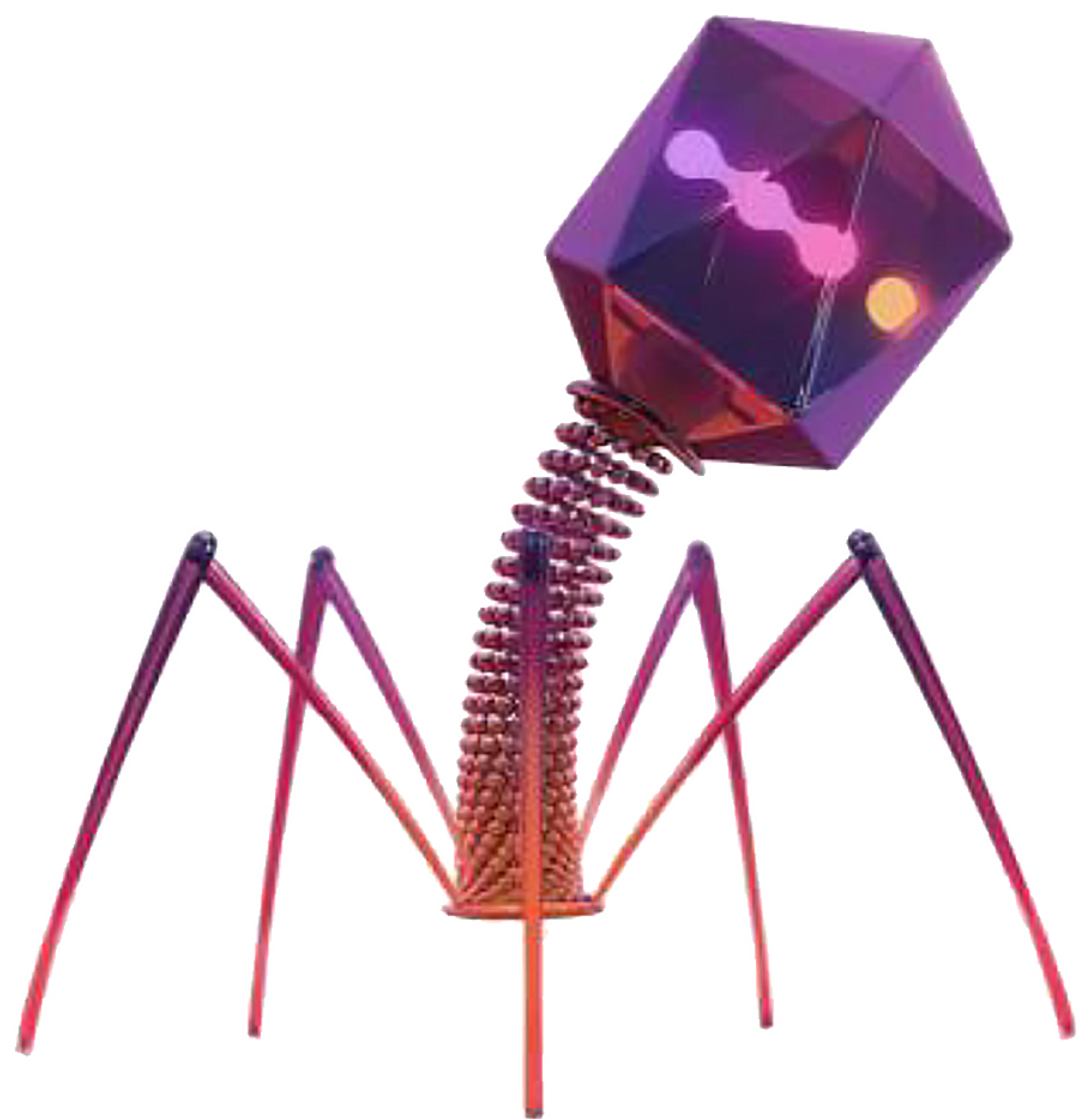


**Phage solutions
as new
antibacterial
tools for
Poultry and
Aquaculture**



About Proteon

Proteon Pharmaceuticals is a biotechnological company developing phage-based products preventing bacterial disease in animal farming. We use the know-how, experience and our proprietary phage-development platform to help farmers improve sustainability.

Proteon Pharmaceuticals S.A. is a leader in bacteriophage (phage) technology for livestock farming and aquaculture. Proteon's mission is to eliminate the need for unnecessary antibiotic use, reducing the risk of antimicrobial resistance (AMR), as well as to increase the sustainability of protein production through the reduction of waste and improvement of on-farm efficiency. Our products function by modulating the microbiome enabling prophylactic health. We have created a precision phage product development platform using -omics technologies, molecular biology, bioinformatics and artificial intelligence (AI) to create effective, reliable and safe antibacterial solutions for animal and human health.



40+ R&D Team, GLP Certified Lab



200+ employees



Proprietary production methodology



Multiple global patents



5 innovation awards



6 EU based Grants

Commercially Active Geographies:

Europe, Africa, Middle East, APAC

Products:

BAFACOL™

Avian Pathogenic *E. coli*

BAFASAL®

Salmonella Enteritidis,
Salmonella Typhimurium

BAFASAL+G®

Salmonella Enteritidis,
Salmonella Typhimurium,
Salmonella Gallinarum

BAFADOR®

Pseudomonas sp. &
Aeromonas sp.

Product Categories:

Poultry

Aquaculture



BAFACOL™

Protection against Avian Pathogenic *E. coli*

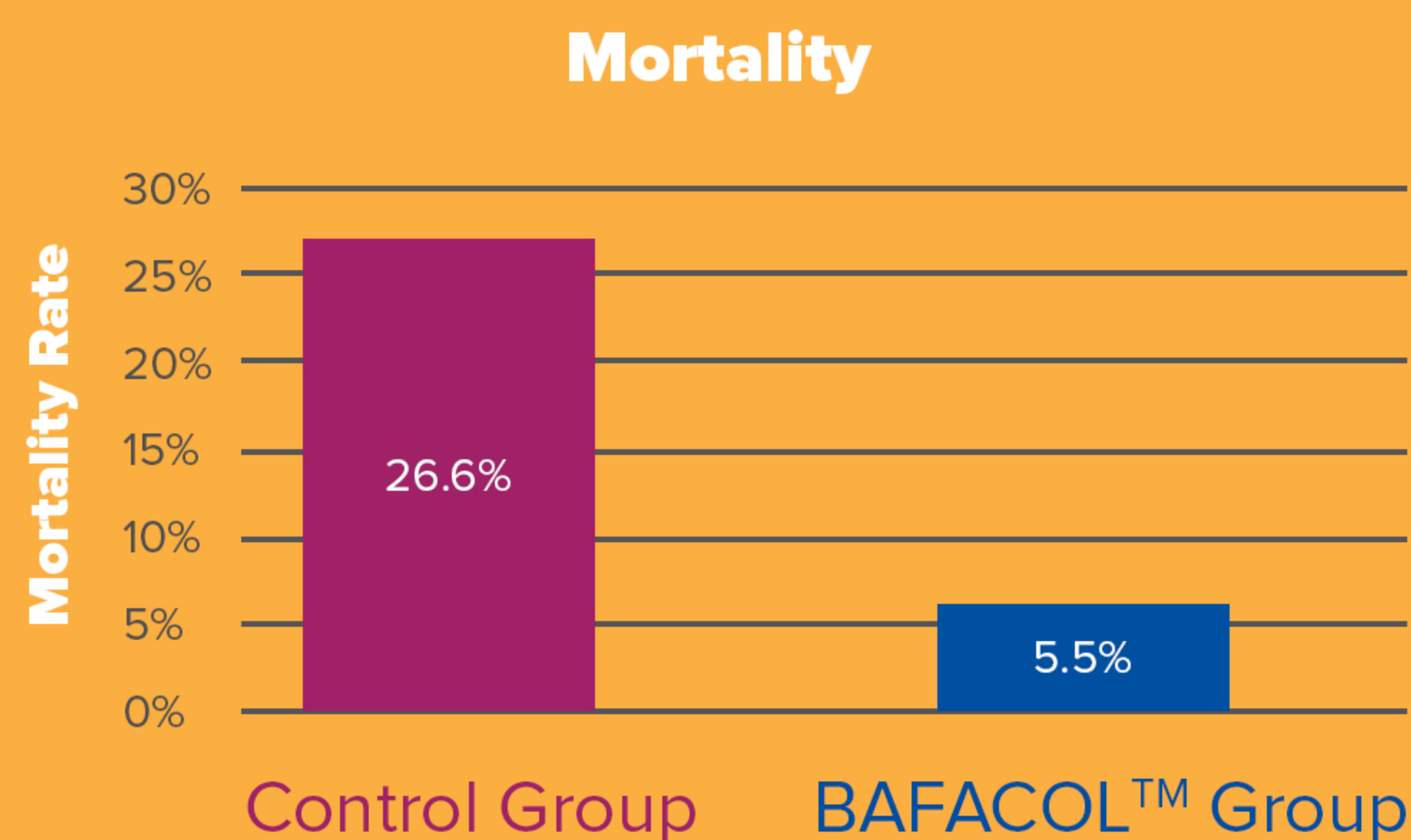
Natural guard to protect poultry
and profits

Key Benefits

- BAFACOL™ is a bacteriophage cocktail preventing Avian Pathogenic *E. coli* infection in poultry.
- BAFACOL™ is effective on multiple APEC strains, including those resistant to antibiotics.
- BAFACOL™ helps to prevent mortality caused by APEC in broilers, layers and breeders.
- BAFACOL™ improves growth and FCR for enhanced production performance.
- BAFACOL™ has no negative impact on the animals' microbiome.
- BAFACOL™ is safe for animals and humans.
- Natural, non-GMO and biodegradable.
- Does not cause bacterial resistance towards antibiotics.

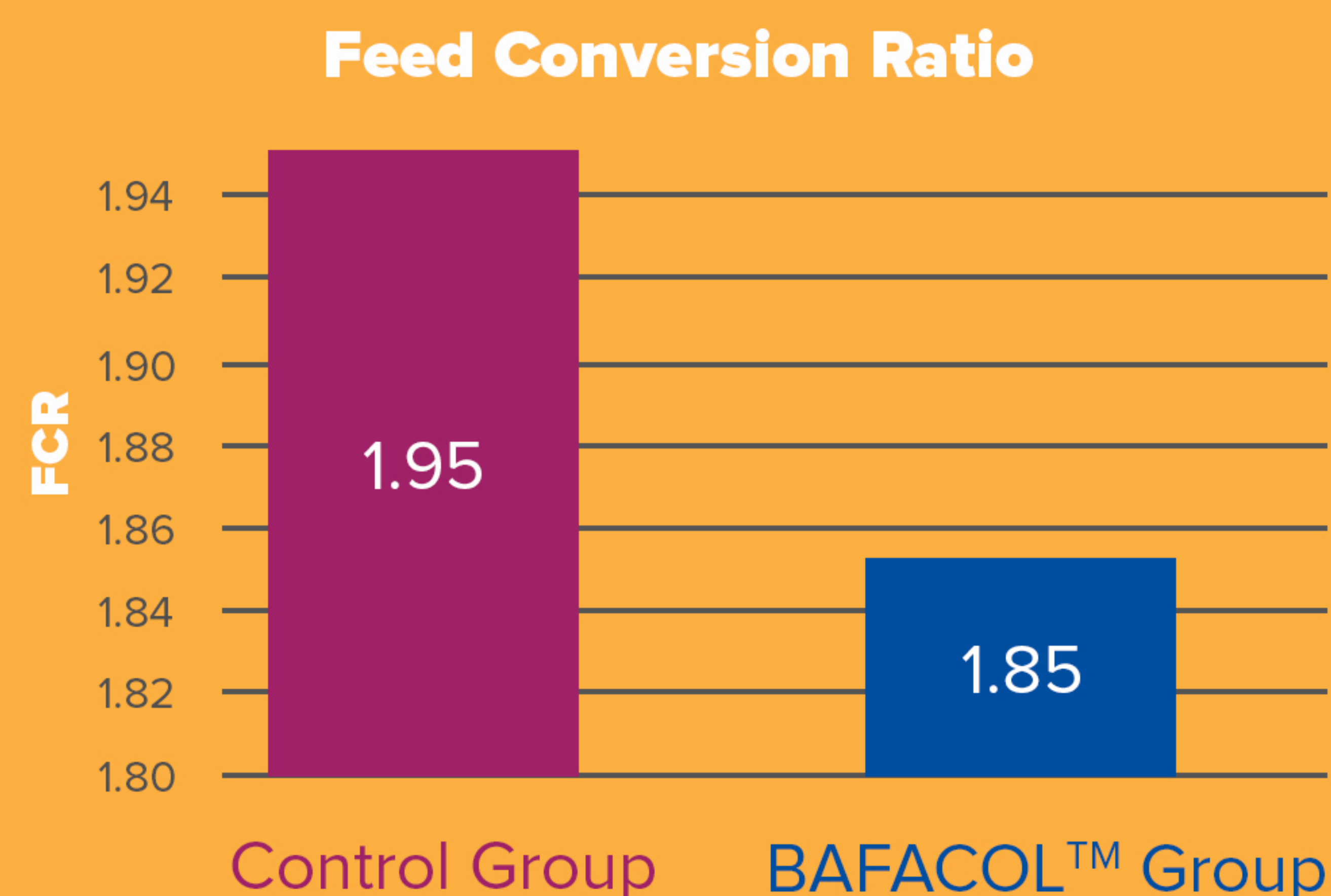
BAFACOL™ helps reduce Mortality

4.9x lower mortality in the BAFACOL™ Group
vs. in the Control Group



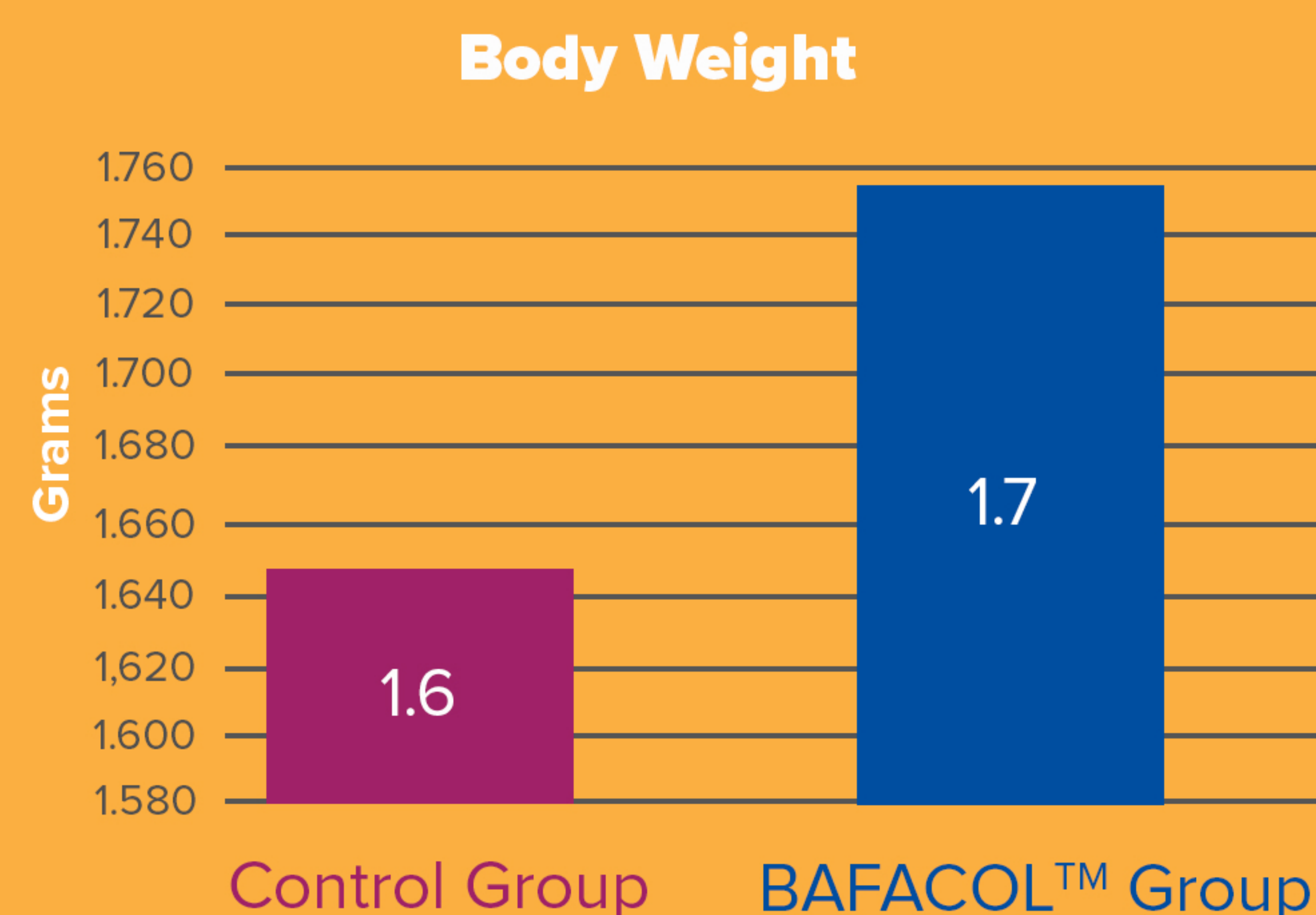
BAFACOL™ improves FCR

5.4% better FCR in the BAFACOL™ Group
vs. in the Control Group



BAFACOL™ improves body weight

6.6% higher Body Weight in BAFACOL™ Group
vs. in the Control Group



The data presented is based on internal scientific trials. Results may vary from farm to farm and depend on the environmental conditions, production parameters including farm and animal health management.



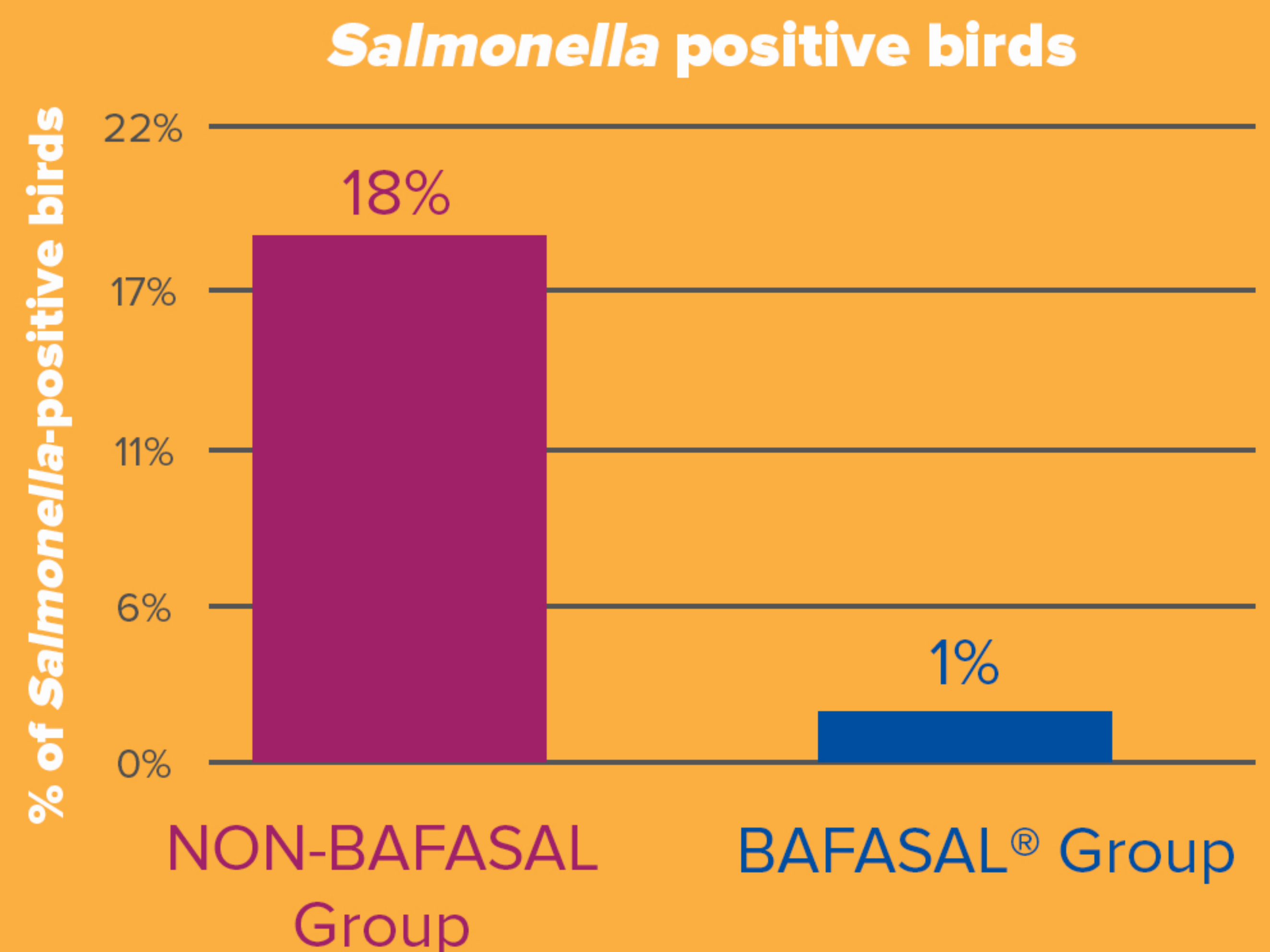
BAFASAL®

Protection against *Salmonella Enteritidis*, *Salmonella Typhimurium*

Key Benefits

- BAFASAL® is a bacteriophage cocktail preventing *Salmonella Typhimurium* and *Salmonella Enteritidis* infection in poultry.
- BAFASAL® has no negative impact on the animals' microbiome.
- BAFASAL® is safe for animals and humans.
- Natural, non-GMO and biodegradable.
- Does not cause bacterial resistance towards antibiotics.
- BAFASAL® improves FCR for enhanced production performance.
- BAFASAL® helps to prevent mortality caused by *Salmonella*.

BAFASAL® helps prevent *Salmonella*



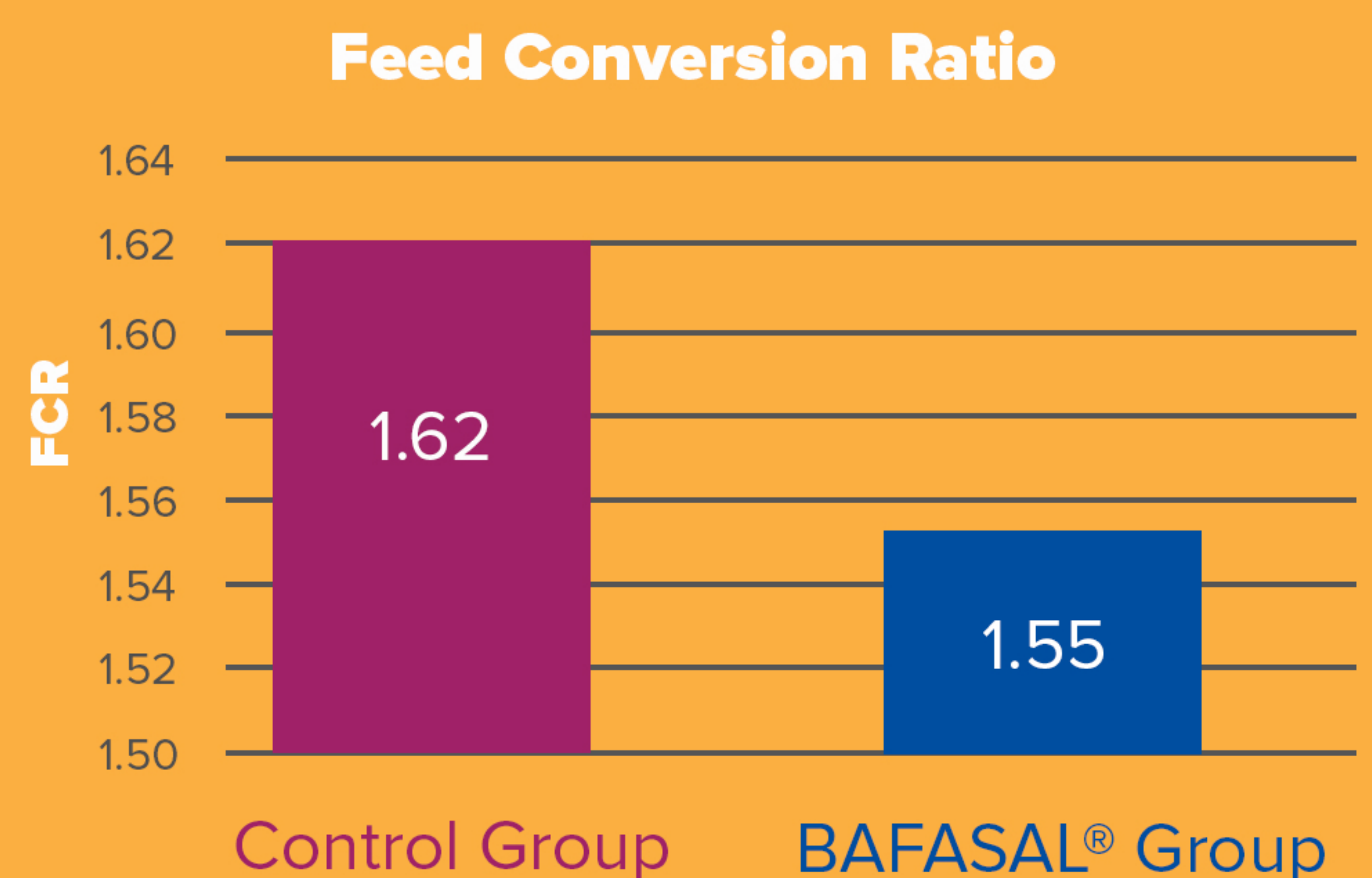
The efficacy of the bacteriophage cocktail BAFASAL® was confirmed through a farm test performed on broiler chickens experimentally infected with strains of *Salmonella* spp.

Source: Ewelina A. Wójcik, Arkadiusz Wojtasik, Elżbieta Górecka, Małgorzata Stańczyk, Jarosław Dastyk. "Application of bacteriophage preparation BAFASAL® in broiler chickens experimentally exposed to *Salmonella* Spp."

Scientific and Technical Bulletin of the State Scientific-Research Control Institute for Veterinary Products and Feed Additives and Institute of Animal Biology - 2015. - Issue 16, No. 2. - P. 241-251.

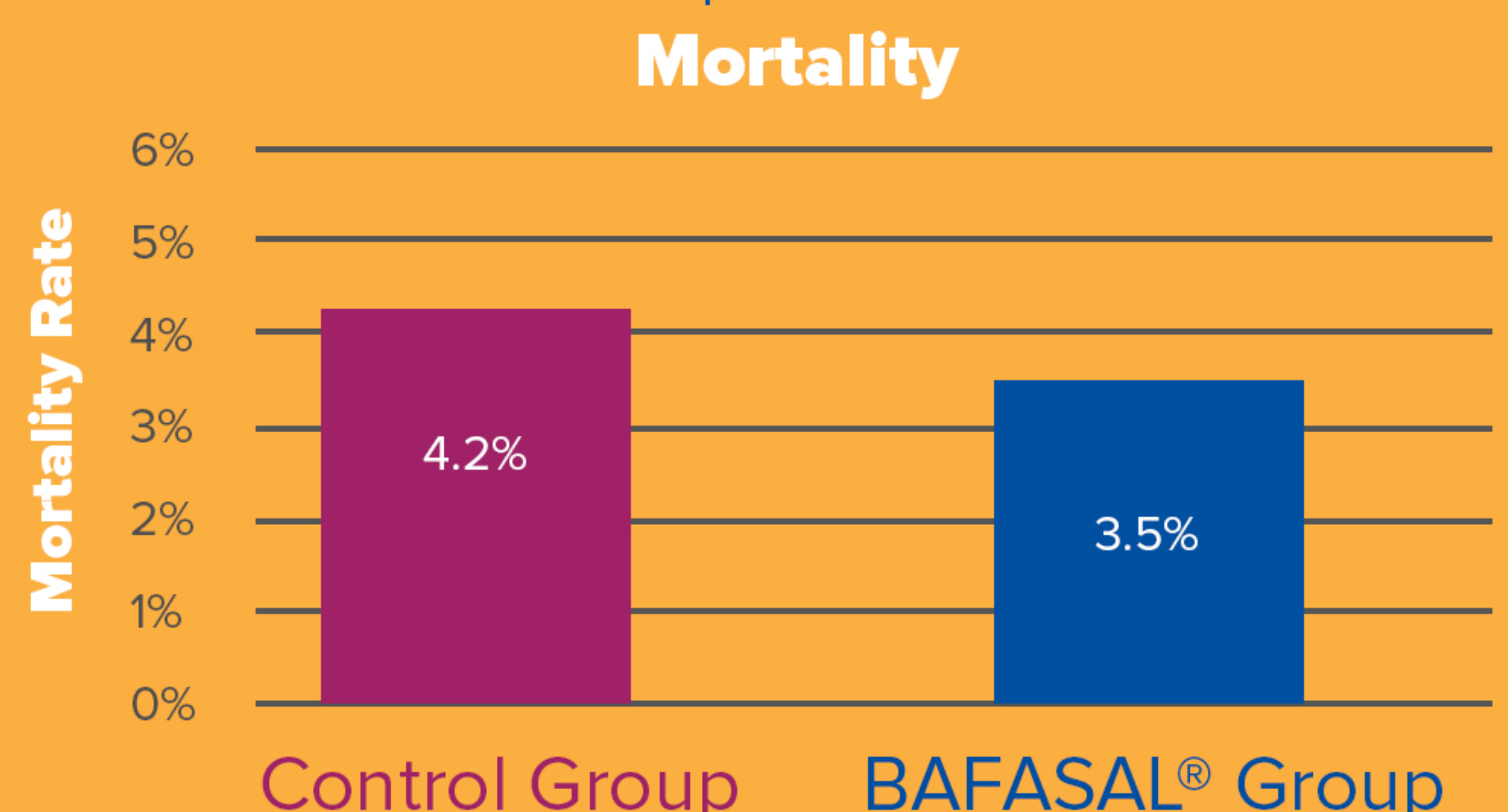
BAFASAL® improves FCR

4.3% better FCR in the BAFASAL® Group
vs. in the Control Group



BAFASAL® helps reduce Mortality

16.7% lower mortality in the BAFASAL® Group
vs. in the Control Group



Results may vary from farm to farm and depend on the environmental conditions, production parameters including farm and animal health management.



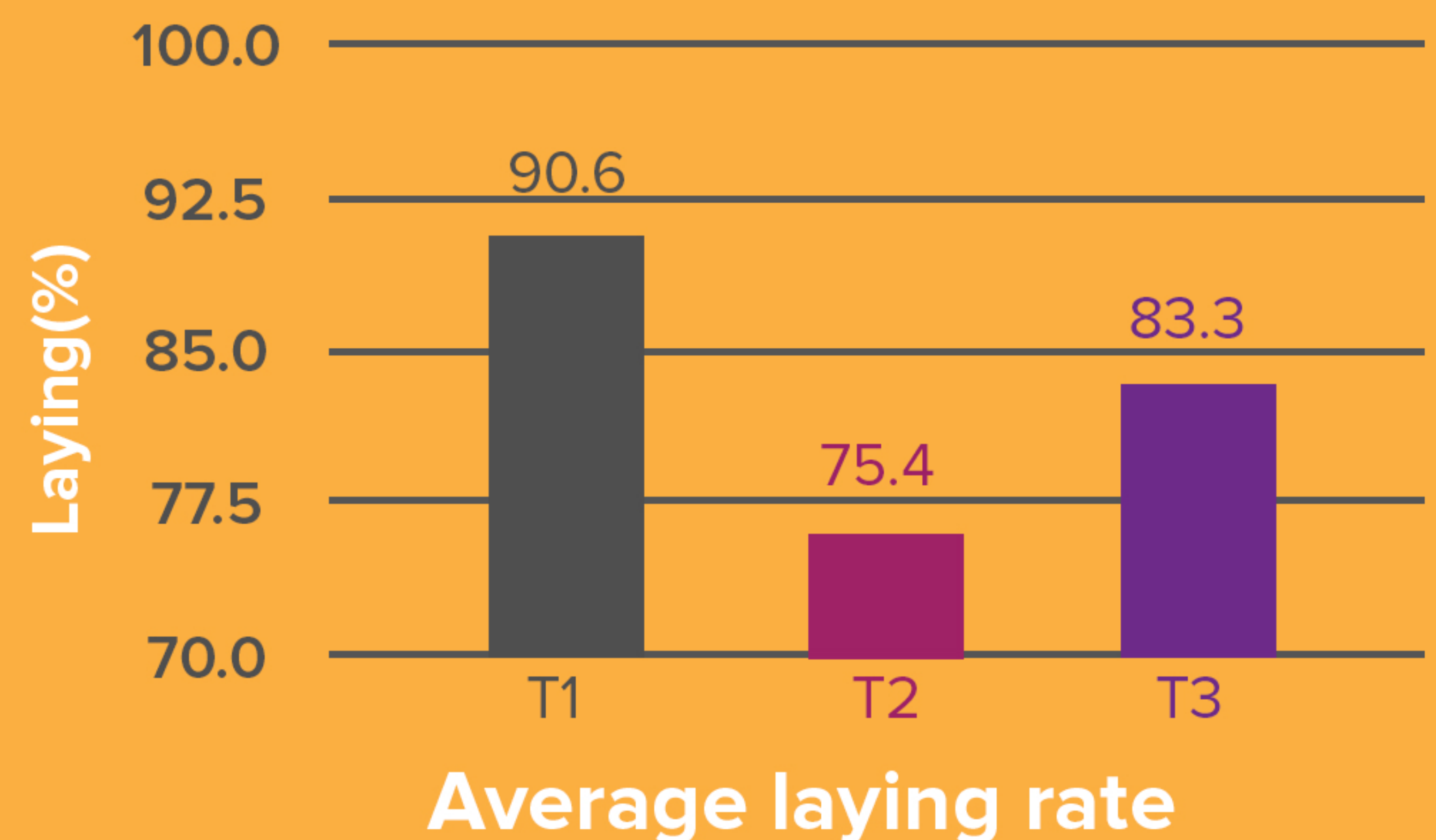
BAFASAL+G®

Protection against *Salmonella Enteritidis*, *Salmonella Typhimurium*, *Salmonella Gallinarum*

Key Benefits

- BAFASAL+G® is a bacteriophage cocktail preventing *Salmonella Gallinarum*, *Salmonella Enteritidis* and *Salmonella Typhimurium* infection in poultry.
- BAFASAL+G® increases egg laying in commercial egg layers and egg laying and hatching in breeders.
- BAFASAL+G® is effective on multiple *Salmonella* strains, including those resistant to antibiotics.
- BAFASAL+G® helps to prevent mortality caused by *Salmonella Gallinarum* in layers, breeders and broilers.
- BAFASAL+G® improves FCR for enhanced production performance.
- BAFASAL+G® has no negative impact on the animals' microbiome.
- BAFASAL+G® is safe for animals and humans.
- Natural, non-GMO and biodegradable.
- Does not cause bacterial resistance towards antibiotics.

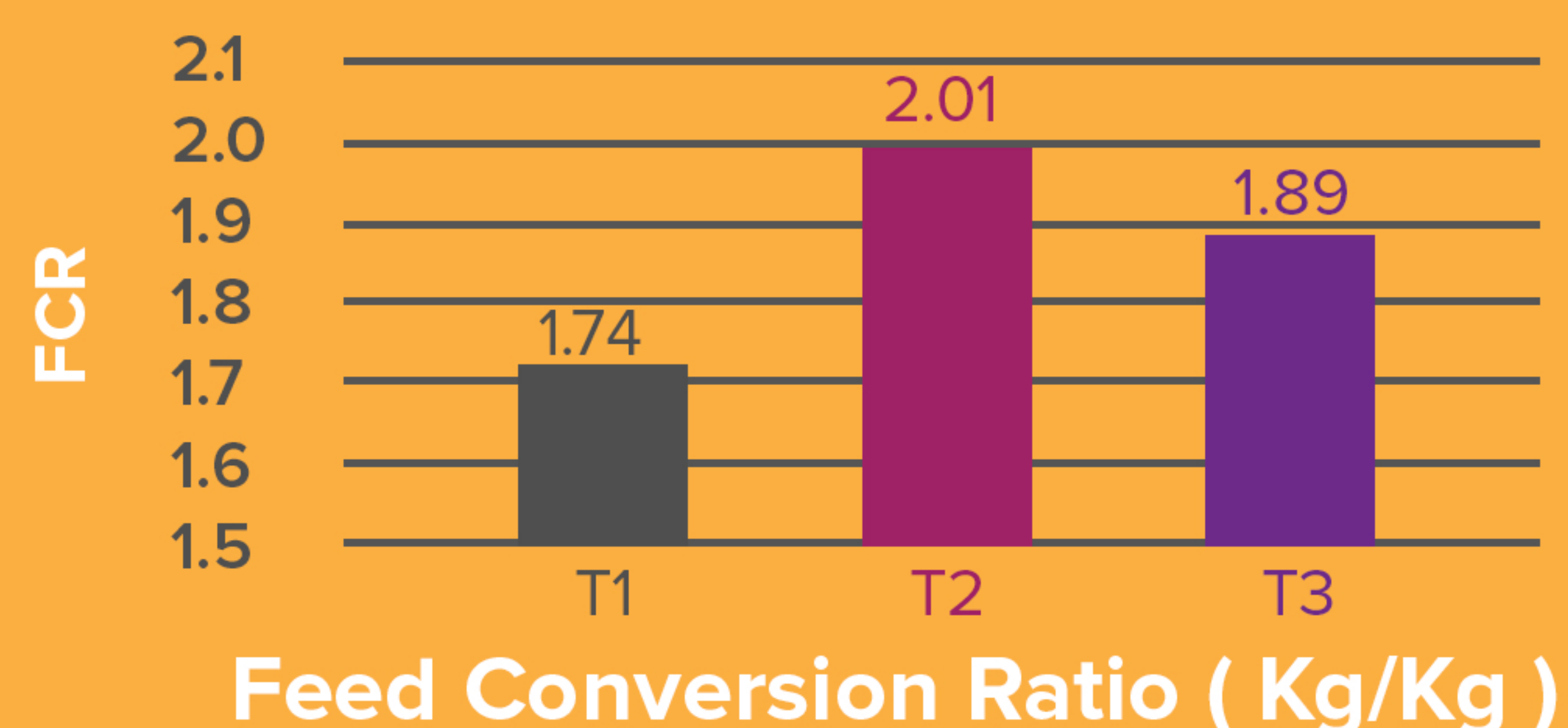
BAFASAL + G® improves egg laying rate



T1: Negative control group: no *Salmonella* infection
T2: Positive control group: *Salmonella* infection
T3: *Salmonella* infection, BAFASAL+G®
Salmonella infected birds receiving BAFASAL+G® (T3) performed better than infected birds not receiving the BAFASAL+G® (T2). That was confirmed by higher laying rate.

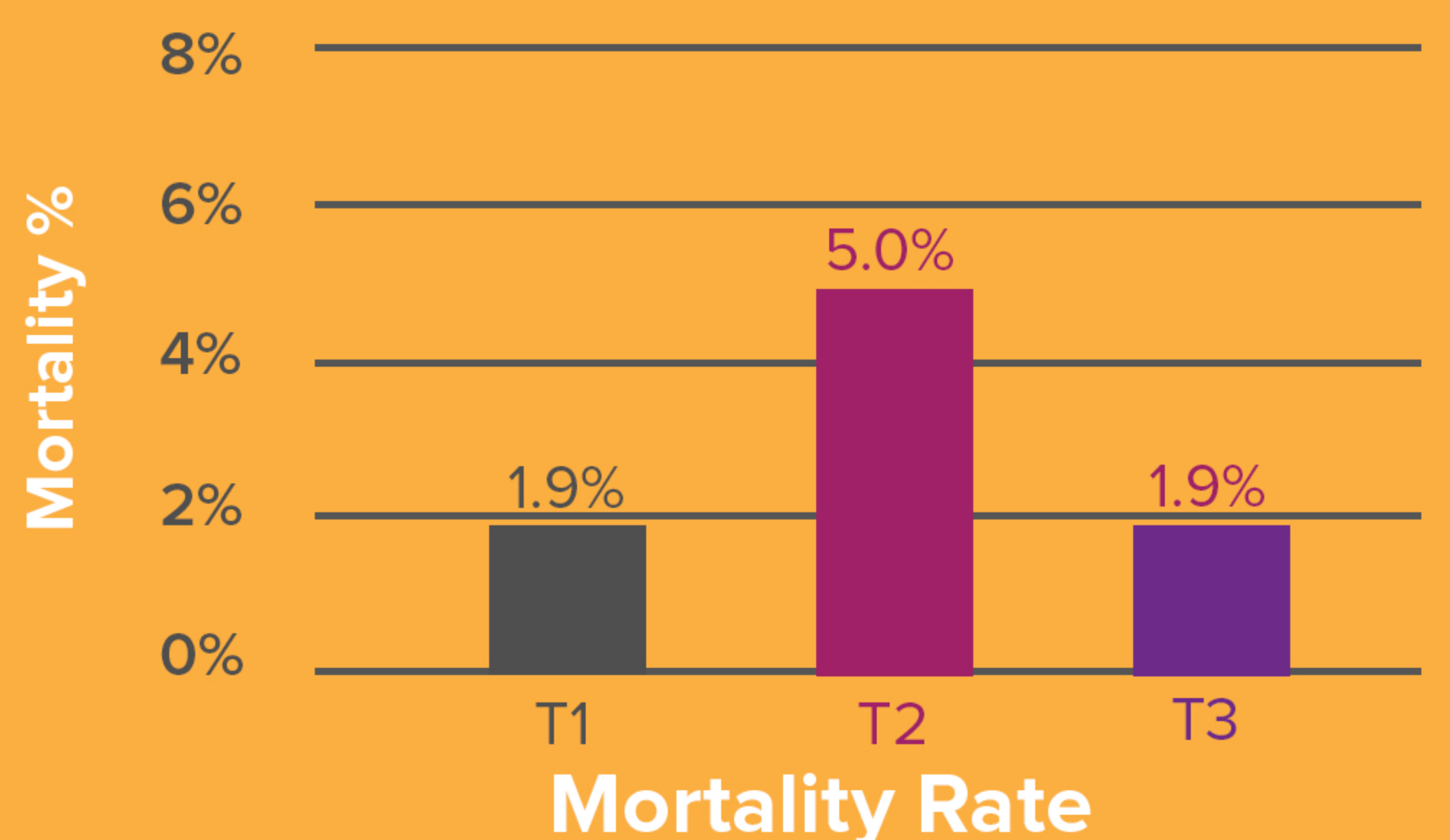
BAFASAL+G® improves FCR

6% better FCR in the BAFASAL+G® Group
vs. in the Control T2 Group



BAFASAL+G® helps reduce Mortality

62% lower mortality in the BAFASAL+G® T3 Group
vs. in the Control T2 Group



T1: Negative control group: no *Salmonella* infection
T2: Positive control group: *Salmonella* infection, no BAFASAL+G®
T3: *Salmonella* infection, BAFASAL+G®
Salmonella infected birds receiving BAFASAL+G® (T3) performed better than infected birds not receiving the BAFASAL+G® (T2). That was confirmed by lower FCR and significantly lower mortality rate. The results of BAFASAL+G® group were comparable with those of non-infected control group (T1).
Results may vary from farm to farm and depend on the environmental conditions, production parameters including farm and animal health management.



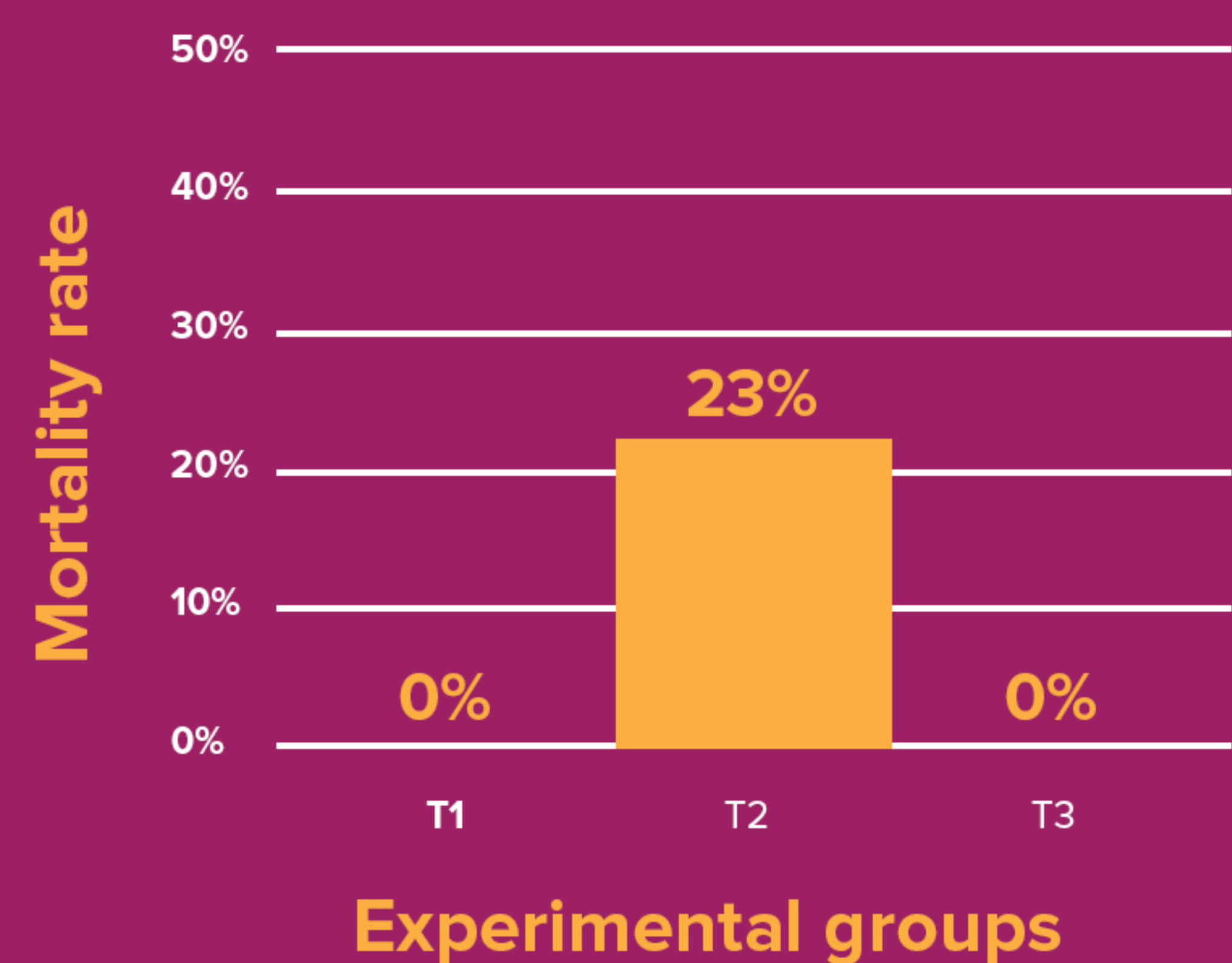
BAFADOR®

Bacteriophage based feed additive cocktail for control of *Pseudomonas sp.* & *Aeromonas sp.* for fish farming.

Key Benefits

- Highly effective against multiple strains of *Aeromonas sp.* and *Pseudomonas sp.* bacteria, including antibiotic-resistant strains.
- Helps to control & prevent mortality.
- Improves fish gut health and promotes higher production performance.
- Can be used on different fish species.
- Safe for fish & non-toxic.
- Natural, non-GMO, and biodegradable.
- Convenient application via mixing with commercial feed or immersion in water bath.
- No withdrawal period.
- BAFADOR® does not cause bacterial resistance towards antibiotics.

Reduced Mortality in European Carp

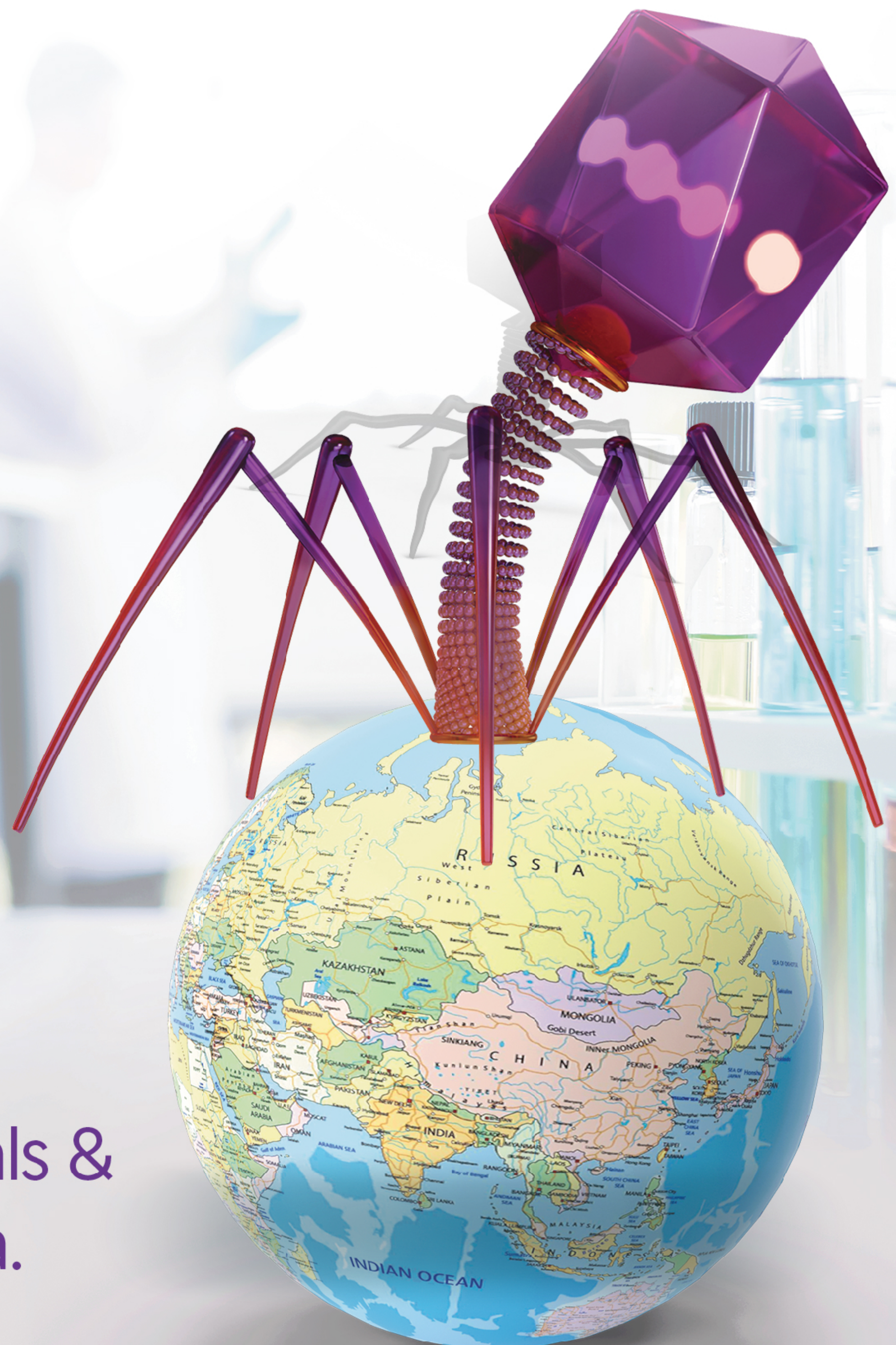


BAFADOR® administered in feed (T3) was effective in preventing *A. hydrophila* and *P. fluorescens* infections, proven by lower mortality rates comparing to positive control group (T2). The rate of the treatment group was the same as the negative control group (T1)

About Phages

Bacteriophages are the smallest, oldest & most numerous organisms on the planet.

- Phages are natural particles which protect animals and humans from bacteria
- Phages eliminate selected bacteria
- Phages are everywhere, i.e., on human hands and skin, in the animal gut and in the soil
- Phages are completely safe – they do not affect human or animal cells, they act only against their target bacterial cells
- Phages do not create antibiotic resistance
- Phages do not damage the beneficial microbiome balance



Phages protect animals & humans from bacteria.

Contacts and Partners

We partner with top industry players.

Proteon Pharmaceuticals works with partners to advance the science and sales of bacteriophage cocktails in the animal health industry.

PARTNERS



HEADQUARTERS

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Website: www.proteonpharma.com