

Gut Health Management Introduction

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14th April 2021



It is important to accelerate the evolution of the microbial community to steady state and then maintaining the *status quo*

Bad bacteria:

- Live in lower gastrointestinal tract
- Mainly aerobic
- Prefer higher pH environment
- Produce toxins that cause tissue damage

Pathogens

Good bacteria:

- Live in upper gastrointestinal tract
- Mainly anaerobic
- Prefer lower pH environment
- Produce lactic acid

Good bacteria

Gut health and immunity

The infographic features a light brown silhouette of a pig. Overlaid on the pig's body are three white, stylized representations of the digestive system: a large stomach in the center, a long, curved small intestine on the left, and a coiled large intestine on the right. The text is arranged around these elements, with percentages and descriptive text in bold black font.

NEWBORN PIGLETS ARE ENTIRELY DEPENDENT ON THEIR **INNATE IMMUNE SYSTEM**

70%

OF THE **IMMUNE SYSTEM** FUNCTIONS THROUGH THE **GUT TISSUE**

90%

OF **DISEASES** CAN BE TRACED BACK TO **GUT HEALTH** AND THE **MICROBIOME**

30%

OF **ENERGY REQUIREMENTS** ARE BY THE **GUT**

Industry Challenges

1. Intensification of animal agriculture

Agricultural intensification in the 20th century resulted in:

- Increased disease pressure
- Drug use for many years to assist the animal
- Drug use to control zoonotic diseases i.e. *Salmonella*, *E.coli*, *Campylobacter* etc.



Industry Challenges Cont.

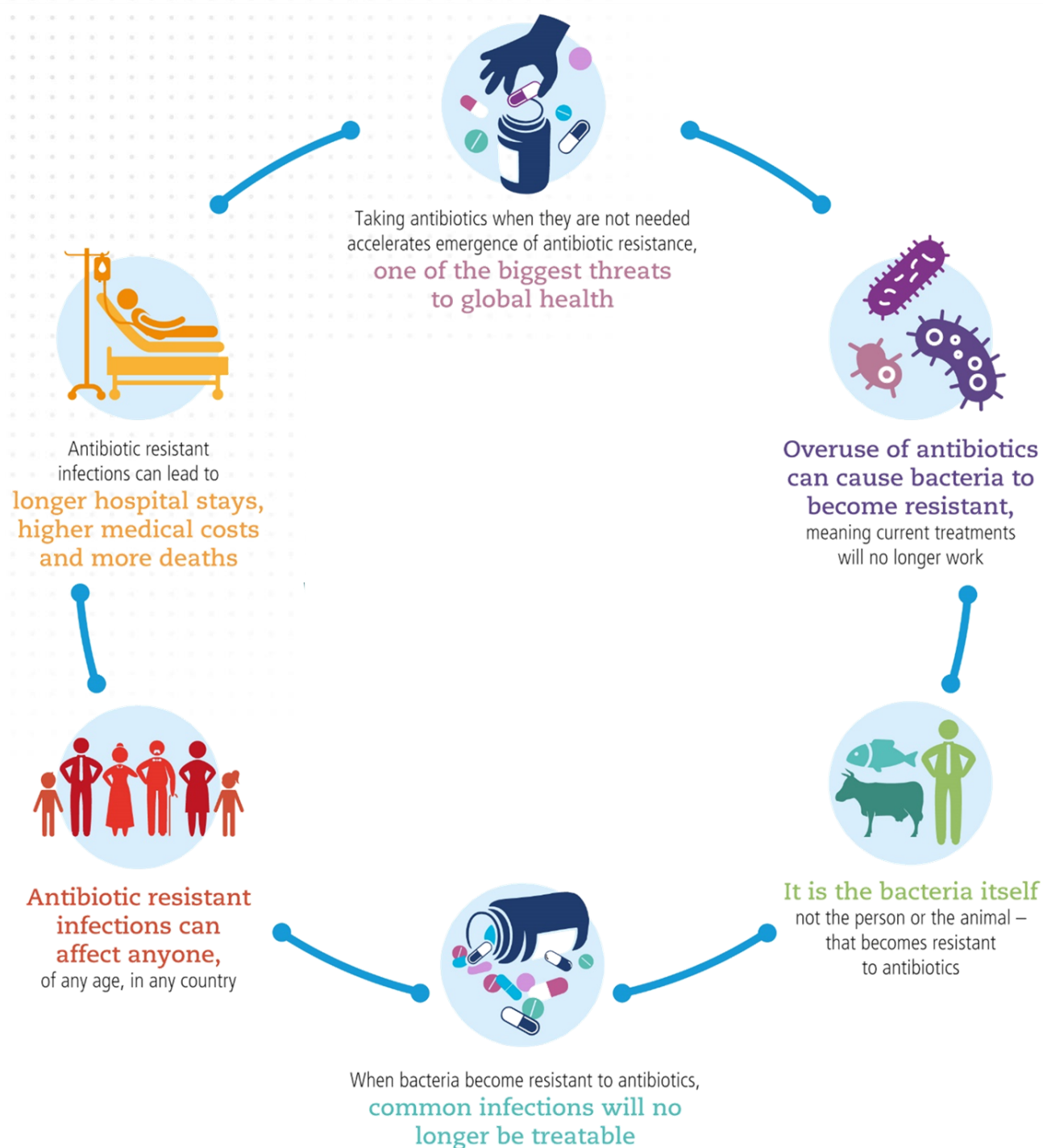
2. Antibiotic Resistance

There is a global movement to reduce antimicrobial use in livestock production. Antimicrobials have historically been, and are still, used extensively to address gut health issues, and a major challenge is finding alternatives to antimicrobials in order to support the gut during the period when it is developing.

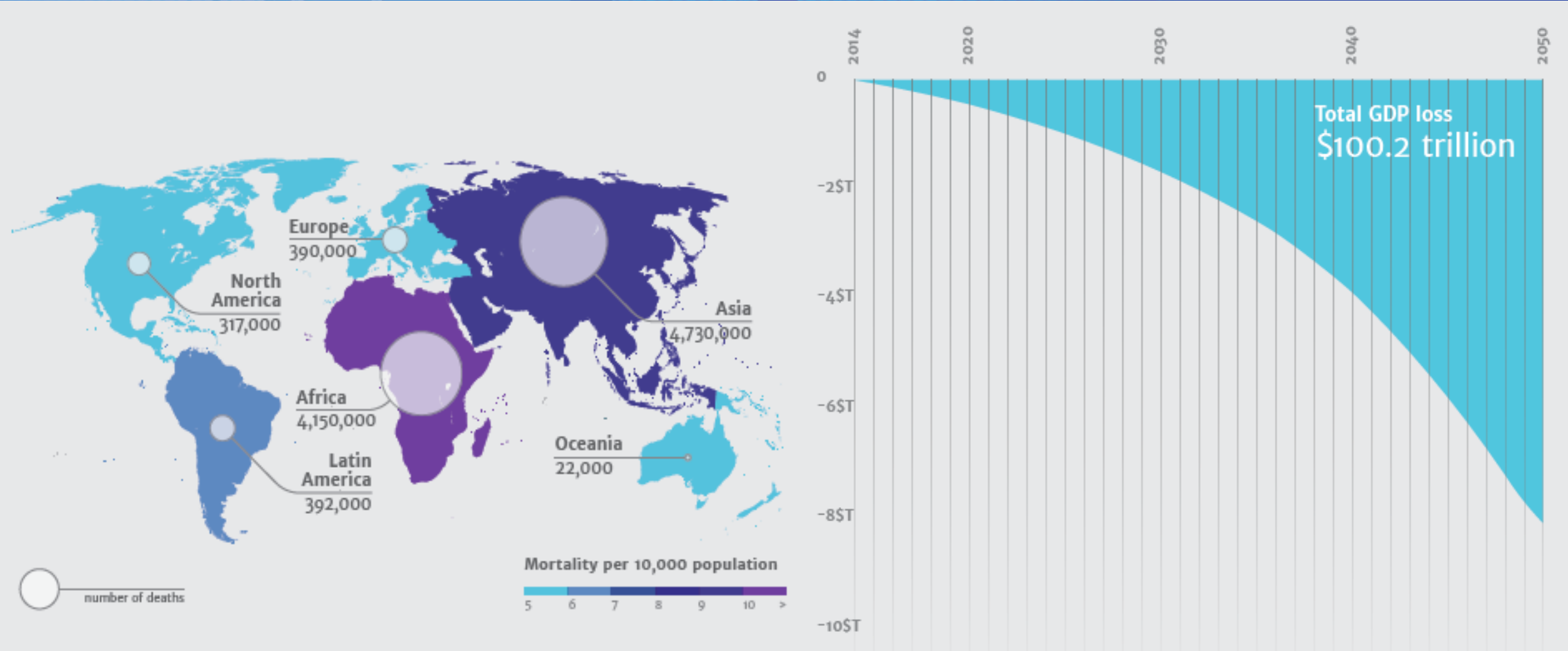


Key facts of antibiotic resistance

- Biggest threat to global health, food security, and development
- Affect anyone, of any age, in any country
- Misuse of antibiotics in humans and animals is accelerating the process
- A growing number of infections are becoming harder to treat
- New antibiotics aren't being discovered – it was as long ago as 1962 that the last new class of antibiotics was discovered
- Longer hospital stays, higher medical costs and increased mortality





Global impact of AMR in 2050



 **1986 – Sweden**
Ban of sub-therapeutic AGP in feed

 **1997 – EU**
Avoparcin banned

 **1998 – Denmark**
Sub-therapeutic in-feed AGP banned

 **2000 – Philippines**
Olaquinox, carbadox, nitrofurans and chloramphenicol banned

 **2010 – Bangladesh**
All AGPs banned in new Feed Act

 **2011 – Korea**
All AGPs banned

 **2013 – Japan**
Monitoring WHO but no clear time frame to ban AGPs

There are growing concerns about using antibiotics in feed


 **1995 – Canada**
Carbadox banned due to being a human carcinogen

 **1999 – Switzerland**
Sub-therapeutic in-feed AGP banned


 **2006 – Thailand**
All AGPs banned in line with EU

 **2017 – US**
Official AGP ban date

 **2020 - China**
Official AGP ban date

 **1998 – Holland**
Olaquinox banned

 **2006 – EU**
Complete ban on sub-therapeutic AGP use in feed

 **2012 – India**
Official ban with AGP withdrawal periods

The path to antibiotic-free production



PROMOTING
FAVORABLE
BACTERIAL
COMMUNITIES



BUILDING NATURAL
DEFENSES



MAXIMIZING
GROWTH



FEED



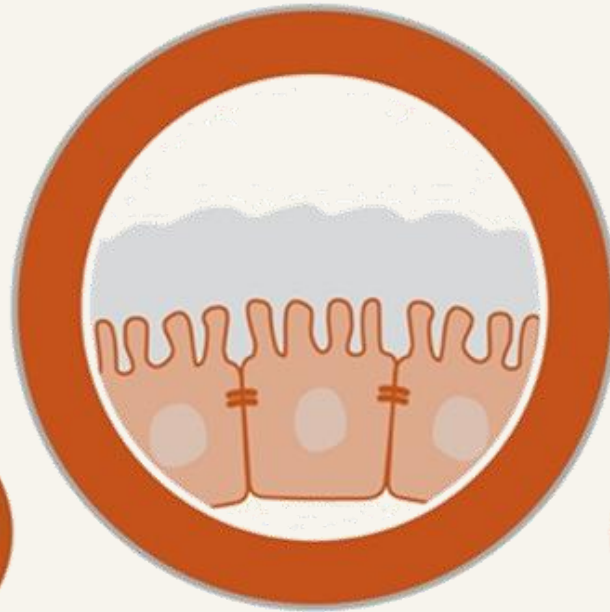
a favorable environment to provide a competitive advantage to favourable bacteria, which are tolerant to acidic environments, unlike most pathogens



SEED



the gut with favorable organism for improved performance in young animals



WEED



out unfavorable bacteria by selective exclusion

01 Stimulate early gut development and build natural immune function



Support the gut microbial population and maximize favourable bacteria

02



03 Maintain Gastrointestinal (GI) Integrity



Benefits

04 Support optimal pH



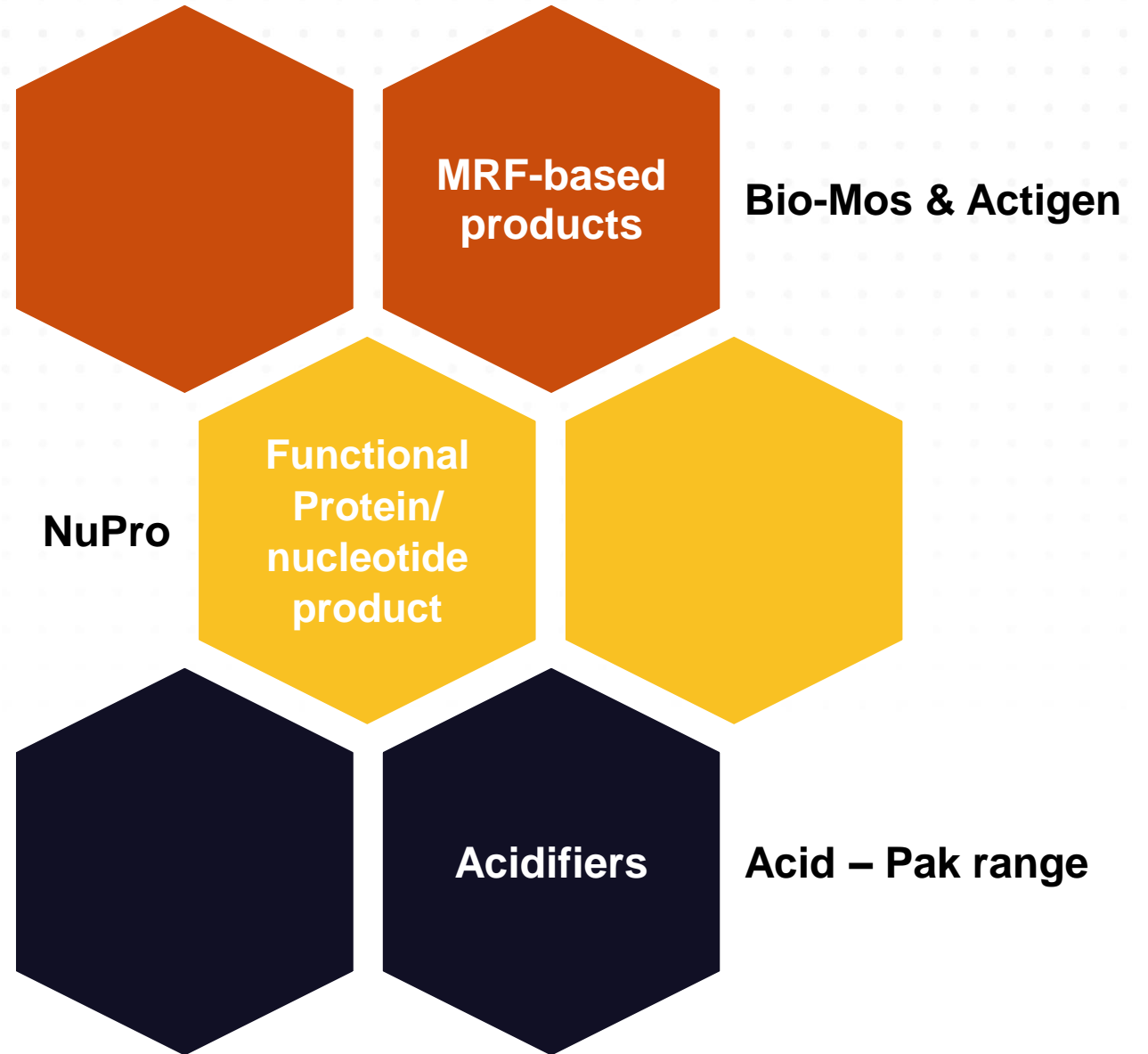
06 Improve performance, including feed efficiency and weight gain



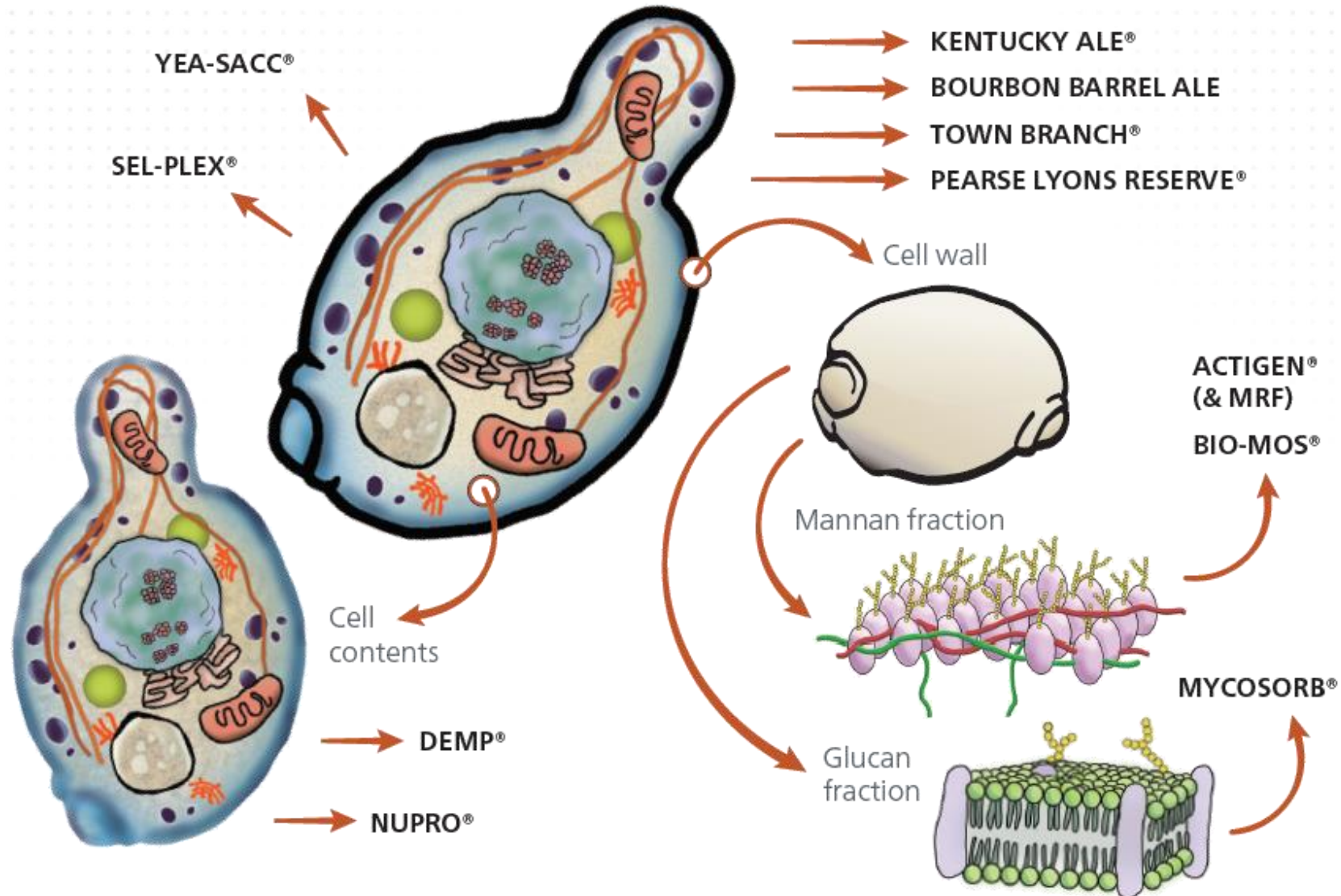
05 Maximize enzyme activity and activate protein, starch and fiber digestion



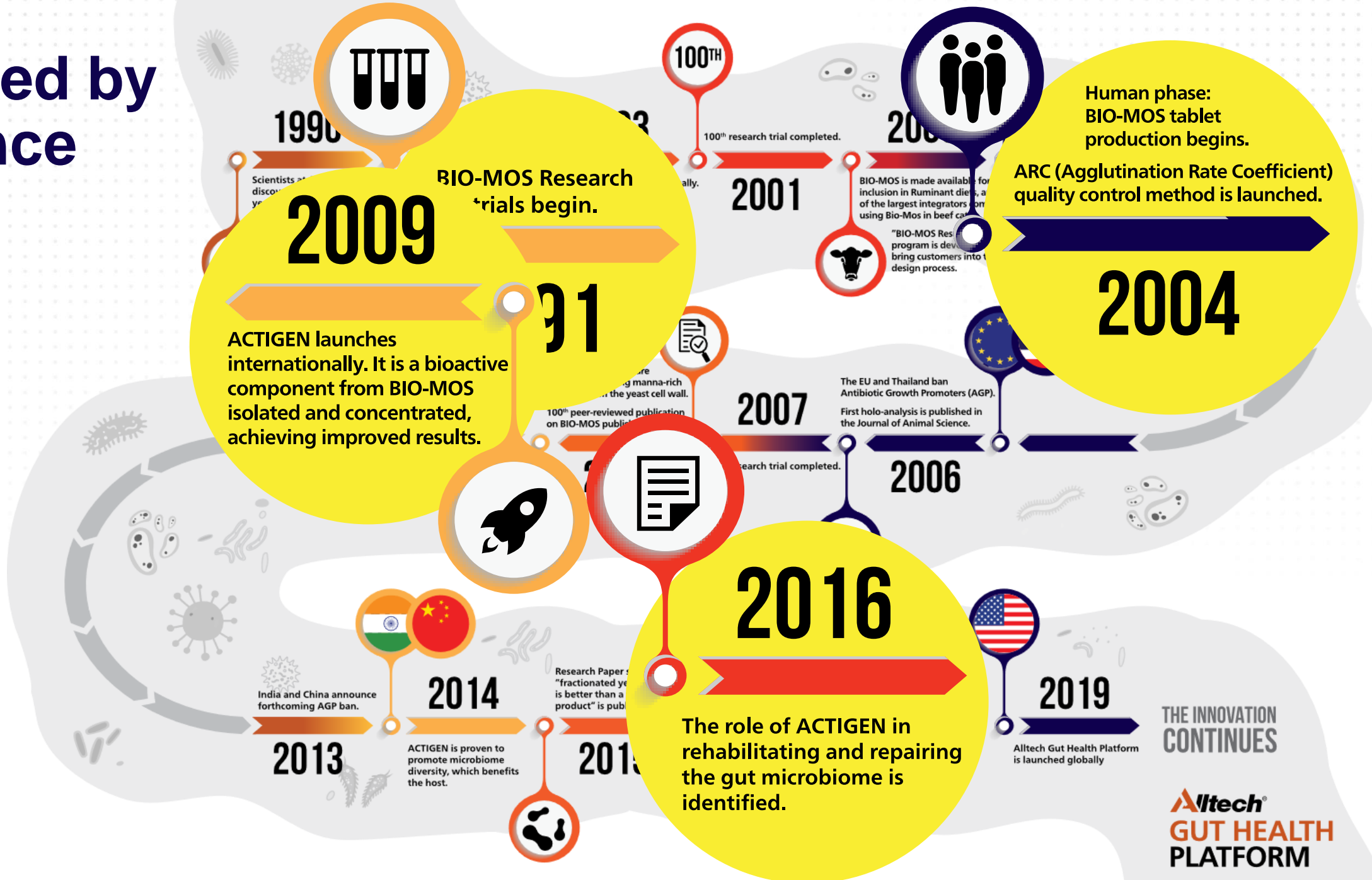
Principal Gut Health Products



Yeast – Our Core Competency



Backed by science



THE INNOVATION CONTINUES

Alltech
GUT HEALTH
PLATFORM

Examples of what we do

– bridge of the research and commercial

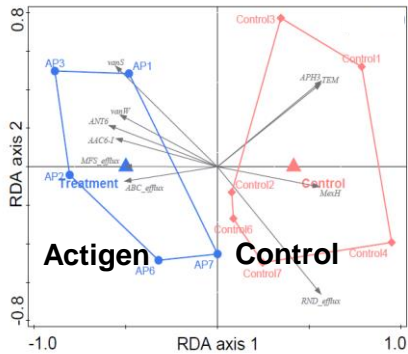
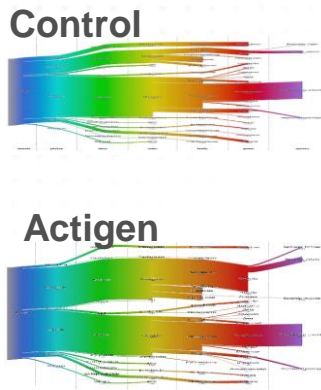
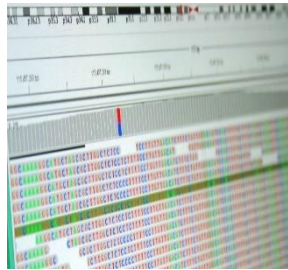
Research



Internal education



External support



CLINICAL STUDIES
Microfloral Rehabilitation: Normalisation of Gut Function

Background Microfloral rehabilitation (MFR) is a novel approach to the treatment of chronic inflammatory bowel disease (IBD). MFR aims to restore the normal composition and function of the gut microbiota, which is often disrupted in IBD. This approach involves the use of probiotics, prebiotics, and synbiotics to promote the growth of beneficial bacteria and inhibit the growth of harmful bacteria.

Objective The objective of this study was to evaluate the effectiveness of MFR in normalising gut function in patients with IBD. The primary endpoint was the resolution of symptoms, and the secondary endpoint was the normalisation of gut function, as measured by the faecal calprotectin level.

Methods This study was a randomised, controlled trial. Patients with IBD were randomised to receive either MFR or a placebo. The MFR group received a combination of probiotics, prebiotics, and synbiotics. The placebo group received a placebo. The study was conducted over a period of 12 weeks.

Results The MFR group showed significantly higher rates of symptom resolution and normalisation of gut function compared to the placebo group. The faecal calprotectin level was significantly lower in the MFR group, indicating a reduction in inflammation.

Conclusion MFR is an effective approach to the treatment of IBD, and it can be used as a first-line treatment or as an adjunct to conventional therapy.

BIO-MOS® vs BIO-MOS II
 Healthier gut, better performance

Implementation points - What does it mean for you?

- 1. New formulation improves:
 - Better performance
 - Improved stability
 - Improved efficacy

Implementation points - What does it mean for you?

- 2. Improves the distribution of beneficial bacteria across the gut
- Reduces microbial diversity
- Reduces gas production
- Reduces the risk of enteritis

Microfloral Rehabilitation - normalising gut function

Helping the gut microbiota to function normally

Restoring the balance of the gut microbiota

Reducing the risk of enteritis

Improving the overall health of the animal

Mode of action:

Target Saccharomyces cerevisiae strains (SC6)

Like most Alltech products,



ACTIGEN®

Effect of feeding Actigen to antibiotic-free chicks for improved gut health and performance

Important Observations

- Improved gut health
- Improved performance
- Improved feed efficiency
- Improved survival

CONCLUSION ACTIGEN® improves gut health and performance in antibiotic-free chicks.

Competitor Analysis

Actigen

ACTIGEN® Technical Product Sheet - Poultry

ACTIGEN® contains a unique blend of yeast and probiotics to support gut health and performance in poultry.

Parameter	Control	ACTIGEN
Survival (%)	92	95
Feed Conversion Ratio (FCR)	1.45	1.40
Weight Gain (g)	1200	1250
Incubation Period (days)	21	21
Incubation Temperature (°C)	37	37
Incubation Humidity (%)	60	60
Incubation Light Intensity (lux)	10	10
Incubation Day Length (hours)	16	16
Incubation Night Length (hours)	8	8
Incubation Temperature (°C)	37	37
Incubation Humidity (%)	60	60
Incubation Light Intensity (lux)	10	10
Incubation Day Length (hours)	16	16
Incubation Night Length (hours)	8	8

Mode of Action:

ACTIGEN® contains a unique blend of yeast and probiotics to support gut health and performance in poultry.

• Improves gut health

• Improves performance

• Improves feed efficiency

• Improves survival

Industry Challenges Cont.

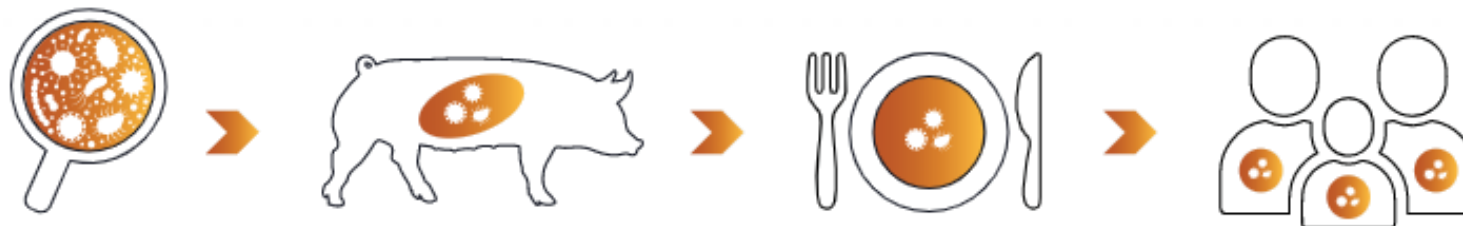
1. Intensification of animal agriculture

2. Antibiotic Resistance

3. Food safety

Bacteria from animals can be spread to food products during slaughter and processing. This spread has been extensively documented for conventional foodborne pathogens such as *Salmonella*, *Campylobacter* and *E. coli*.

Potential for transmission of antimicrobial resistance in the food chain



Walmart Food Safety Requirements for Suppliers



1 log reduction of *Salmonella*

POULTRY SAFETY

Poultry products have been involved in multiple high-profile recalls and outbreaks over the past several years. In light of these incidents, we require all poultry suppliers that provide raw chicken products (both whole birds and parts) and raw ground turkey to meet our poultry safety initiative. Please note that this initiative applies to product sold raw to the consumer as well as product that is supplied raw to our stores and clubs which will be cooked prior to being provided to our customers and members. Suppliers of these products must comply with the following requirements:



- As indicated above in the Audits & Certifications section, all manufacturing operations must achieve and maintain GFSI certification annually.
- To reduce the vertical transmission of *Salmonella* to broiler flocks, all poultry suppliers are expected to source from primary breeders who participate in USDA's National Poultry Improvement Plan (NPIP) for Breeding Poultry (9 CFR 145.83).
- *Salmonella* data, obtained via the current NPIP programs, must be reviewed by your company on a regular basis to measure the effectiveness of preventive and corrective actions that occur when *Salmonella* is detected and to reduce the likelihood of re-occurrences.
- When *Salmonella* serotypes known to be associated with human illness are detected in a housing complex, suppliers must use autogenous and/or commercial *Salmonella* bacterins for vaccination of broiler-breeder (parental) flocks against the serotypes found. Moreover, to further control horizontal transmission at the broiler farm level, we expect all of our suppliers to strictly adhere to disease prevention best practices associated with bio-security and vector control.
- Poultry suppliers must implement a regulatory approved intervention or a combination of interventions post-chill, after cut-up of whole chickens/turkeys (past the current whole bird carcass rinse sampling point) and prior to packaging, to produce, at a minimum, a 1-log reduction of *Salmonella* on all chicken parts or ground turkey supplied to our stores and clubs. The intervention(s) and their corresponding reductions must be scientifically validated. Each facility providing chicken parts or ground turkey, regardless of ownership, is required to comply.
- Poultry suppliers must implement a regulatory approved intervention or a

Walmart GLOBAL ETHICS & COMPLIANCE

September 1, 2020

Alltech, Inc.
3031 Catnip Hill Road
Nicholasville, KY 40356



APPROVED feed additive for fresh shell egg supplies listed in Walmart's Best-in-Class Program

Dear Alltech, Inc.,

Thank you for contacting us regarding Walmart Inc.'s approved feed additive products for fresh shell egg suppliers. The Best-in-Class program document which includes a list of approved feed additive products is currently being revised and is in the final stages of being shared with our supply chain.

As you are aware, your product Actigen has been added to our list of approved non-antibiotic feed additives. Until the updated Best-in-Class document is released to our suppliers, please use this letter to assure your customers that your products have been approved for use by Walmart, Inc. A full list of approved feed additives along with rate of inclusion can be viewed below. This is the same table our suppliers will see when the updated Best-in-Class documentation is distributed.

MANUFACTURER	PRODUCT	RATE OF INCLUSION	
		Cage/Cage-Free (lb/Ton)	Outdoor Birds Organic/Pastured (lb/TON)
Alltech, Inc.	Actigen	0.4 – 1.6	0.4 – 1.6
Arm & Hammer	Celmanax Dry NC (product with carrier)	2	2 (only for non-organic pastured birds)
	Celmanax SCP NC (pure product without any carrier and color)	0.2	0.2
Diamond V	XPC	1.5	2.5
	Calisparin 1.0B	0.5	1.0
QTV/Calpis	Calisparin	0.25	0.5
	Calisparin Organic	0.5	1.0
	Calisparin Organic 2.0	0.25	0.5
	IMW50	1.0	2.0
	Backpak	1.0	1.5

Sincerely,

Walmart, Inc. Food Safety & Health
702 SW 8th Street
Bentonville, AR 72716

Campylobacter opportunity

Campylobacter is well known as the leading cause of foodborne gastrointestinal illness worldwide.

Reducing Campylobacter load in the GI tract and particularly in poultry caeca will reduce human infections by the bacteria.

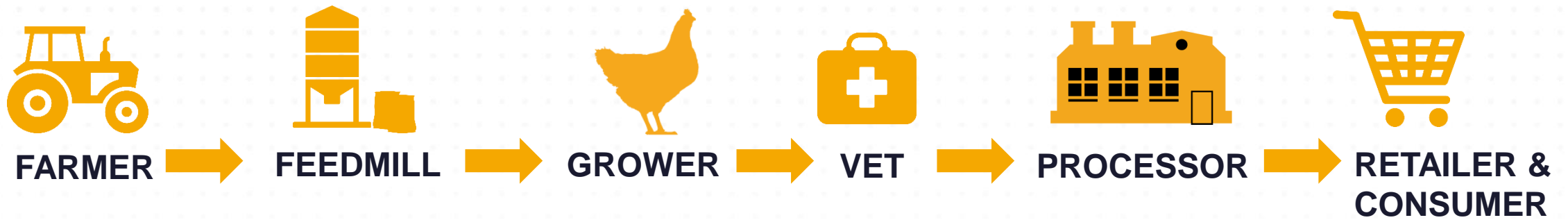


9 million cases of campylobacteriosis in the EU alone each year



63-88% of all chickens carry latent infection

Benefit for the whole supply chain



Potential to cause disease in poultry:
diarrhoea and reductions in feed efficiency –
the costs to the industry are up to **€26 / thousand broilers**

Reduced energy
cost on heat
treatment:
€940K / month

+ C Footprint
benefits

Cost of illness for
human
campylobacteriosis:
€267 / case

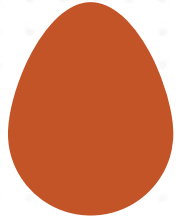


Mucus Layer

Beneficial microbes help to form a protective barrier

Examples of what we do

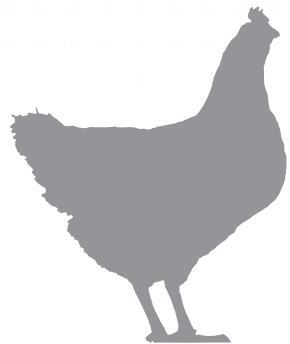
– identify the new opportunities



The egg market:
\$162.39 billion by 2022



The layer sector was moving towards **longer laying cycles** with birds set to be laying up to 500 eggs a cycle in the next few years. **Ageing birds** may face an increased disease risks with longer periods of no vaccination.



8 billion layers
in 2019 globally



Better gut health →
Better ability to absorb
mineral/nutrient →
More and higher quality eggs

Internal education



Commercial and
research trials



External promotion
– marketing
campaign



Partner with key
integrators /
accounts

Lifting the lid on layer gut health



On- and off-farm services



Antimicrobial
reduction audit



Pig ASSIST



Research papers
and laboratories



Ammonia
monitoring



Biosecurity
audit and
advice



Eggshell quality
testing



Interactive
dashboard
delivering real-
time data



On-farm visits
and technical
support



Post-mortem
analysis



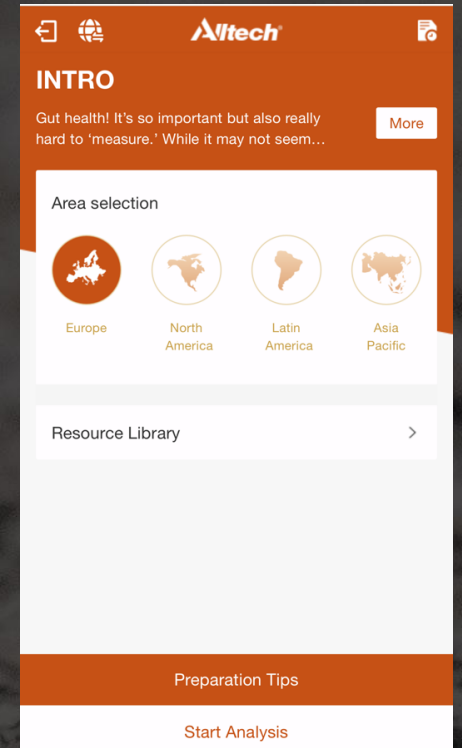
Tailored
nutritional
plans



THE CLUE IS IN THE MANURE

Monitor poultry gut health
from the outside

- Online system
- “Full picture” look at manure quality
- Analyse litter condition, intestinal manure colour and texture, cecal manure colour and texture, foot pads, feather cleanliness and ammonia gas levels



<http://alltechmanurescoring.com/>

Atlas is the place to go

SharePoint Settings ?

Alltech atlas
CONNECTING ONE ALLTECH

INFO ▾ EVENTS ▾ GLOBAL COMPLIANCE MANAGE AN INCIDENT PRODUCTS ▾ SUPPORT ▾ DEPARTMENTS ▾ RESEARCH

Q

Alltech atlas Atlas

Send by email

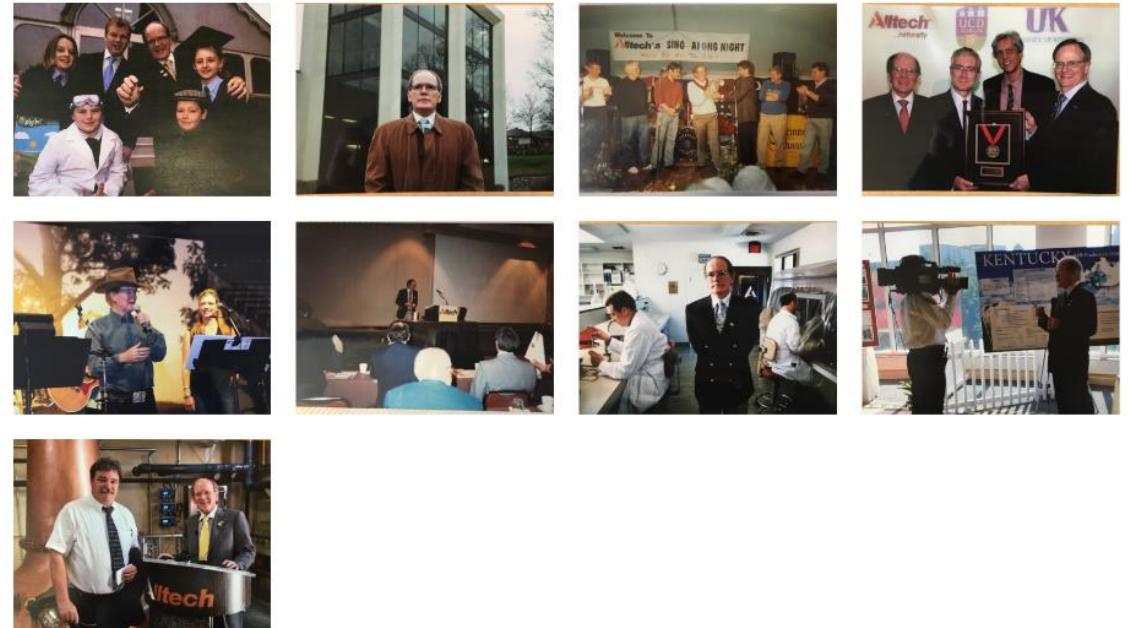
Links we love to share



- Waive Code Request Form
- Staff Registration...
- Alltech Best Practices
- ONE Virtual Experience
- Global Platforms**
- Employee Handbook
- The Alltech Wiki

Digital Marketing

Throwback Thursday



Select a platform



Enzyme Management



Gut Health



Mineral Management



Mycotoxin Management



Rumen Function

Alltech SELL

 North America SELL App

The Gut Health Platform focuses on building and reinforcing the basis and future developments of our gut health solutions, especially in pig and poultry diets. The gut health strategy revolves around four key solutions: **Seed Feed Weed***, **Antibiotic Reduction**, **Antibiotic-Free**, and the **Salmonella control program**, which assist producers by helping them develop bespoke action plans. Incorporated in these solutions are our products **BIO-MOS/ACTIGEN**, **NUPRO**, **ACID-PAK**, **VILIGEN**, **NATUSAT** and **GUARDICATE**. Also provided as part of the gut health strategy is a series of on- and off-farm services developed to demonstrate the efficiency of our products in achieving productivity, quality and economic objectives.

Research, training and marketing updates, as well as all other necessary resources, can be found here. For more information, please get in touch with our team.

** Seed, Feed, Weed is designed to modify the gut microbial population to establish a favorable microbial population after birth.*

What is the Gut Health Platform?

WHAT IS THE ALLTECH GUT HEALTH PLATFORM?

BENEFITS

- 01 Stimulate early gut development and boost natural immune function
- 02 Support the gut microbial population and maximize immune function
- 03 Maintain gastrointestinal (GI) integrity
- 04 Support immune pH
- 05 Minimize enzyme activity and activate protein, starch and fiber digestion

It focuses on Supporting animal performance to enable them to overcome both environmental and physical challenges by:

- promoting favorable bacterial populations
- building natural defenses
- maximizing growth

0:00 / 1:58

Our Team



Jules Taylor-Pickard
Gut Health Platform, Global Director



Leona Shaojing Luo
Global Marketing Manager - Gut Health



Athanasios Patsiogiannis
Business Insight Co-ordinator



Emily Marshall
Poultry Coordinator

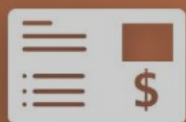
One stop shop for gut health materials:

- Marketing materials
- Presentations
- Videos and animations
- Competitor analysis
- One-page technical flyers
- Webinars
- Podcasts
- Researches
- Highlights and latest update

Global Platform Tools



Marketing Materials



Presentations



Videos & Animations



Technical Documents

Internal Training



Learning Hub



Webinars



Technical Presentations



Species Focus Training



Podcasts

Gut health

Plant of Plenty elevator pitch

The Alltech Gut Health Management uses **science-based solutions and services** to help balance the microbial diversity within the gut, **reducing antimicrobial resistance by supporting natural immunity**, leading to **sustainable and profitable production**. We deliver valuable insights to each stakeholder in the supply chain, working together to provide **safe food** to the planet for future generations.

Storytelling

Sustainability

Science

The Gut Health Team is here to help!



Dr. Jules Taylor-Pickard
Global Director



Leona Shaojing Luo
Global Marketing Manager

Research Support



Dr. Richard Murphy
Director of Research



Dr. Daniel Graugnard
Research Group Director

Technical Support



Emily Marshall
Poultry Technical Support



Dr. Hazel Rooney
Pig Technical Support

Project Support



Nicola Barret
Executive Assistant



Athanasios Patsiogiannis
Business Insights