSS AFFECTS THE SHELF  
LIFE OF MEAT

LIMITING ITS SELLING  
TIME IN RETAIL

## HOW TO INCREASE MEAT WATER RETENTION?

— 1.25% drip loss

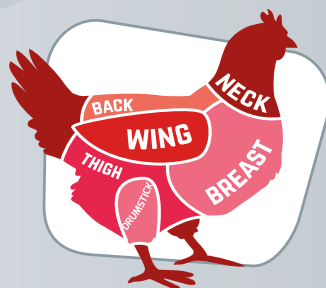
= + 22g meat



+ €20,500 profit  
1 million broilers



VS  
Sodium  
selenite



**SELISSEO<sup>®</sup>, PURE ORGANIC SELENIUM**



helps reduce drip loss, which translates  
INTO HIGHER PROFITS FOR  
PRODUCERS AND RETAILERS.



# 3

## MAKING ADDITIONAL PROFITS BY REDUCING DRIP LOSS

Drip loss alters the perceived quality of meat in retail by the consumer. It also negatively impacts its juiciness and its conservation. Research has revealed that drip loss is correlated with the oxidation of proteins in muscles. Proper supply of antioxidants through nutrition can contribute to reduce oxidation happening in chicken muscles.

### Selisseo® can help reducing protein oxidation and drip loss.

A trial conducted in Henan Agricultural University, China<sup>(1)</sup> showed that a supplementation with Selisseo® reduced drip losses in chicken breast muscle compared to sodium selenite. With Selisseo®, drip loss was improved by - **1.25% unit**. This suggests a higher water holding capacity, which would also increase meat shelf life. 1% improvement of drip loss is equivalent to **an additional profit of 20,500 €** for a 1 million chicken production.

Having Selisseo® in broilers feed can contribute to reduce drip loss in chickens, which translates into direct additional profit for producers and retailers. Moreover, in retails, meat becomes more attractive to consumers.

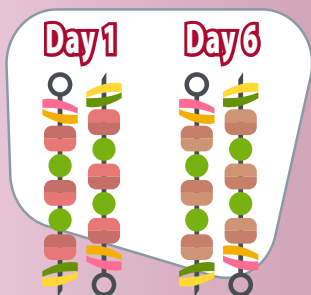


(1) Trial conducted in Henan Agricultural University, China, 2015



# MEAT COLOR

## STABILITY



MEAT COLOR IS AFFECTED BY  
OXIDATION MECHANISMS

LIMITING ITS SELLING TIME  
IN RETAIL

### HOW TO EXTEND MEAT COLOR STABILITY?



105 days of storage



54% sales after  
10 days



» vs «

Sodium  
selenite



Saving €0.45/kg per brochette

### SELISSEO®, PURE ORGANIC SELENIUM



helps insure meat color stability over time,  
WHICH TRANSLATES INTO HIGHER PROFITS  
FOR RETAILERS

# 4

## MAINTAINING MEAT COLOR STABILITY

After slaughtering, meat discoloration during storage may lead to consumer rejection, thus economical losses. Meat color is influenced by a number of factors including ultimate pH, pigment content, myoglobin and oxidative status. A discoloration of meat frequently appears after 8 days storage.

**Selisseo® has shown to reduce the speed of discoloration of turkey meat and increase potential storage time.**

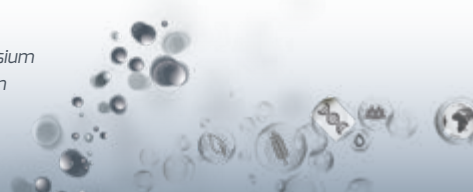
In a trial conducted at CERN, France<sup>(1)</sup>, meat color stability of turkey brochettes was studied. Two forms of selenium were supplied to turkeys: selenite and Selisseo®. Brochettes were processed 1 day after slaughter and a visual observation was made by a panel of experts at D8, D13 and D28.

The observations allowed concluding that Selisseo® could **improve by 1.5 days the time of storage**, without seeing any discoloration of brochette processed from thigh and drumstick under standard slaughter and processing conditions. These supplementary days of storage would represent **54% of possible sales after 10 days**. It is equivalent to a valuable saving of **0.45€/kg of brochette**.

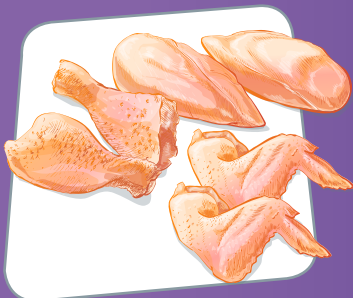
Using Selisseo® in poultry feed helps to slow down oxidative mechanisms and insures meat color stability. Moreover, this allows extending the selling time in retail, and directly translates into higher profits for retailers.



(1) Trial conducted in CERN, France, 2014  
Mickaël Briens et al. (2016), *Australian Poultry Science Symposium*  
Mickaël Briens et al. (2016), *10th Turkey Science and Production Conference*



# NUTRITIONAL VALUE



STRESS CONDITIONS HAVE  
AN IMPACT ON PROTEIN AND  
SELENIUM CONTENT OF MEAT

## HOW TO INCREASE MEAT SELENIUM CONTENT?



» vs «

Sodium  
selenite



**0.88mg Se/kg**

of DM in breast  
muscle



**0.61%**

unit  
of protein in breast muscle

**SELISSEO<sup>®</sup>, PURE ORGANIC SELENIUM**



HELPS ENHANCE NUTRITIONAL PARAMETERS OF BROILERS  
meat which translates into  
HIGHER PROFITS FOR PRODUCERS AND INTEGRATORS

# 5

## IMPROVING NUTRITIONAL VALUE OF MEAT

In general, eggs and meat are considered to be good sources of selenium in human diet. The level and source of selenium present in poultry feed largely influences the selenium content in final consumable products. Optimizing poultry nutrition is a solution to be considered to alleviate the potential nutrient deficiencies of food or increase its nutritional value.

**Selisseo® is highly bioavailable and allows great selenium deposition in tissues.**

In a trial made at INRA-URA, France<sup>(1)</sup>, Selisseo® was compared to sodium selenite in broiler feed. Two environmental conditions were tested: a thermo-neutral condition and heat stress. In both conditions Selisseo® allowed significantly increasing the selenium content of breast muscle. Selisseo® also positively influenced protein content of breast muscle under heat stress conditions: **+0.61% unit vs selenite**. While under heat stress protein content decreased for the group fed the sodium selenite diet, it didn't with the Selisseo® diet.

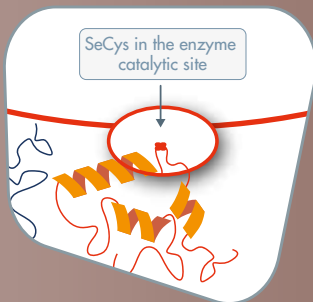
Selisseo® in broiler feed results in enriched selenium meat and contributes to maintain high protein content. This translates into higher profits for producers and integrators.



(1) Trial conducted in INRA-URA, France, 2016



# SELENOPROTEINS



- SECYS CONTAINING ANTIOXIDANT ENZYMES.
- SE AVAILABILITY AND STRESS ARE THE MAIN DRIVERS OF SELENOPROTEIN EXPRESSION.

## HOW TO MAXIMISE THE EXPRESSION OF SELENOPROTEINS?

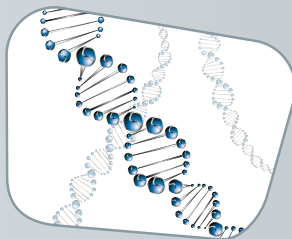
The expression of selenoprotein genes is the starting point to insure a reliable and functional antioxidant system.



**vs**  
Sodium  
selenite

**+ 73%**

of Selenoprotein P mRNA expression in liver. Selenoprotein P is the major selenoprotein involved in selenium transport throughout the body.



## SELISSEO®, PURE ORGANIC SELENIUM



HELPS IN STIMULATE THE EXPRESSION of selenoprotein genes in broilers, WHICH GUARANTEES A STRONG PROTECTION FROM THE EFFECTS OF STRESS

## 6

# STIMULATING THE GENE EXPRESSION OF SEVERAL SELENOPROTEINS IN BROILERS

In animals 26 SeCys containing selenoproteins have been identified, all having essential functions, several of which directly detoxify oxidants. In chicken tissues selenium availability and stress are the main drivers for selenoprotein expression.

**Selisseo® provides adequate selenium levels for SeCys de novo synthesis and selenoprotein gene expression and activity.**

Screening of the complete selenogenome (Cornell University, USA)<sup>(1)</sup>, in different tissues of broiler chickens, revealed that Selisseo® stimulates the expression of selenoproteins both at gene and protein levels. In particular, the expression of genes related to antioxidant function and maintenance of optimal cell selenium status was increased with Selisseo®. Further gene expression results also revealed improvements in the expression of several selenoproteins in both breast and thigh muscles. Notably several known to have antioxidant (glutathione peroxidases (GPx), methionine sulfoxide reductase B1) and anti-inflammatory functions (selenoprotein S and K).

Increases were also seen in SepSecS, which is an enzyme involved in the expression of all selenoproteins. Selenoprotein P, the major selenoprotein involved in selenium homeostasis, was highly influenced by the selenium source fed.

Using Selisseo® in broilers feed helps stimulating the expression of selenoproteins gene in broilers, which guarantees a strong protection from the effects of stress.



(1) Trial conducted in Cornell university, USA, 2015

Ling Zhao et al. (2017), *Journal of Nutrition*, 10.3945/jn.116.247338

Xin Gen Lei et al. (2017), *ASAS-CSAS Annual Meeting*



**Selisseo®**

**EUROPE - AFRICA - MIDDLE EAST**

**ADISSEO France S.A.S**

Immeuble Antony Parc 2  
10, Place du Général de Gaulle  
92160 Antony | FRANCE

**NORTH & CENTRAL AMERICA**

**ADISSEO USA Inc.**

One Point Royal Suite 275  
4400 North point Parkway  
30022 ALPHARETTA, GA | USA

**SOUTH AMERICA**

**ADISSEO Brasil Nutrição Animal Ltda.**

Avenida Maria Coelho Aguiar, 215  
Bloco G - 1º andar  
São Paulo -SP | BRAZIL

**ASIA PACIFIC**

**ADISSEO Asia Pacific Pte Ltd**

30 Hill Street, #03-03  
179360 Singapore | SINGAPORE

**CHINA**

**ADISSEO Life Science**

Suite 1003-1006, Kerry Parkside  
1155 Fangdian Rd., Pudong New Area  
Shanghai 201204 | CHINA (PRC)

Preferendum

