

Making a difference in animal nutrition

Annual meeting Gruppo Veterinario Suini Mantova
25th of October
Mantova
Italy



Presentazioni

- Ezio Bosia
Area Sales Manager SE EU Italy
- Davide Mara
Technical sales specialist SE EU Italy
- Dr. Angelo Ventura
Technical Manager SE EU
- Dr. Frederika Somers
Platform Marketing Manager EME Therapeutic
Nutrition & Enzymes
- Dr. Sven Keller
Technical Manager NW-CE EU
- Dr. Franco Calini
Veterinario consulente zootecnico

AGENDA incontro

19.00h

1. Introduzione

Ezio Bosia

2. La gestione del problema Salmonella, una delle maggiori sfide nell'allevamento dei suini in fase di svezzamento/ingrasso,

Dr. Sven Keller

3. La salute intestinale nel suino in fase svezzamento/accrescimento attraverso una soluzione innovativa ed efficace

Dr. Angelo Ventura

Dr. Calini, moderatore ed aiuterà nella traduzione

20.30h *cena conviviale*

About Novus

- Born in 1991 out of scientific heritage of Monsanto
- Owners:
 - Mitsui & Co. (USA), Inc.
 - Nippon Soda Co., Ltd.
- Sales > \$1 billion
- Nutrition & Health Products
(Historically → Animals)

Serving more than
3,000 Customers in
over 100 Countries



Headquarters in St Charles, Missouri USA



Global Footprint



GLOBAL HEADQUARTERS

REGIONAL HEADQUARTERS

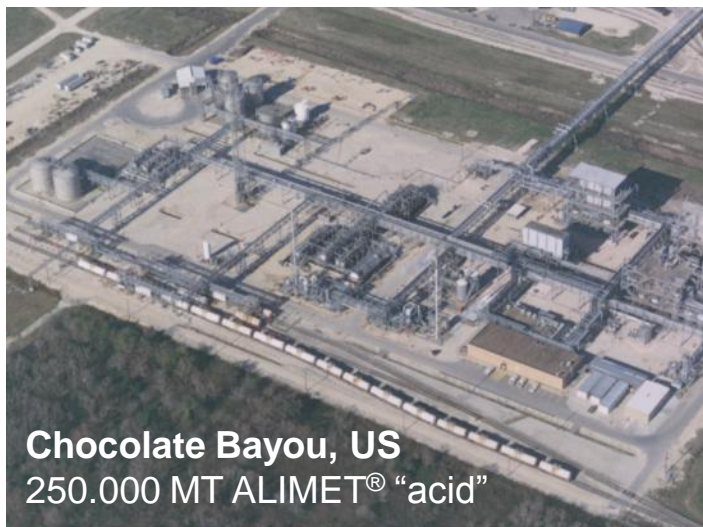
MANUFACTURING PLANT

SALES OFFICE

RESEARCH FACILITY



Manufacturing sites



Chocolate Bayou, US
250.000 MT ALIMET® “acid”



Owned by Novus,
Operated by Arkema



Little Rock, US - MHA® and Mintrex® Plant



Gudensberg, DE - Free & Protected Acids



Novus Europe R&D Center of Excellence, Reus, Spain

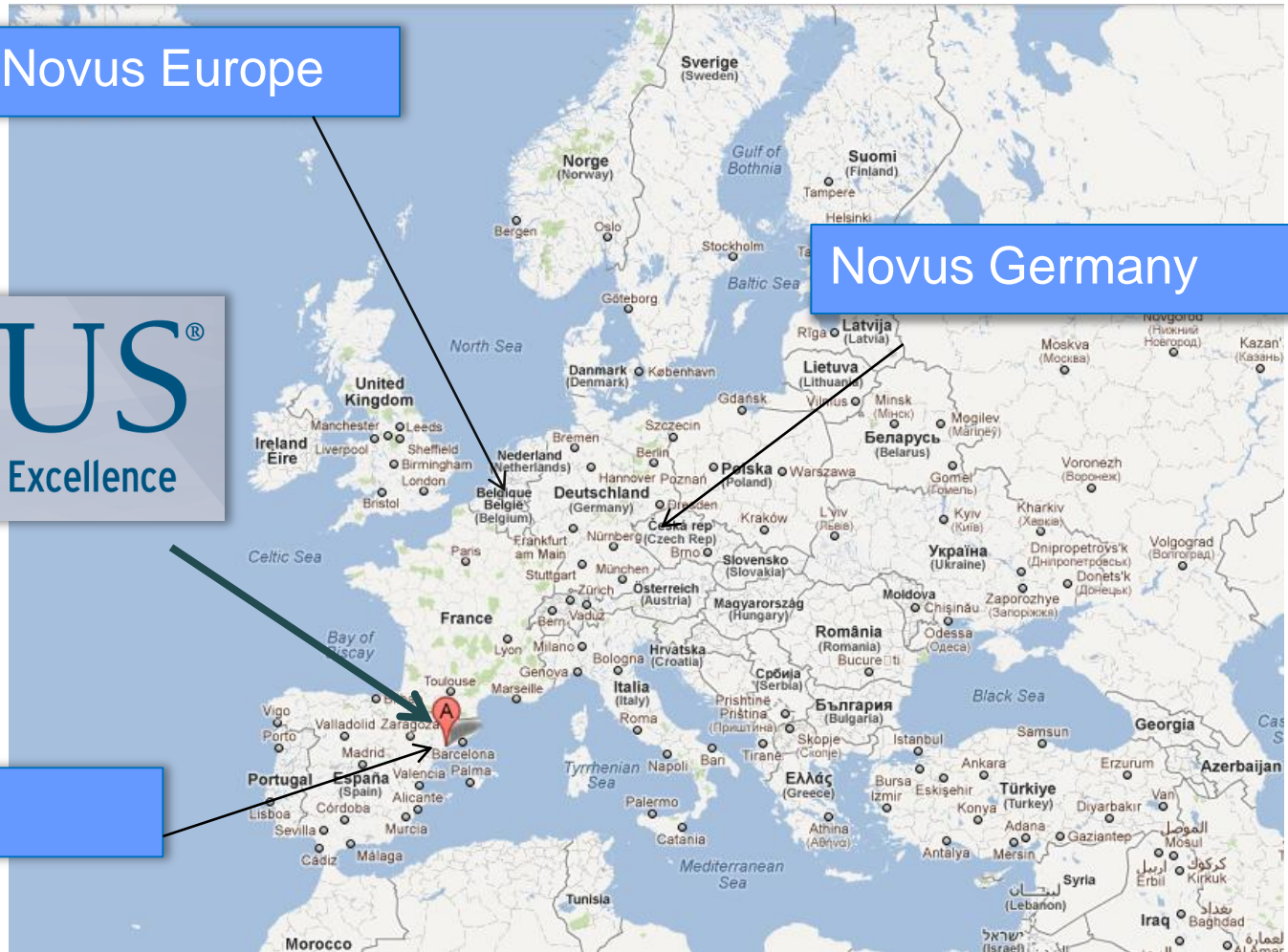
Novus Europe

Novus Germany

NOVUS[®]
Europe R&D Center of Excellence

Novus Spain

NOVUS



Novus Europe R&D Center of Excellence



Novus Europe R&D Center of Excellence

R&D Team:

- 6 full-time Ph.D. (chemists, biochemists, animal nutritionist)
- 1 Ph.D. consultant (chemist)
- 2 full-time M.S. (microbiologist, biochemist)
- 1 part-time M.S. (biologist)

5 Product development lines

- Antioxidants
- Carotenoids
- Essential Oils
- Organic Acids
- Other Natural Products

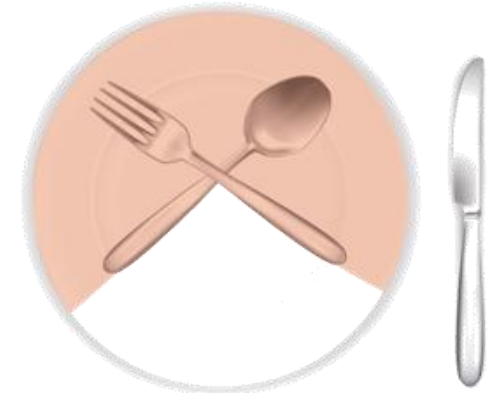
Limited Resources = Greater Need for Technology



In **50** years,
the world **population**
will require...



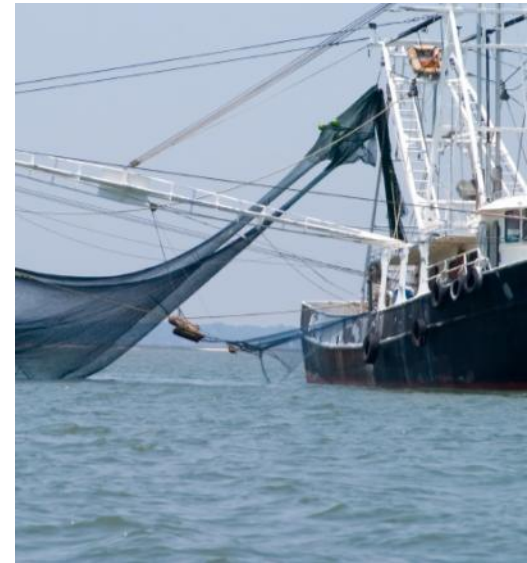
100%
more **food**, and...



70%
of this food must come
from efficiency-improving
technology.

The U.N. projects world population will reach 9+ billion by 2050 and has called for a 100 percent increase in world food production. According to the U.N., this doubled food requirement must come from virtually the same land area as today.

Impact

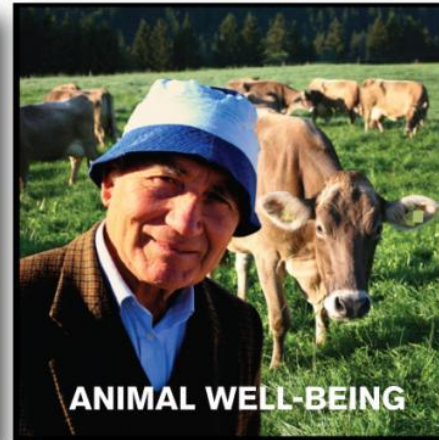


Proper conventional farming makes nutrition possible around the world.

Market Drivers

Guidano le scelte strategiche....investimenti, ricerca

Performance

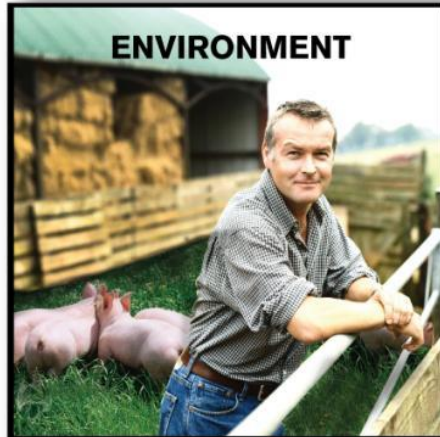


Benessere animale

Legislazione...
Sensibilità del consumatore

Impatto ambientale

Inquinamento....
escrezioni...

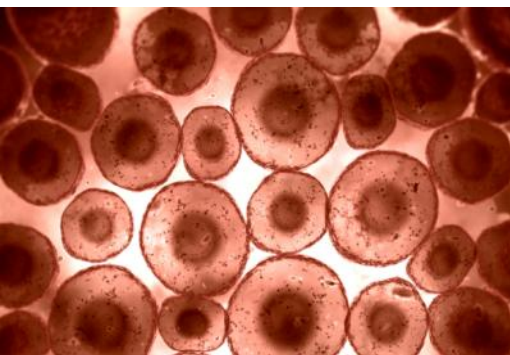


Sicurezza alimentare

Controllo qualità
Legislazione
Sostanze indesiderate



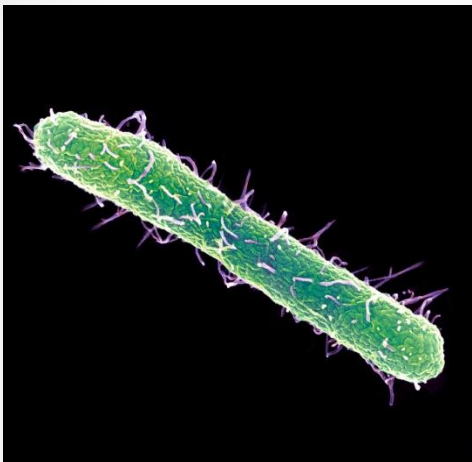
Ricerca ed Innovazioni



Successo per il futuro

RICERCA & INNOVAZIONE





NOVUS[®]
SOLUTIONS SERVICE SUSTAINABILITY™

***La gestione del problema Salmonella,
una delle maggiori sfide nell'allevamento
dei suini in fase di svezzamento/ingrasso***

Dr. Sven Keller
Technical Manager Novus Europe



SOLUTIONS SERVICE SUSTAINABILITY™

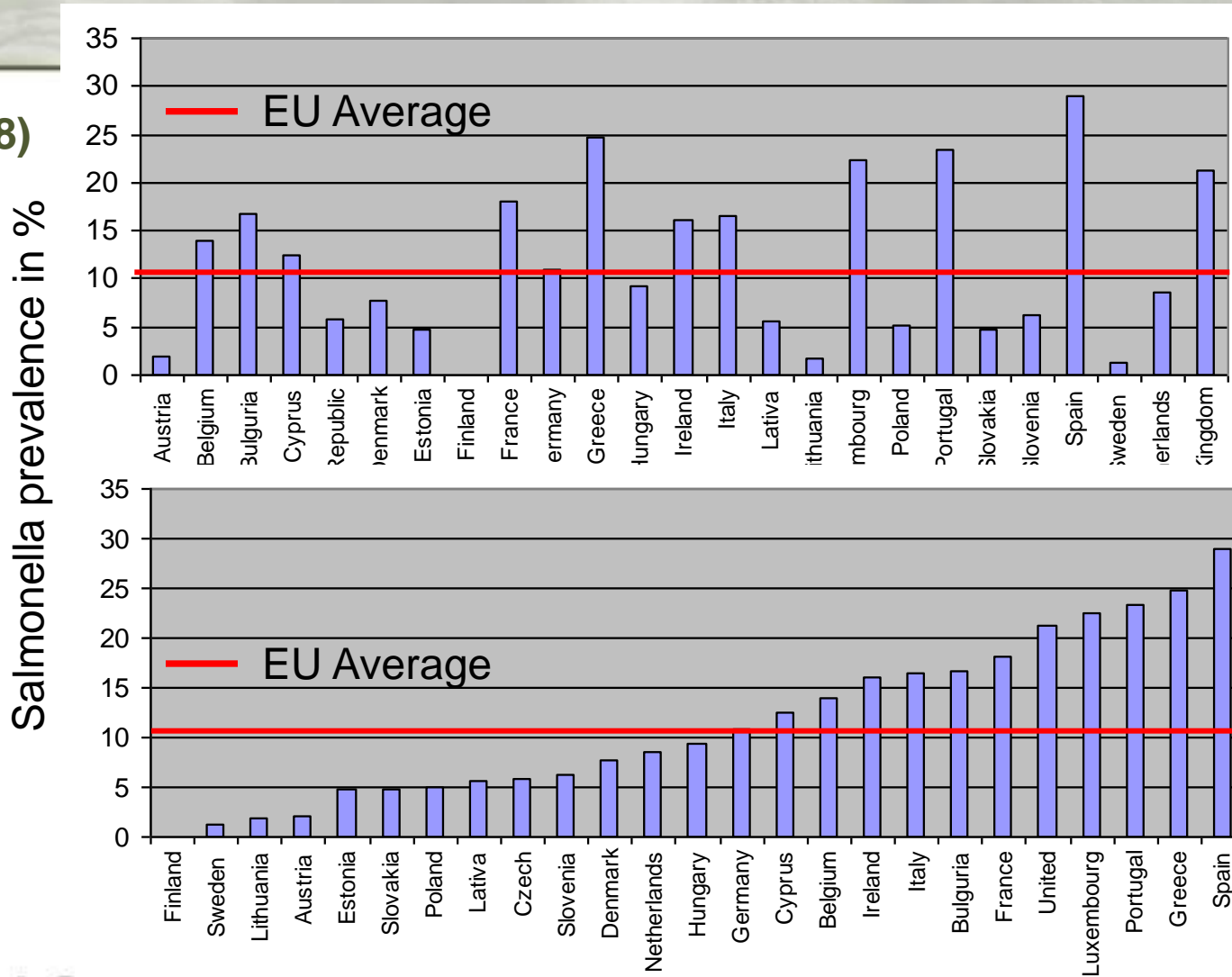
Content

- Salmonella Zoonosis Report
- Anti-Microbial Resistance in Salmonella
- Quality Assurance Program (QS)
- Guideline of a Salmonella Monitoring Program (example in Germany)
- Feed acidifiers as part of anti-Salmonella programs with focus on the latest development (protected acids)

- EU regulation was introduced 2003 “EU Zoonoses Regulation (EC) No 2160/2003” aiming to reduce the incidence of food-borne diseases in the EU.
- Each member state had to carry out a 12 month survey in 2006 designed to establish base line data on the incidence of Salmonella in slaughter pigs. The results were published 2008 by the EFSA to form the basis of new legislation setting targets for the reduction of Salmonella and implementation of National Control Plans.
- EU Member States are obliged to put in place a monitoring and reporting system, to analyse the data and report it to the EU Commission and EFSA

Prevalence of Salmonella in Slaughter Pig Lymph Nodes in the EU

(EFSA 2008)



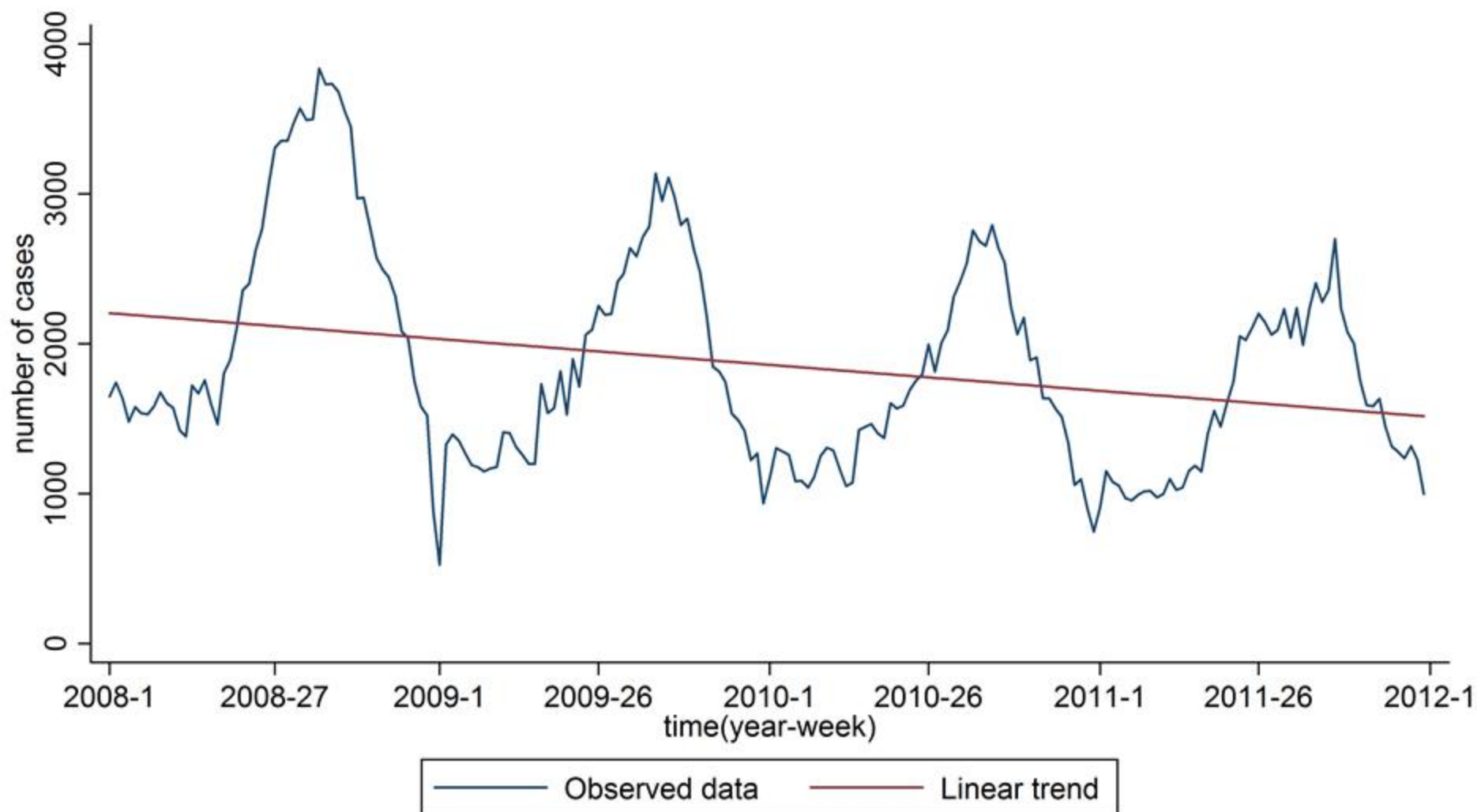
Salmonella zoonoses report

(EFSA 2013)

- In 2011 a total of 95,548 confirmed cases of human salmonellosis has been reported
- This is a reduction of 5.4% compared to 2010 and of 37.9% compared to 2007
- S. Enteritidis was the most reported serovar (44.4%) followed by S. Typhimurium with 24.9%
- In Italy 3,344 confirmed cases (5.5 cases per 100,000 persons)



Trend in confirmed cases of human salmonellosis in the EU from 2008-2011



Salmonella in fresh pig meat at slaughter, processing level and retail (EFSA, 2011)

- A total of 52,868 fresh pig meat samples were tested in the EU
- As an average 0.7% of these samples were positive
- Slaughterhouse: Finland, Sweden and Norway reported negative samples, Denmark 0.7%, Germany 4%, Spain 7.5% *
- Processing/Retail: Finland negative, Italy 0.7%, Germany 1.9%, Spain 5.2%

*Italy delivered less than 25 samples and was therefore not part of the data base

Examples of anti-microbial resistance of human *Salmonella* isolates for some EU countries

(EFSA and ECDC, 2013)

Salmonella spp. (all non-typhoidal serovars)						
	Ampicillin	Cl-Amphenicol	Cipro-floxacin	Genta-mycin	Strepto-mycin	Tetracyclines
Italy	59.2	9.6	11.3	45.7	51.3	61.9
Austria	12.7	4.0	0.7	0.9	13.1	14.8
Germany	38.6	-	1.1	2.2	42.9	-
Netherlands	37.9	8.4	10.2	1.3	37.8	39.1
Spain	38.1	7.7	0.7	1.6	29.1	36.9
Average EU	26.6	6.0	9.1	5.6	18.4	27.1

In total 25,199 isolates were tested

Examples of anti-microbial resistance of human *Salmonella* isolates for some EU countries

(EFSA and ECDC, 2013)

Salmonella Typhimurium						
	Ampicillin	Cl-Amphenicol	Ciprofloxacin	Gentamicin	Streptomycin	Tetracyclines
Italy	76.7	24.3	13.0	49.1	63.8	76.6
Austria	46.0	22.5	0	0.3	42.4	48.3
Germany	79.0	-	0.4	1.6	78.2	-
Netherlands	55.1	24.5	12.7	0.6	51.3	55.4
Spain	82.5	26.4	0	1.8	59.1	83.2
Average EU	61.5	18.5	4.8	5.8	38.0	59.5

In total 19,250 isolates were tested

Examples of resistance (%) of *Salmonella* spp. isolates in pigs

(EFSA and ECDC, 2013)

Salmonella spp.						
	Ampicillin	Cl-Amphenicol	Cipro-floxacin	Genta mycin	Sulfona-mides	Tetracylcines
Italy	40.3	9.0	14.9	6.0	44.8	61.2
Denmark	71.4	10.2	0	0	67.3	65.3
Germany	56.5	12.2	6.1	2.6	63.5	59.1
Netherlands	53.3	26.7	20.0	0	53.3	60.0
Average EU	56.2	13.7	7.4	1.4	54.5	52.8

Examples of resistance (%) of *Salmonella typhimurium* isolates in pigs

(EFSA and ECDC, 2013)

Salmonella spp						
	Ampicillin	Cl-Amphenicol	Cipro-floxacin	Genta mycin	Sulfona-mides	Tetracylcines
Italy	58.3	16.7	25.0	8.3	58.3	75.0
Denmark	60.7	17.9	0	0	60.7	50.0
Germany	90.0	40.0	10.0	0	85.0	75.0
Belgium	78.6	13.6	3.9	0	53.4	41.7
Average EU	74.4	24.0	8.0	0.8	62.4	59.2

Certified quality control programs in the EU



THE DANISH PIG PRODUCERS'
QUALITY PROGRAMME - DANISH
PRODUCT STANDARD →



QS – Quality Assurance Program



- The production and marketing of meat is a multi-stage process starting with the animal feed, agricultural production, slaughtering, deboning and processing and through to the retail trade.
- The QS scheme integrates every one of these individual production and marketing stages into a comprehensive quality assurance system

For example: handbooks for feed monitoring guidelines, slaughtering processing guidelines etc...



Current Number of Participants



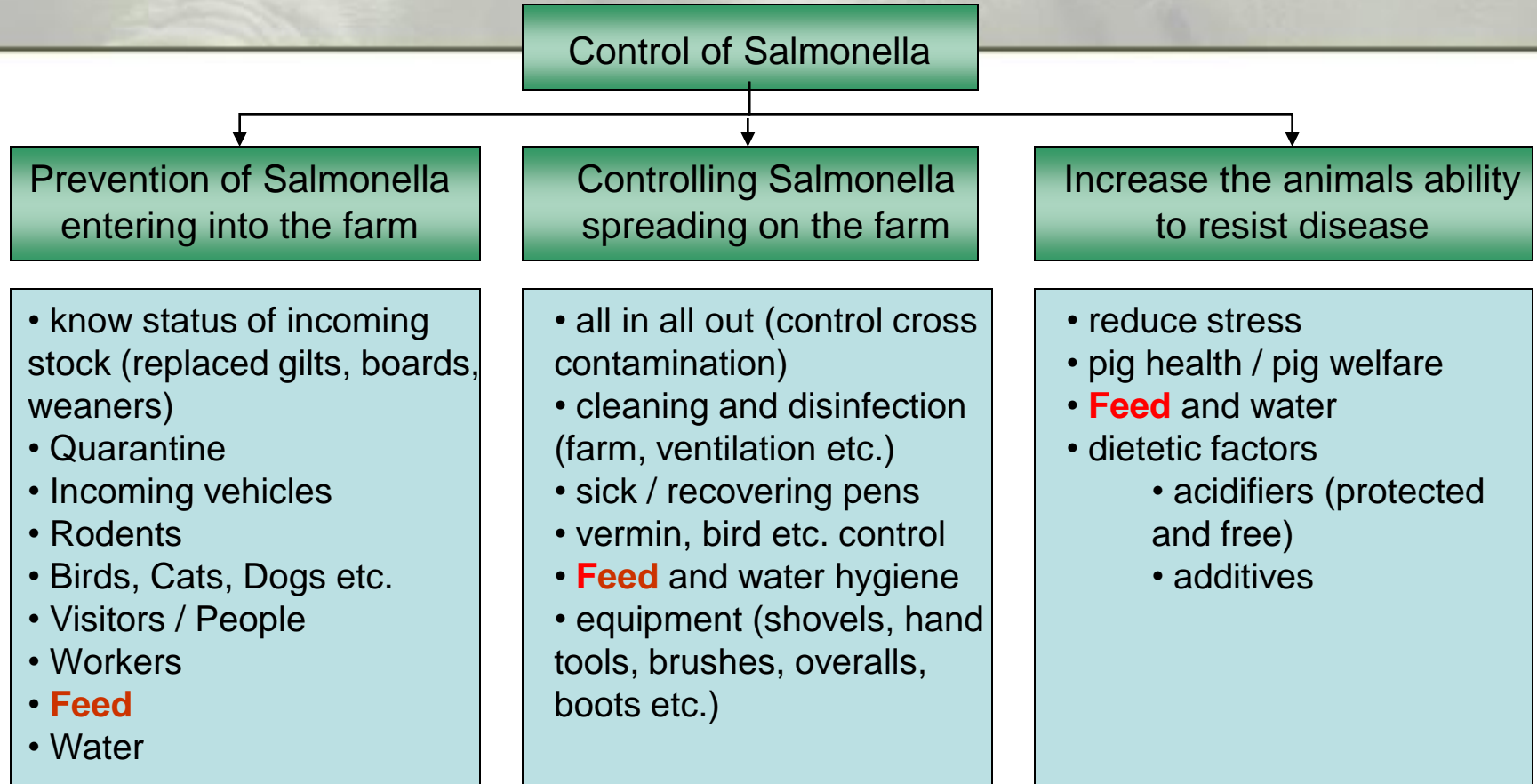
QS. Quality
scheme for food.

Stage	Total	Germany	Other countries
	104,617	96,833	7,784
Feed sector	3,684	3,169	515
- feed material production ^{1,2}	1,159	1,028	131
- compound feed production ³	1,356	1,058	298
- trade, transport, storage ⁴	1,169	1,083	86
Agricultural production	75,006	68,268	6,738
- cattle farming ⁵	30,790	30,789	1
- pig farming ⁶	40,082	34,829	5,253
- poultry production	4,134	2,650	1,484
Livestock transport	1,759	1,617	142
Slaughtering / deboning⁷	462	400	62
Processing⁸	255	244	11
Food retail⁹	23,451	23,135	316

QS – a short overview

- 385,000 feed monitoring analysis results were entered in the QS database in 2012
- About 95% of German pork and poultry meat is produced by QS certified companies
- 37,700 regular audits were conducted in 2012 to control compliance with QS requirements
- *100 % of German compound feed producers are integrated in the QS scheme*
- 1.72 million samples were analysed within the QS salmonella monitoring in 2012

Prevention of Salmonella Infections in Farms

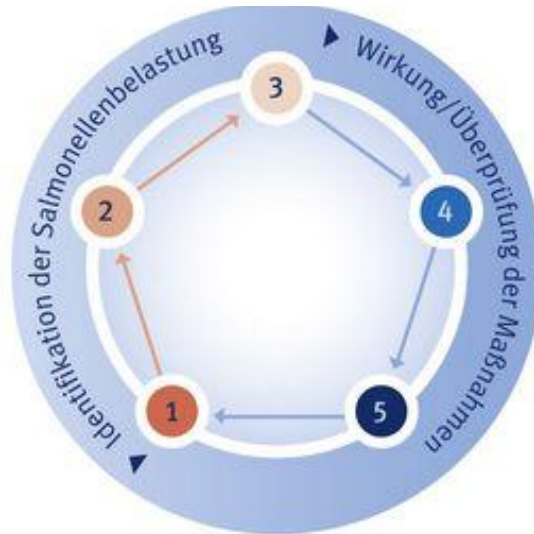


Guideline – Salmonella Monitoring Program

(QS-Quality Assurance 2013)

3 The number of positive results is used to categorise the pig fattening farm into salmonella category I (low risk), II (medium risk) or III (high risk).

2 The samples are tested in QS recognised laboratories for the existence of salmonella antibodies. The results are recorded in the central QS salmonella database and evaluated.



4 Pig fattening farms categorised into category III are obliged to, in agreement with the farm vet, identify the sources of salmonella

1 The sample testing for salmonella is carried out at the slaughterhouse or at the pig fattening farm (blood samples taken by a vet).

5 Develop targeted measures to reduce the salmonella at the farm

Guideline – Salmonella Monitoring Program

(QS-Quality Assurance 2013)

- Members of the Program

- 1) Farmer - Responsible to participate in the monitoring program, take the correct no. of samples etc.)
- 2) Slaughterhouse - Sample taking of all delivered QS pigs according to the sample plan from the database
- 3) Laboratory (QS approved test system)
- 4) Coordinator (enters data of their farms into QS database and regularly informs farmer about ranking)
- 5) **Veterinarian** (taking samples and submitting them to salmonella database)
- 6) Animal carriers (are using the database to file a slaughter request)

All connected by the Central Salmonella Database (QS software platform)

For all partners there are detailed guidelines like sampling plan, testing method, documentation protocols etc.

Salmonella Database Qualiproof

- Includes all master data
- Controls that all samples are taking
- Computes the risks classification
- Distribution of relevant data according to access rules

The screenshot displays the Qualiproof website interface. At the top, there is a navigation menu with links for Sitemap, Suche, Links, Presse, AGB, Impressum, Datenschutz, Support, and Kontakt. The main header features a banner with a yellow pig release cap and the text '2.0 PigRelease Qualiproof®'. Below the banner, there are navigation tabs for 'Datenbank', 'Allgemeine Informationen', 'Systemteilnehmer', and 'QS Informationen'. The main content area is titled 'Der Prozess' and contains a paragraph explaining the process: 'Erzeugerbetriebe vermarkten ihre Schlachttiere über verschiedene Abnehmer (Viehvermarkter, Metzger oder Schlachtbetriebe). Daraus ergeben sich unterschiedliche Nutzungsmöglichkeiten der Datenbank für die einzelnen Systemteilnehmer.' Below this text is a flowchart diagram illustrating the process flow from 'Erzeugerbetrieb' to 'Viehvermarkter', 'Schlachtbetrieb', 'Abnehmer', and 'Labor'. The 'Qualiproof' logo is also present in the diagram. On the right side, there is a 'Kontakt' section with the following information: T: 0351/8838 2800, F: 0351/8838 2809, E-Mail: service@qualitype.de, Web: www.qualitype.de. Below this is the 'Qualitype GmbH' address: Moritzburger Weg 67, 01109 Dresden. There is also a 'Registrierung Probenehmer' section with a 'Registrierung' button. The footer of the page includes the URL 'www.qualiproof.de/sites/default/files/pictures/Qt_Logo.jpg' and a status bar at the bottom showing the system tray with various icons and the time '13:53'.

Guideline – Salmonella Monitoring Program

(Veterinarian)

- Must be registered in the database
- Are signing a commitment to accept the specification of the S. Monitoring Guideline
- Entering the data into the S. Database (if taking blood samples)
- Has access to the database (lab results, evaluation, statistics)
- Must follow guidelines
- In case of Cat III farms additional actions needed

Sampling key for fattening farms by expected annual volume of production

Annual quantities of animals delivered	Min. number of annual samples
≤ 50	10
51-100	20
101-200	47
>200	60

- Sampling is evenly spread across a period of 12 months
- Can be applied on the farm (blood samples) or the slaughter house

Evaluation of Results

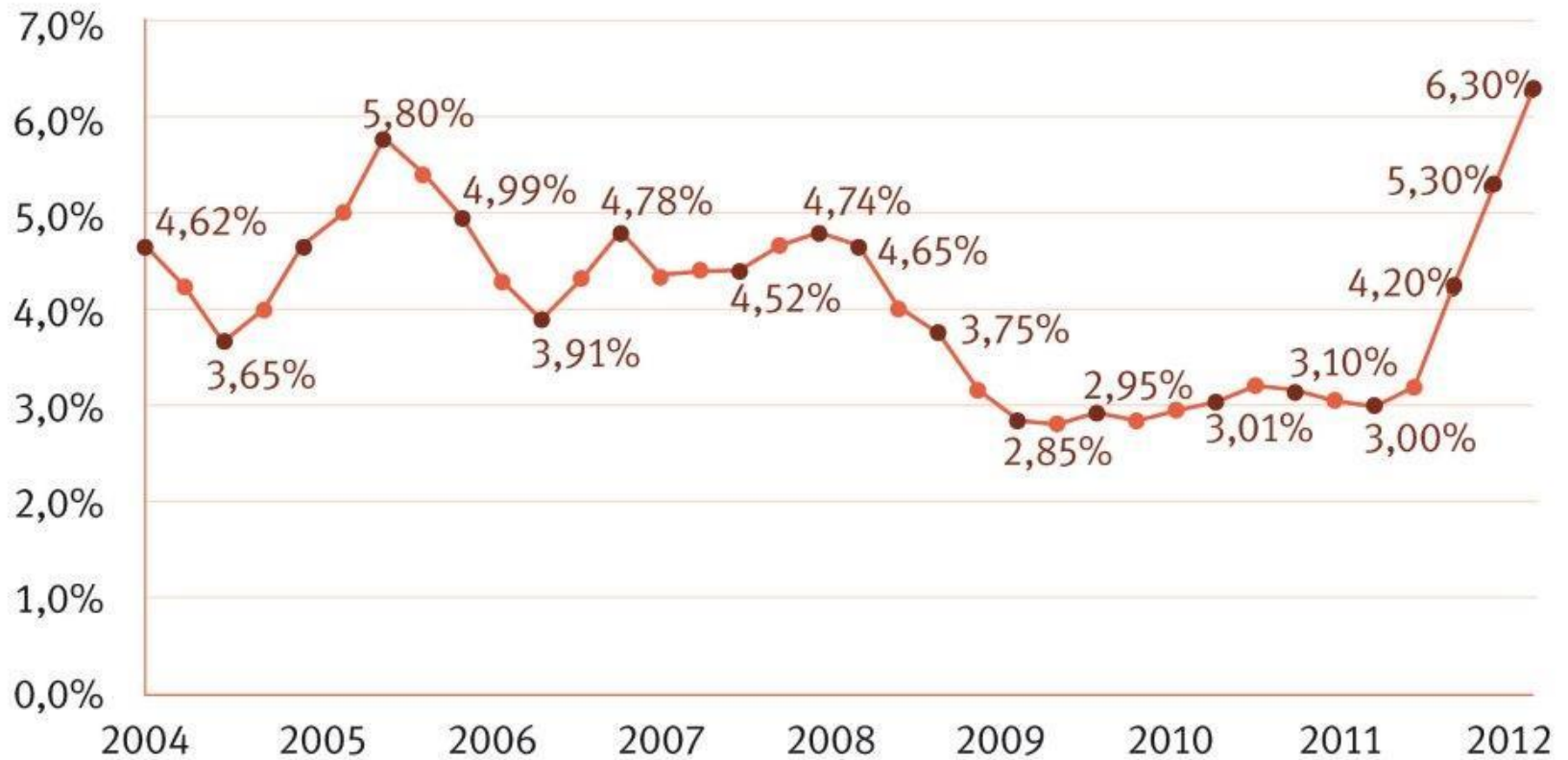
(QS-Quality Assurance 2013)

Risk of Salmonella in livestock	Category	Percent of positive findings
Low	I	≤ 20
Middle	II	> 20 and ≤ 40
High	III	> 40

Initial assessment after 1 year being in the system and a complete set of results of samples based on the sampling key

Development of Cat III farms in Germany

Entwicklung Anteil Kategorie-III-Betriebe im Salmonellenmonitoring



Actions to be taken in case of Cat III

(QS-Quality Assurance 2013)

- Farmer needs to inform the district veterinarian office
- Veterinary ensures that actions are taken immediately
 1. Bacteriological and epidemiologic testing for salmonella to find the cause of salmonella transmission
 2. Reduce salmonella contamination, in particular by cleaning and disinfecting newly vacant pigsties or farm areas, by performing rodent pest control etc.

Actions to be taken

Identification of Inward Transmission Sources

- Animals added to livestock for fattening
 - Anal/Rectal faecal samples taken from a representative spot check sample (2-10% depending on volume of deliveries, up to 5 swabs may be pooled)
 - Bacteriological spot check of faecal samples collected on the transport vehicle or taken from the first discharge of stool in the new pigsties
- Animals added to livestock for piglet production
 - Possible faecal samples from individual gilts (or blood samples) depending on number of animals arriving

Actions to be taken

Identification of Inward Transmission Sources

- Other sources of transmission
 - Feedstuffs (remaining feed better than fresh feed)
 - Rodents (take sample of dead or caught animals)
 - Domestic animals such as dogs, cats, pigeons
 - Check environment around piggery (e.g. kennels, dovecotes etc.)
 - Water for watering
 - Operative procedures like personal traffic, clothing, storage and disposal of dead animals, vehicle traffic

Actions are based on orientations for possible procedures and depend on the actual situation

Actions to be taken

Analysis of factors responsible for spreading Salmonella infections (Checklist)

- Samples from immediate and indirect environment of animals
- Controlling of cleaning and disinfection
- Samples from clean and disinfected sties before allowing in new animals
- Samples from areas that animals come into direct contact with
- Samples from other piggery areas including driving aisles, feed storage rooms, ventilation, scales, entrances, loading bays, boots, tools, towels etc.

Specifically focus on areas not normally included in cleaning routines

Examples



Examples



Abb. 4: Schlecht gewartete Nippeltränke



Abb. 5: Gut gereinigte Nippeltränke

Examples



Examples





Conclusion

- Salmonella monitoring helps to reduce the risk of S. entry into the meat production chain, detects possible entry sources and eliminates those with appropriate measures.
- The sampling results are centralised into the QS salmonella database and farms are categorised into low to high risk levels.
- Farms in category III (high risk) are obligated to identify salmonella entry sources together with the farm veterinarian and to take immediate action to reduce salmonella.

Step by step reduction of Salmonella contamination

- Basic principle
 - Eliminate or reduce the sources of inward transmission previously identified as well as the factors responsible for spreading and sustaining infections in pigs

Examples of Brochures



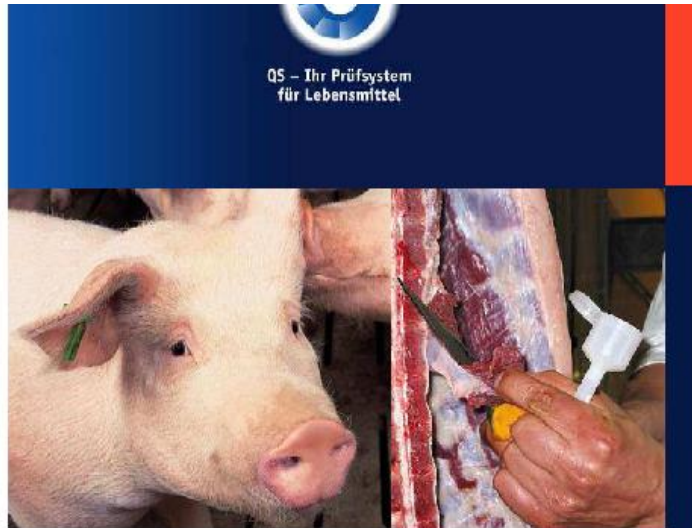
Example of a guideline



Step by step reduction of Salmonella contamination

- Improve general cleanliness and hygiene
 - Farm areas normally not included in standard cleaning and disinfection procedures often constitute a risk of infection (air in/air out ducts, cable ducts, dust deposits, gaps in slatted floors, scales, etc.)
 - Special protective clothing to minimize the risk of carrying Salmonella from one group of animals to the next
 - Expand rodent pest control
 - Establish a strategic permanent rodent pest control programme including means of efficiency control
 - Add **encapsulated** acids to the feed, possible putting and acid additive
 - Disinfection of water
 - Etc...

Concept of protected acids is supported by QS



QS – Ihr Prüfsystem
für Lebensmittel

Programmes for the monitoring and reduction of food-associated zoonotic pathogens as part of QS standards conformity verification:

I. Salmonella monitoring and reduction programme for pork production

Guideline

Version: 01.01.2009 Status: ● Approved

3.1.2. Step-by-step Reduction of Salmonella Contamination of Livestock

Basic objective

Eliminate or reduce the sources of inward transmission previously identified as well as the factors responsible for spreading and sustaining salmonella infections of livestock.

The actions presented below can be applied to both the livestock for fattening and any upstream stages of production:

- 1) Improve general cleanliness and hygiene
We know from experience that farm areas not normally included in standard cleaning and disinfection procedures often constitute a risk of infection (air-in/air-out ducts, cable ducts, dust deposits, gaps in slatted floors, scales, etc.).
- 2) Special protective clothing
Protective clothing, boots and tools to minimise the risk of carrying salmonella from one group of animals to the next.
- 3) Expand rodent pest control
Remove all possibilities of rodents escaping, hiding or nesting (unused corners, waste, etc.)
- 4) Establish a strategic, permanent rodent pest control programme including means of efficiency control.
Strictly keep all domestic animals out of pigsties and feed areas
- 5) Prevent wild animals - especially birds - from getting in
(international experience has shown bird nets to be a good means)
- 6) Other actions
 - Add encapsulated acids to the feed; possibly putting in acid additives
 - Use of lactulose
 - Modify composition of feedstuffs (with regard to protein content, energy, use of fermented feed, 25% barley in ration)
 - Change type of feed from flour-like to more structured feeds
 - Disinfection of water for watering
 - Vaccination on-site the rearing farm
 - Change of supplier



Antibiotic treatment should be given only if clinical salmonellosis has been confirmed and an antibiotic resistance test showed negative findings.

Acidifiers as part of an Anti-Salmonella program

- A single additive can not prevent Salmonella outbreak in farms
- An anti-Salmonella Program is based on several measures like training of staff, good farm management, hygiene and disinfectant measures, clean water feed, rodent control etc
- An acidifier program is an important piece of an anti-Salmonella concept (see guidelines) and supports on-farm hygiene
- Any action that can be taken to reduce the number of Salmonella on the unit will lower the chance of slaughter pigs carrying Salmonella.

Latest development in the field of protected acids for anti-Salmonella programs

- Newest generation is highly effective against Salmonella in the intestinal tract
 - Matrix vs. Coating
 - Slow Release Formulation
 - Reaching the lower part of intestinal tract
 - Selected ingredients being effective in the intestinal tract (intestinal screening model)
 - Additional benefit due to gut stabilising effect (health and growth) maintaining a balanced healthy micro-flora



***Thank you for your
attention !***



***La salute intestinale nel suino in fase
svezzamento/accrescimento
attraverso una soluzione innovativa ed efficace***

Dr. Angelo Ventura
Technical Manager Novus Europe



La salute intestinale

- I disturbi enterici hanno componenti sia legati alla dieta che a fenomeni infettivi
- Gli elementi chiave di una scarsa salute intestinale
 - Infiammazioni, stress ossidativo
 - Problemi della digestione
 - Eccesso di flusso di nutrienti nella parte terminale dell'intestino
 - Fallimento della funzione-barriera, setticemia, tossicemia

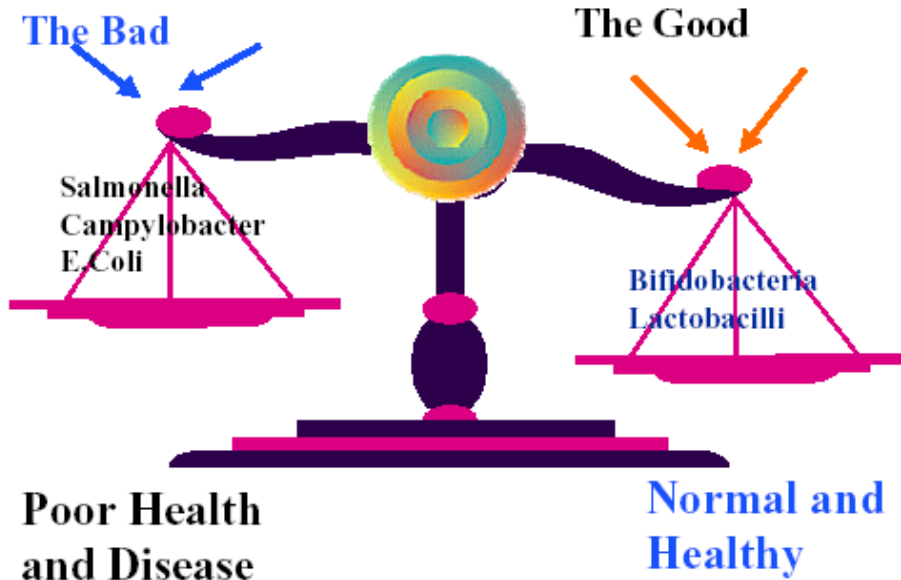
I microrganismi nel tratto gastro-intestinale del suino

GUT MICROFLORA IN PIGS

10^3 - 10^5 CFU/g digesta	10^8 CFU/g digesta	10^{11} - 10^{12} CFU/g digesta
STOMACH & DUODENUM	ILEUM	COLON
<i>pH 3-5</i>	<i>pH 6.5-7.5</i>	<i>pH 7</i>
<i>Lactobacillus</i> <i>Streptococcus</i> <i>Enterobacteria</i> <i>Clostridium</i> <i>Eubacterium</i> <i>Bifidobacterium</i>	<i>Lactobacillus</i> <i>Streptococcus</i> <i>Clostridium</i> <i>Enterobacteria</i> <i>Bacillus</i> <i>Bacteroides</i>	<i>Bacteroides sp (30%)</i> <i>Eubacterium</i> <i>Bifidobacterium</i> <i>Ruminococcus</i> <i>Clostridium</i>

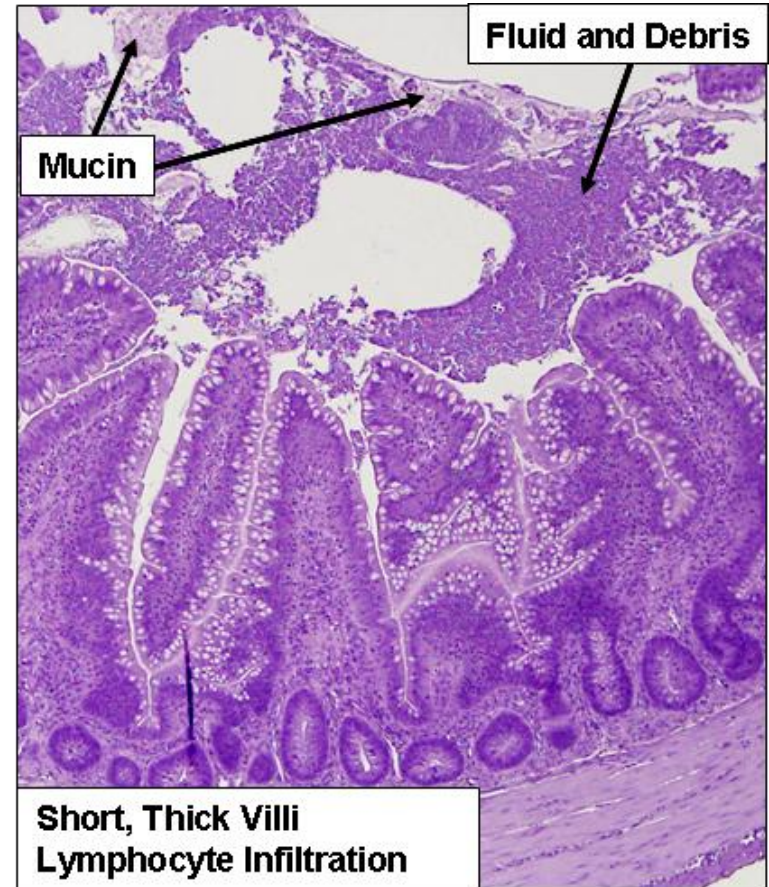
Swords et al., 1993; Taras et al., 2006
Bederska, 2011

Popolazione intestinale: 9 a 1



Equilibrio della microflora gastro-intestinale

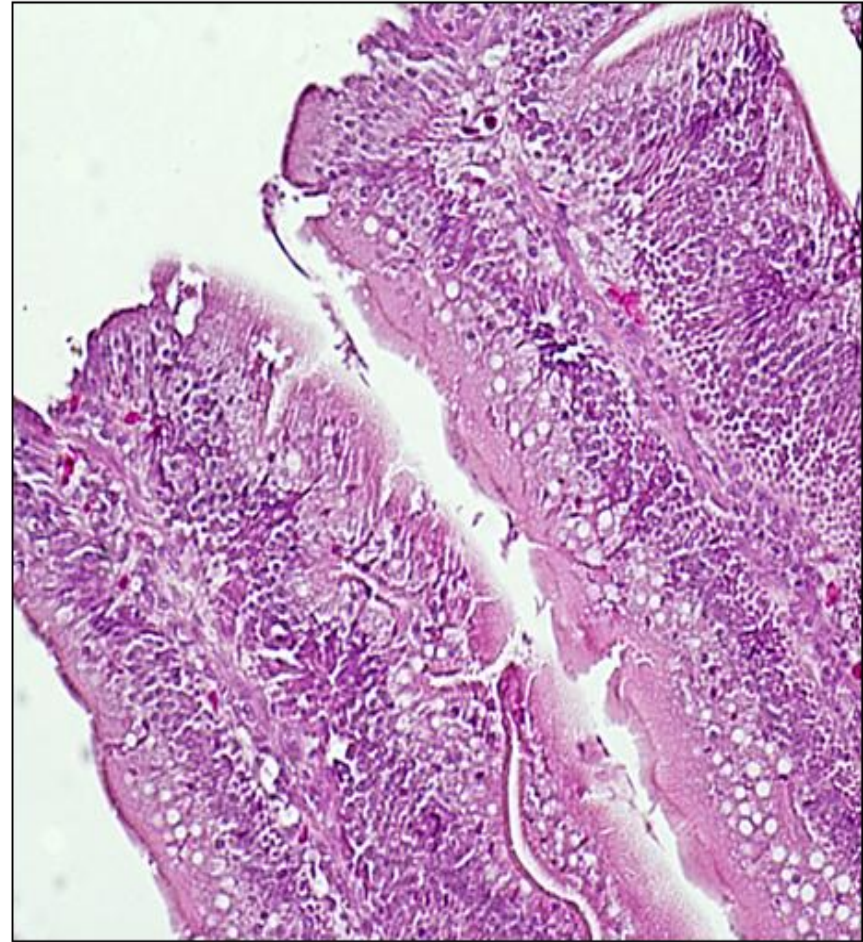
Risultati della risposta infiammatoria in Villi accorciati, iperplasia delle cellule caliciformi e produzione di mucina



How Barrier Function is Lost



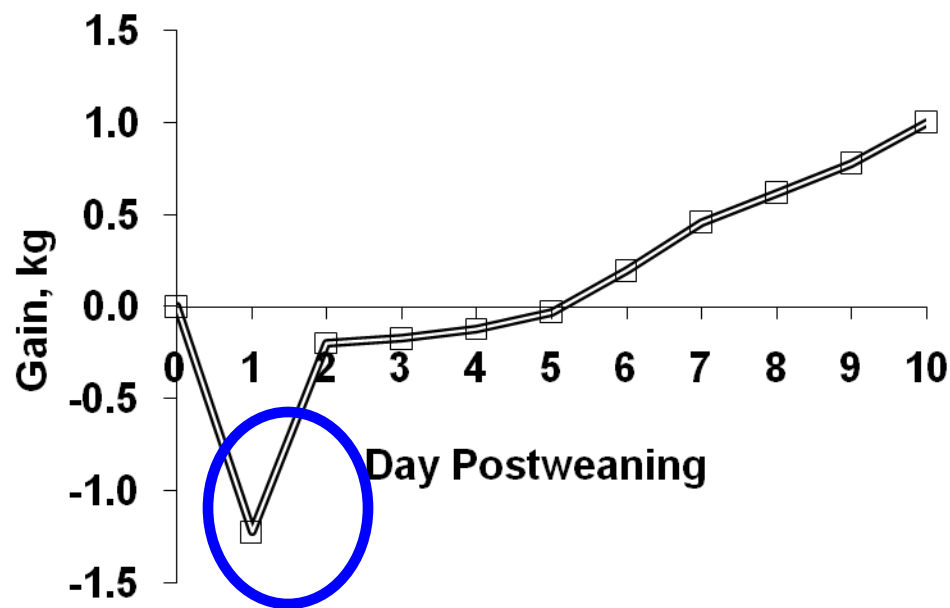
Control, 200x



Enteritis, 200x

Calo di peso allo svezzamento innesca infiammazione intestinale e problematiche della barriera

Perdita di peso Post-svezzamento



- Anoressia in post svezzamento innesca infiammazione intestinale (McCracken et al, 1999).
- L'infiammazione intestinale comporta atrofia dei villi e fallimento dell'azione di barriera
 - Risposta in fase acuta
 - Setticiemia
- Alimentazione con infiammazione intestinale
 - Digestione incompleta
 - Permette lacrescita di patogeni
 - Diarrea

Come possiamo intervenire sulla popolazione intestinale ?

- Acido formico
- Acido butirrico
- Acido benzoico
- Acido propionico
- Acido lattico
- Acido fumarico
- Acido malico
- Acido acetico
- HMTBa

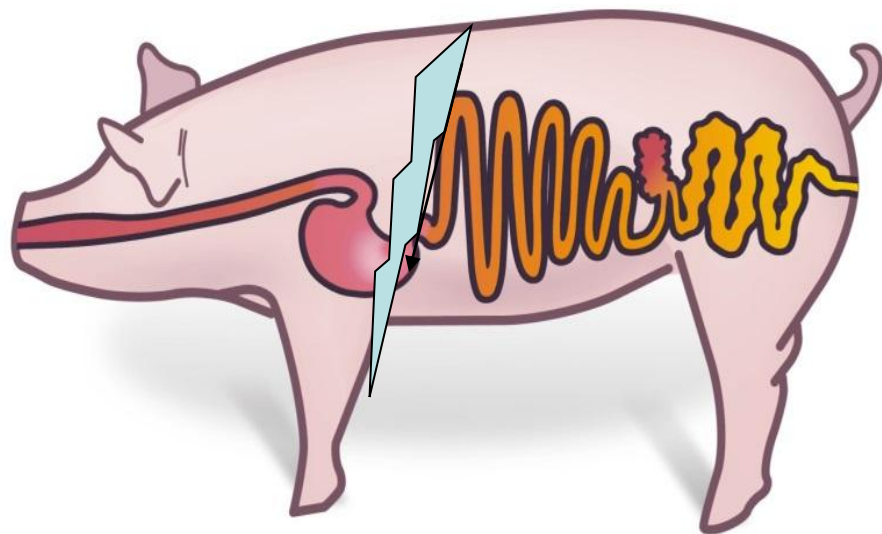
	Sito d'azione			
	Mangimi	Stomaco	Piccolo intestino	Intestino largo
AGPs				
Acidi liberi				
Acidi protetti				

1. Acidi liberi verso Acidi protetti
2. Nel mangime, nell' acqua da bere
3. Come liquido, polvere, granulato

L'impiego degli acidi organici liberi nel mangime

Meccanismo di azione

Barriera di protezione

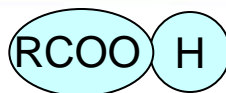


- Giocano un ruolo fondamentale nella prevenzione dell'ingresso dei batteri nell'intestino rafforzando la barriera naturale contro potenziali patogeni e nella attivazione degli enzimi
- migliorano il processo digestivo ed evitano incidenti di percorso.
- in modo naturale, sicuro ed efficace.

UNA MINORE QUANTITA' DI BATTERI POTENZIALMENTE PATOGENI ENTRA NEL TRATTO GASTRO-INTESTINALE, RIDUCENDO IL RISCHIO DI SVILUPPO DI PATOGENI OPPORTUNISTI

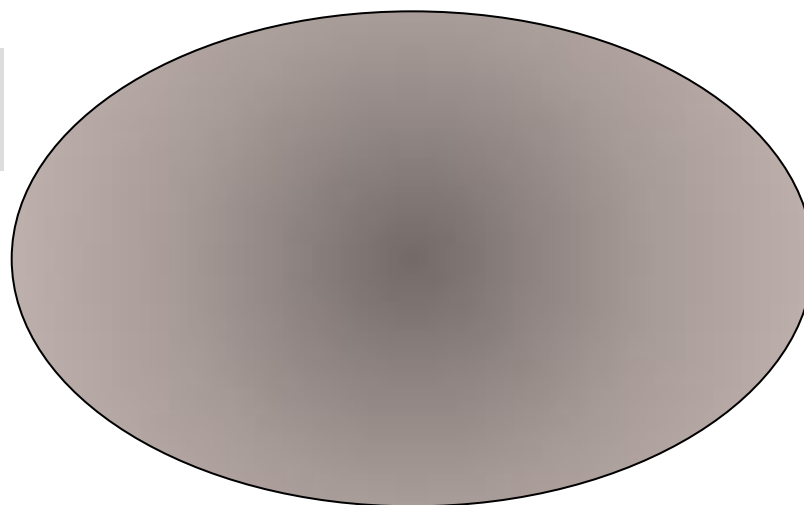
Acidi organici – Modo d' azione – Part I

Acido organico



R = Radicale

Acidificazione dell' ambiente



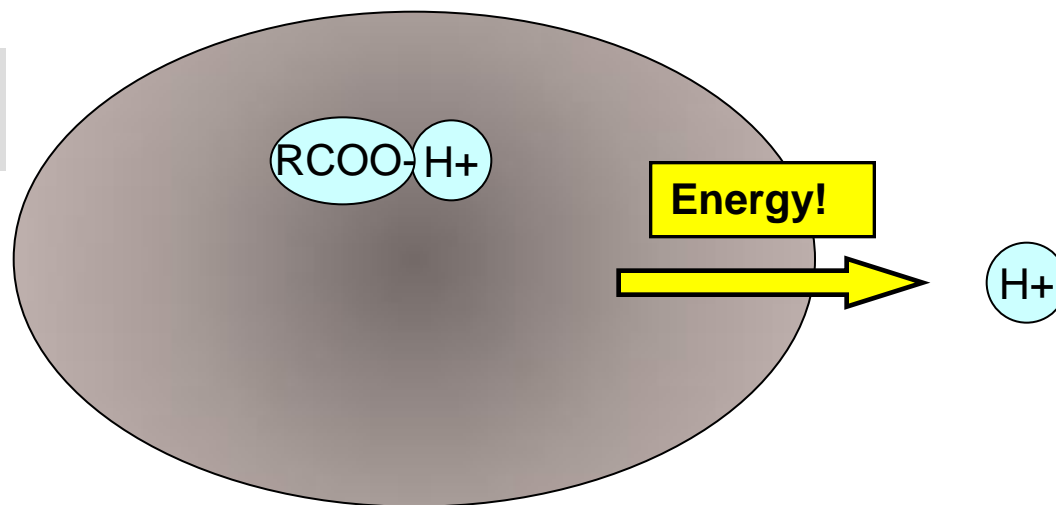
Cellula batterica

Acidi organici – Modo d' azione – Part II

Acido organico

R = Radicale

Acidificazione dell' ambiente



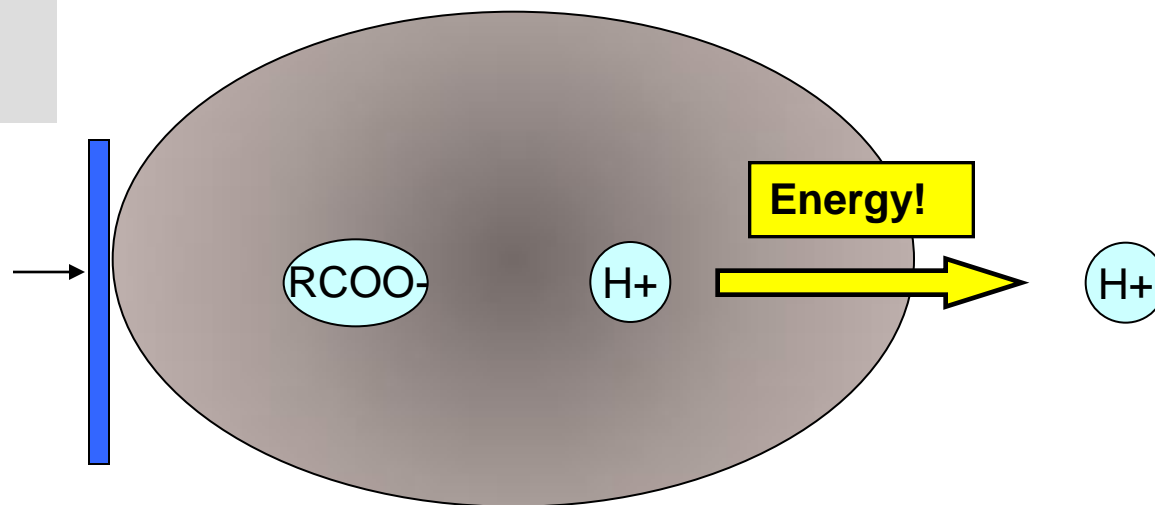
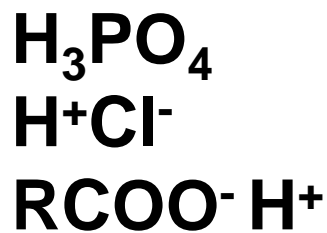
Cellula batterica

Acidi organici – Modo d' azione – Part III

Acido organico

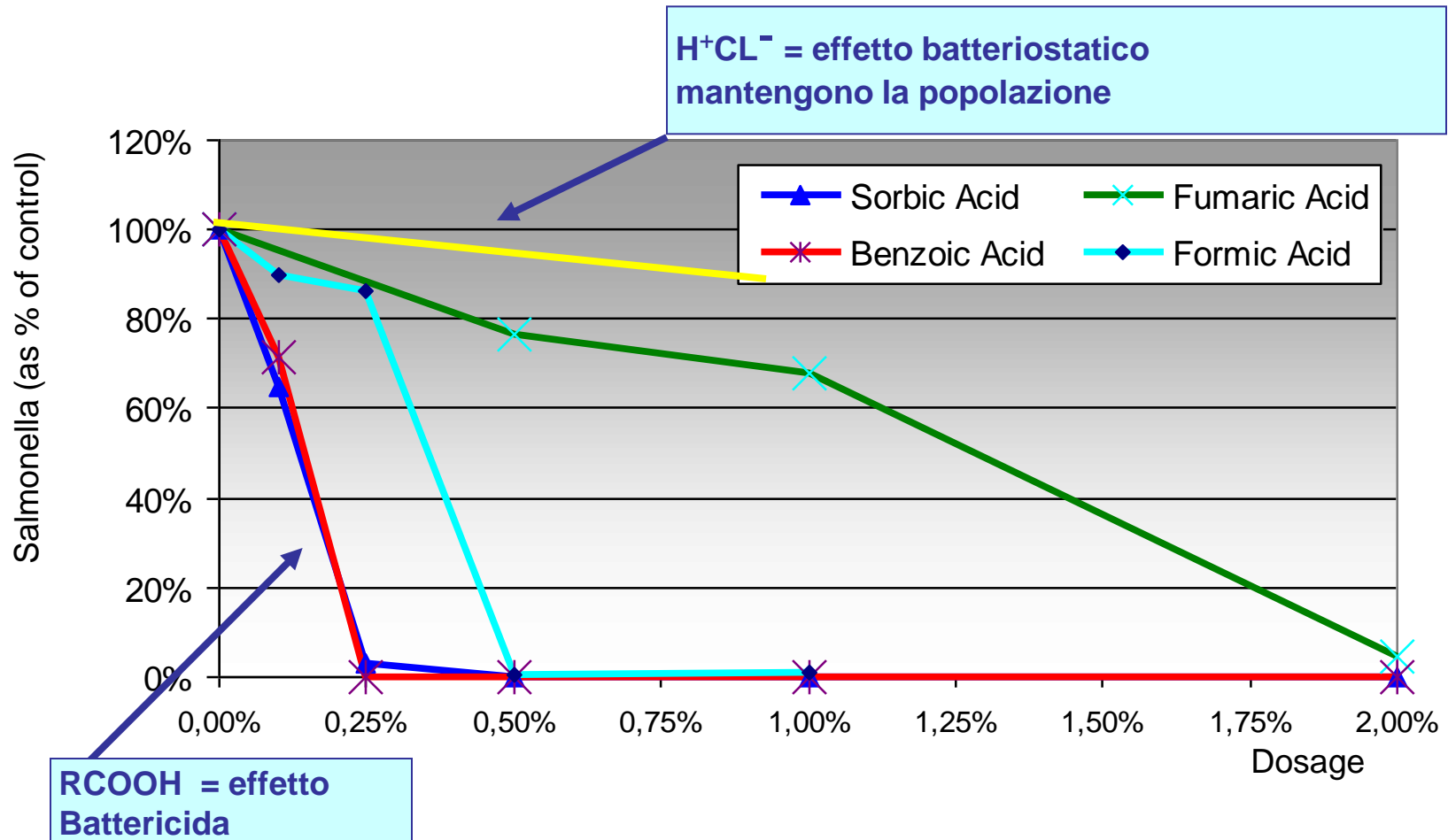
R = Radicale

Acidificazione dell' ambiente



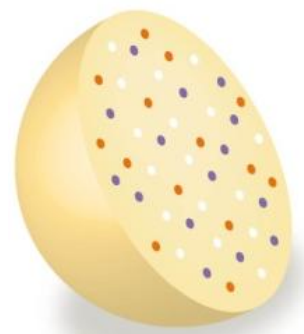
Cellula batterica

Effetto Anti-Salmonella di Acidi Organici a pH neutro

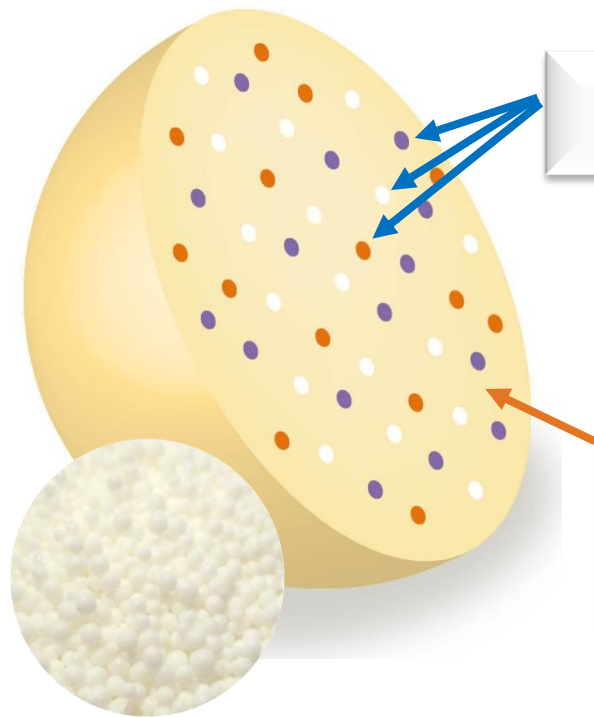


Come portare I giusti acidi nell' intestino = dove si sviluppa la malattia ?

- un mangime complementare ad alto contenuto energetico per scrofe, suinetti e suini in fase di ingrasso/finissaggio
- prodotto con la tecnologia NOVUS Premium Blend
 - ✓ una maggiore efficacia per gli animali
 - ✓ un uso più conveniente



Novus Premium Blend[®] technology



Una miscela esclusiva efficace in ambiente gastro-intestinale

Protetto: rilascio delle sostanze attive attraverso l'intero tratto intestinale

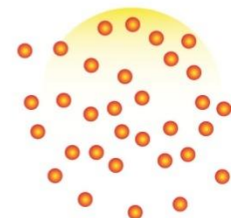
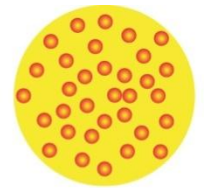
Provenia[™]

Duodenum

Small intestine

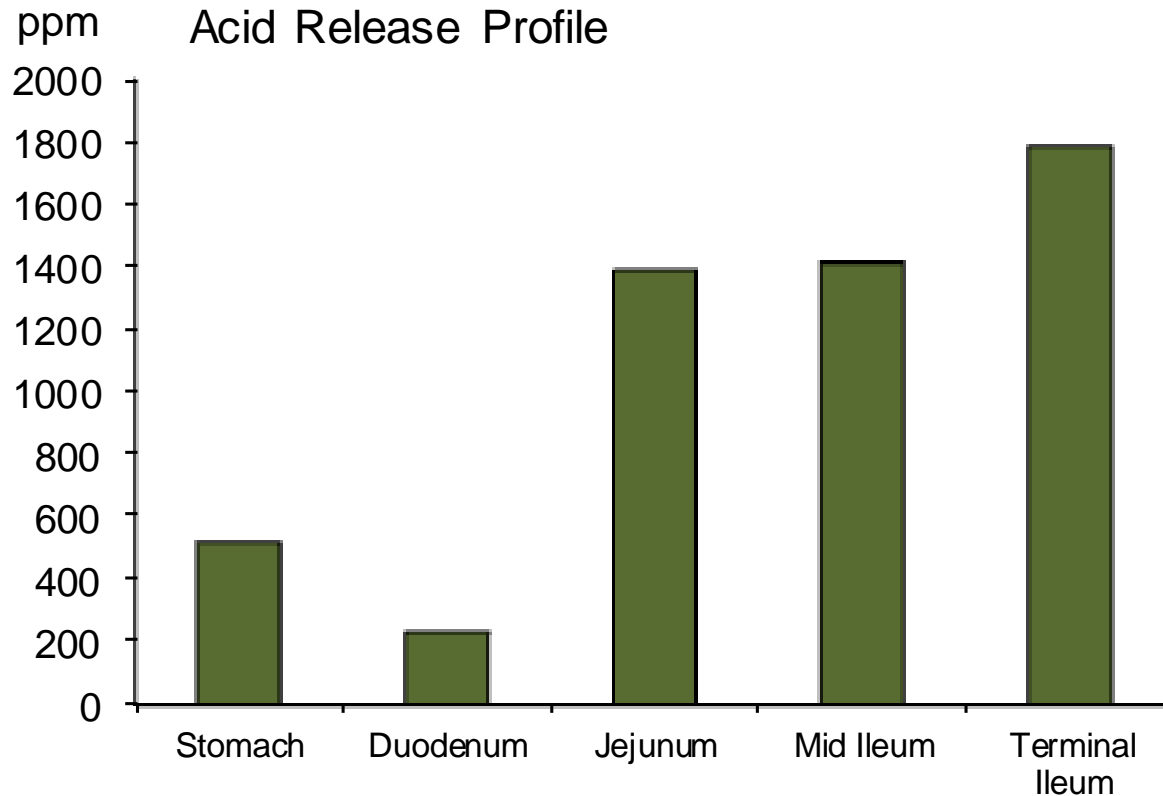
Cecum

Colon



Studi in vivo sul rilascio di acidi in suinetti usando Novus Premium Blend Technology

Concentration of active ingredients in feed and digesta on dry matter value



Novus 2008

PROVENIA™, benefici per scrofe, suinetti e suini ingrasso

- ✓ Rafforzamento della salute intestinale
- ✓ Aiuta la crescita dei suinetti favorendo
 - minore incidenza di diarree,
 - incremento ponderale
 - indici di conversione migliori
- ✓ Migliora il valore della carcassa nei suini grassi e conseguentemente aumenta il profitto



Trial 1

PROVENIA™ in suinetti

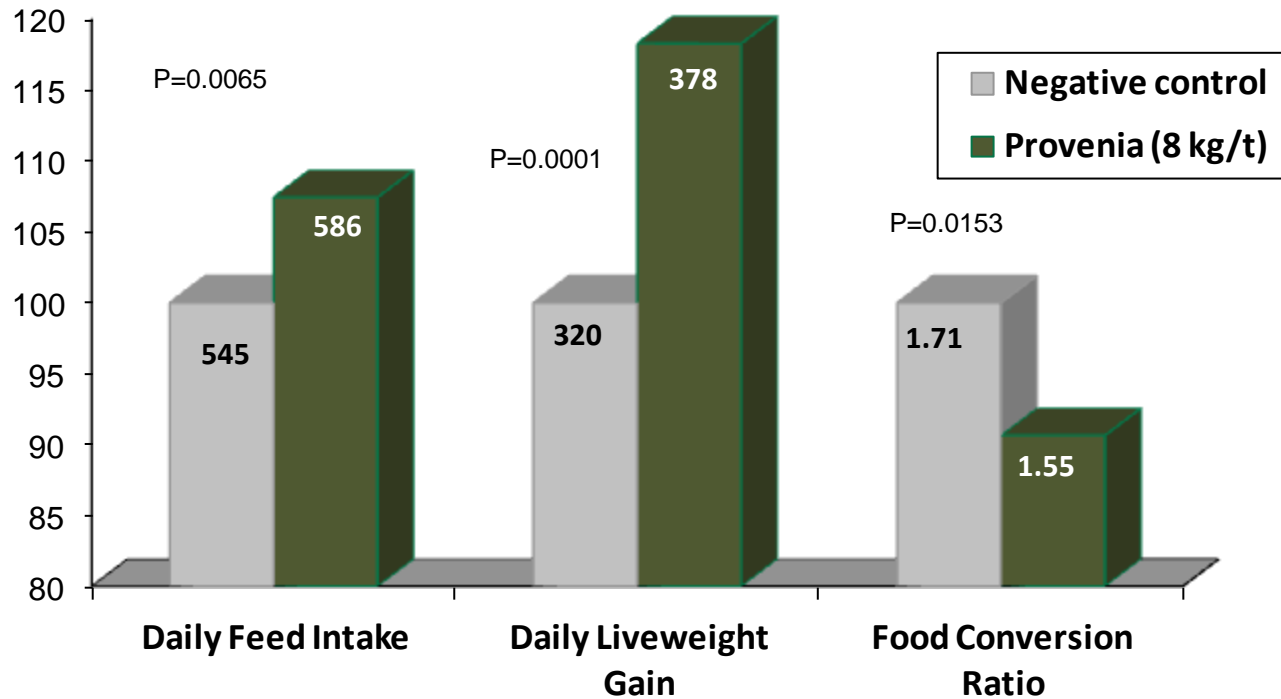


- Location: IMASDE, Agroalimentaria, Spain, 2007
- Treatments: **Negative control vs 8 kg PROVENIA™/t feed**
- Number of Piglets: 160 (80 males, 80 females) same origin
- Breed: 50% LW male line x 25% Landrace x 25% LW
- Design: 10 piglets/pen, 8 pens/treatment
- Duration: from weaning at 21 days (5.7kg) to 63 days of age

TRIAL 1

PROVENIA™ migliora accrescimento e rese

% improvement compared to negative control



PROVENIA™ significantly improves piglet performance



Trail 2

PROVENIA™ in suinetti



Location: FBF Technology Centre, UK. Medium Health Unit , 2009

Diets: **5kg/t benzoic acid** compared to **2.5 kg/t PROVENIA™**

Piglets: 96 pigs, same origin, outdoor breeding unit

Breed: 25% Landrace, 25% Duroc, 50% PIC synthetic sire

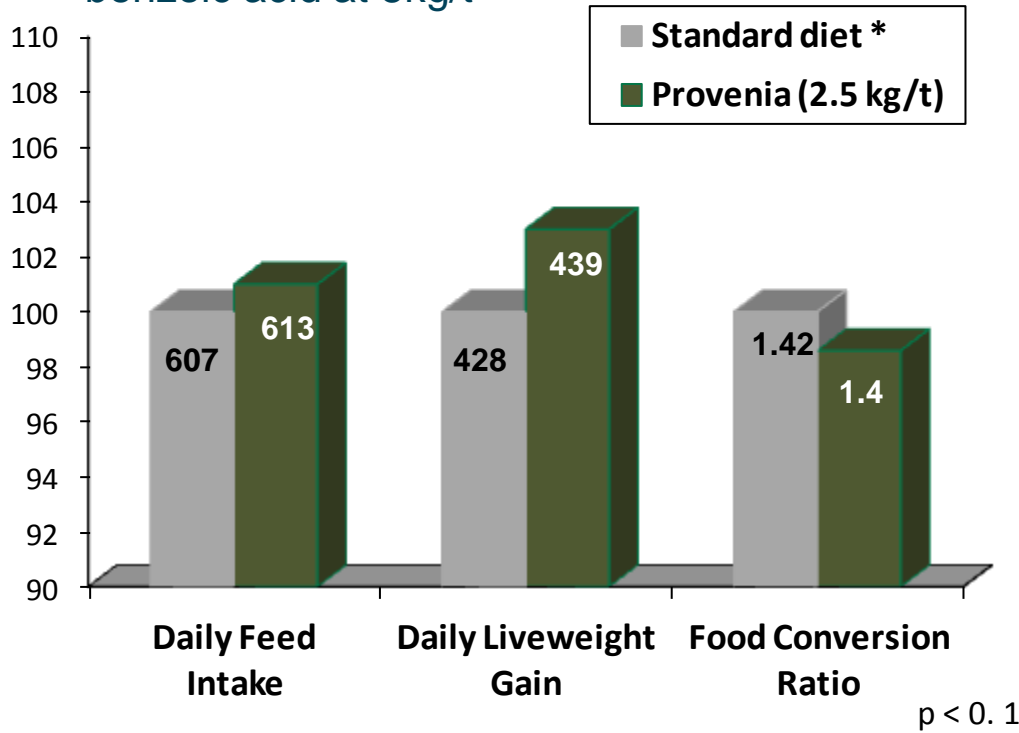
Design: 6 pigs/pen (3 males,3 females), 8 pens/treatment.

Duration: From weaning (28 days) to 70 days

TRIAL 2

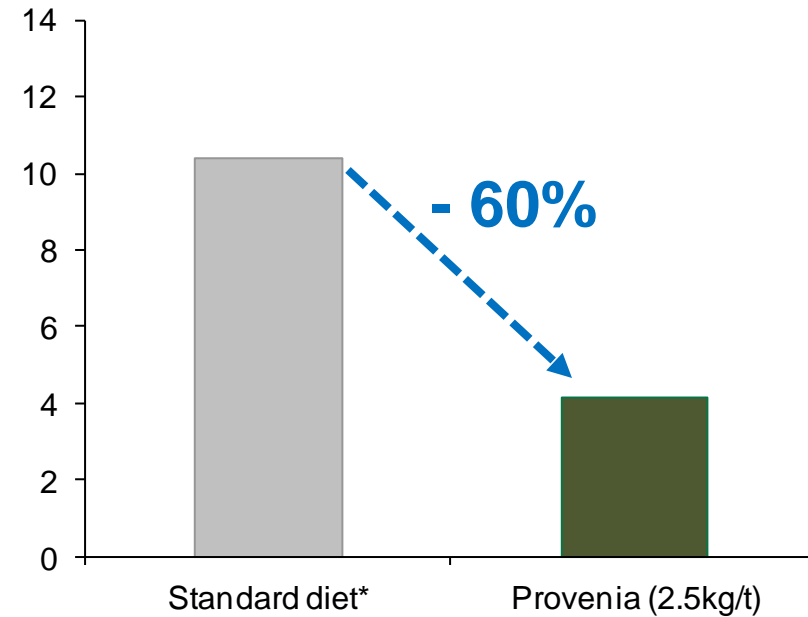
PROVENIA™ miglioramento delle performance

% improvement compared to including benzoic acid at 5kg/t



* Benzoic acid 5 kg/t

% of pigs treated for scouring



Trial 3

PROVENIA™ in suinetti

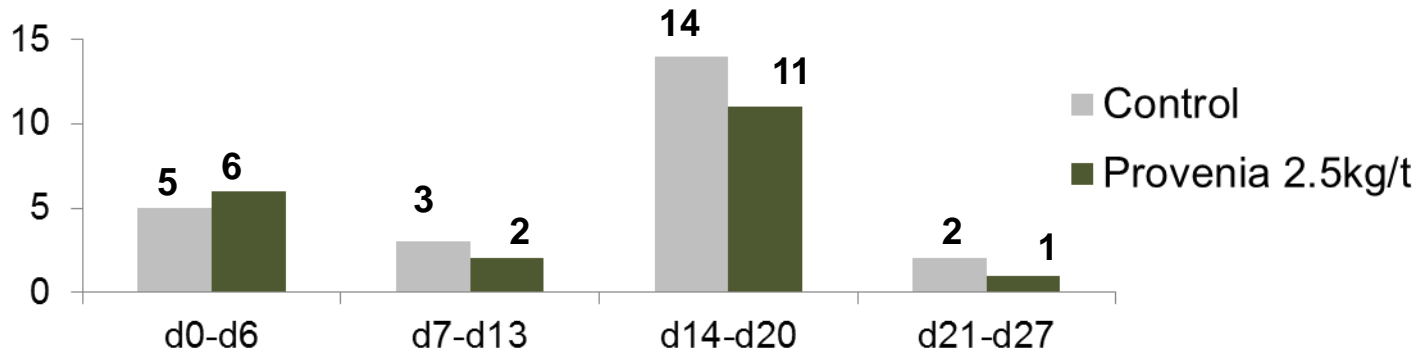


- Location: French research station, 2010
- Diets: **Negative control vs 2.5 kg/t fee PROVENIA™**
- Number of piglets: 90 piglets of 40 days of age
- Design: 5 piglets/pen, 18 pens, 9 pens/treatment.
Stress induced by removing access to feed during first 24hs to induce diarrhea
- Duration: post weaning period
- Measurements: enteritis status and growth

TRIAL 3

PROVENIA™ riduce l'incidenza di diarrea

Numero di suinetti con diarrea acquosa



Numero di suinetti trattati contro la diarrea

	Control	Provenia	%	P
Days with soft feces	7.8	5.9	-24%	
Treatments for watery diarrhea	24	20	-17%	0.28

- ✓ **Less days with soft feces (-24%)**
- ✓ **Trend in reduction of diarrhea treatments**



TRIAL 3

PROVENIA™ miglioramento delle performance

Results on growth performances of the piglets

	Control	PROVENIA	%	P
Initial weight	13.4	13.5		0.85
Final weight	29.0	29.2		0.79
DWG (Daily Weight Gain)	574	581	+1.2%	0.79
DFI (Daily Feed Intake)	1040	1009	-3.0%	0.30
FCR (Feed Conversion Ratio)	1.82	1.74	-4.4%	0.008



PROVENIA™ significantly improves feed efficiency

- ± 4 x less undigested feed
- favors healthy intestines

Trail 4

PROVENIA™ in suini in fase di ingrasso



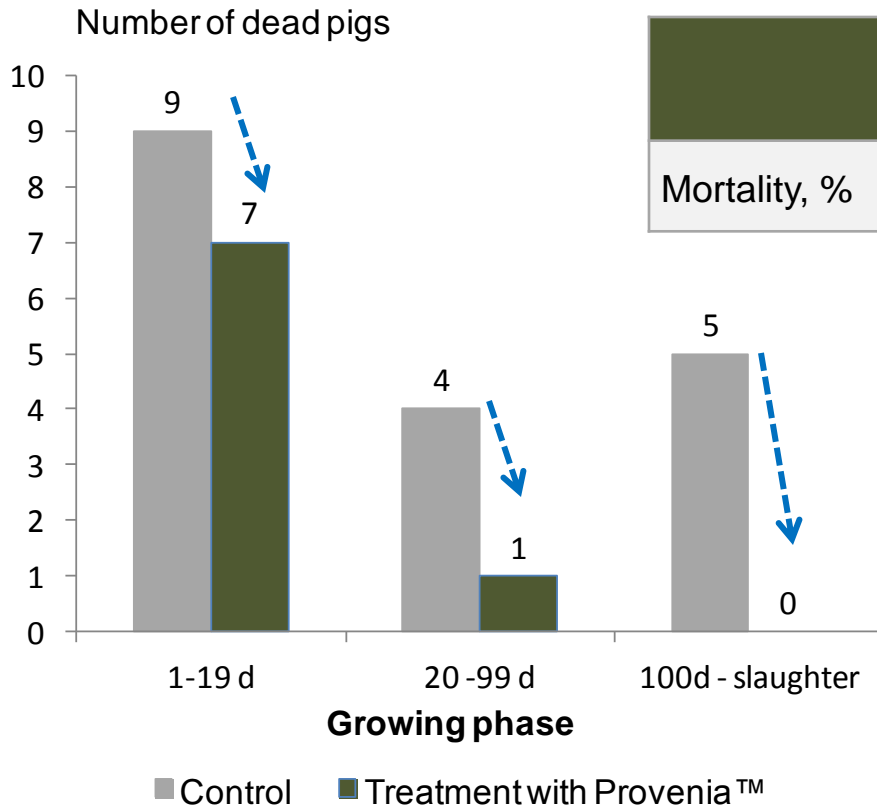
Polonia, Giugno-Settembre, 2011

- Allevamento con 14 000 suini ingrasso venduti/anno (peso vivo alla macellazione 125 kg)
- Suinetti importati con stato sanitario scadente, scrofette e maschi castrati
- 681 suinetti età circa 70 giorni, 25 kg di peso vivo; allocati in gruppi separati, nello stesso capannone diviso in due parti
- Alimentati da linee di alimentazione separate.
- Trattamenti:
 - 1) Gruppo di Controllo: Acidomix AFG - 280 suinetti, 8 gruppi
 - 2) Gruppo Provenia: Acidomix AFG + Provenia™ - 300 suinetti, 9 gruppi

Mangime	Periodo aliment.	Quantità di mangime	Controllo (ACIDOMIX AFG only)	Gruppo trattato	
	Giorni			kg/pig	kg/t
P-W	21	30	3	3	1.5
PT-1	75	175	2	2	1.0
PT-2	21	80	1	1	0.5
Total	117	285			

Trail 4

PROVENIA™ riduce la mortalità in tutte le fasi di ingrasso



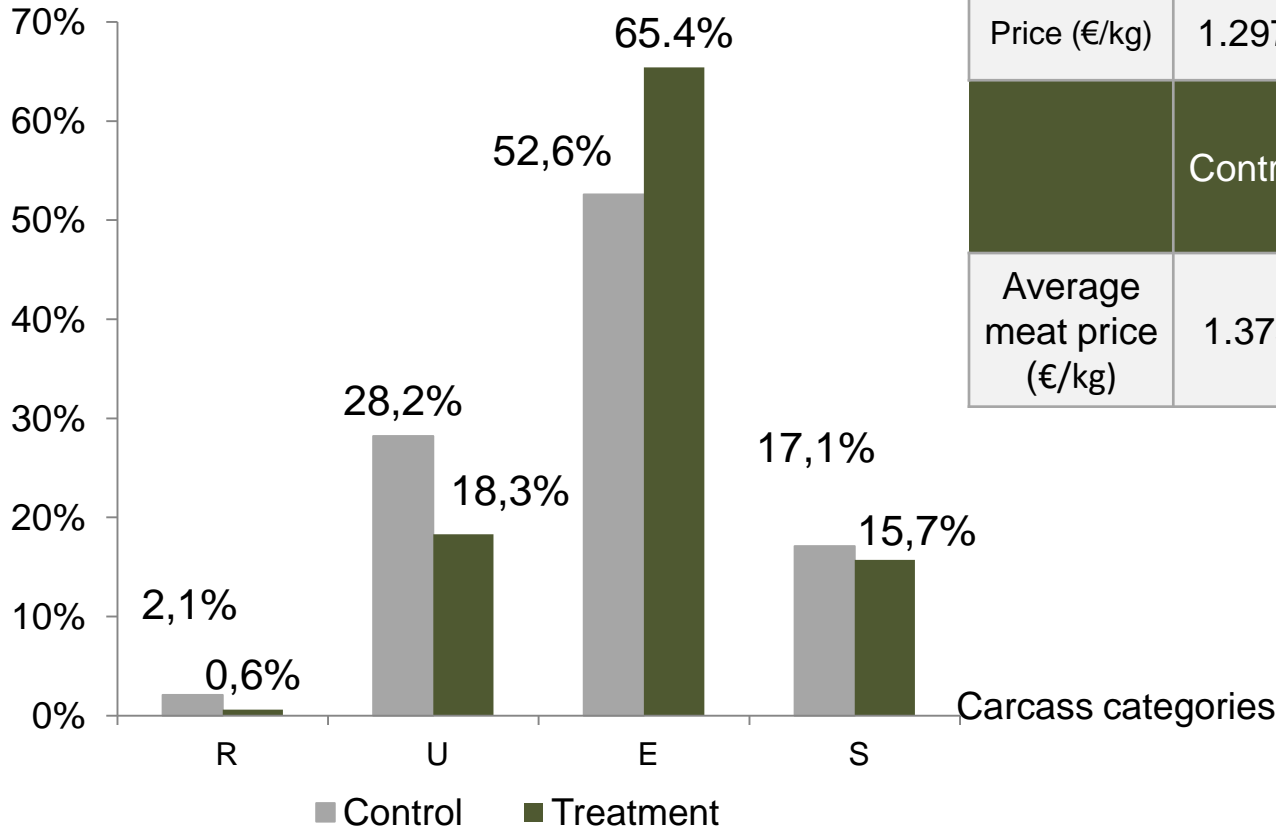
	Control (ACIDOMIX AFG only)	+ PROVENIA	Improvement with PROVENIA™
Mortality, %	6.43	2.66	-3.77

No difference in drug treatments
Main cause of mortality in the control group:
Staphylococcus aureus

Trail 4

PROVENIA™ aumenta il valore della carcassa

La proporzione di carcasse con maggiore valore commerciale risulta aumentata



Carcass categories	R	U	E	S
Price (€/kg)	1.297	1.341	1.386	1.408
	Control	PROVENIA™		Increased carcass value with PROVENIA
Average meat price (€/kg)	1.375	1.381		+ 0.006

Prezzo carne + 0.5%



SUINETTI

Post weaning : fino a 2.5 kg/t (0.25%)



SCROFE

Gestazione, Lattazione : fino a 3 kg/t (0.3%)

INGRASSO

Fino a un massimo di 5 kg/t (0.5%)

1,5-2 kg/t da 25-30 a 45-50 kg PV

1-1,5 kg/t da 45-50 a 90-100 kg PV

0,5-1 kg/t oltre 100 kg PV



Sommario

- ✓ **minore incidenza di diarrea + riduzione della durata**
- ✓ **meno trattamenti richiesti per diarrea**
- ✓ **miglioramento della resa del mangime**
- ✓ **aumento dell'aumento di peso**

 **Provenia™**



Sommario dei vantaggi in suini ingrasso

- ✓ **L'aggiunta di PROVENIA™ nelle diete per suini in fase di ingrasso/finissaggio migliora la profittabilità, in maniera particolare nel caso di uno stato sanitario scadente**
 - Minore mortalità -3.77 % points
 - Migliore Conversione -0.10 (da 30 a 115kg)
 - Maggiore valore carcassa +0.006 €/ kg carne(+0.5%)
- ✓ **PROVENIA™ inoltre garantisce un vantaggio complementare quando usato in aggiunta ad acidi organici liquidi.**



Grazie!

Merci

Thank you

kiitos

Dank u

Благодаря ви

Obrigado

NOVUS |



Danke

mulțumesc

Gracias

d'akujem

dziękuję

tak

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