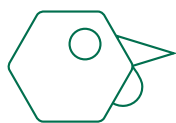


BioSol

POULTRY



THE PROTECTOR FOR DAY OLD CHICKS



BioSol

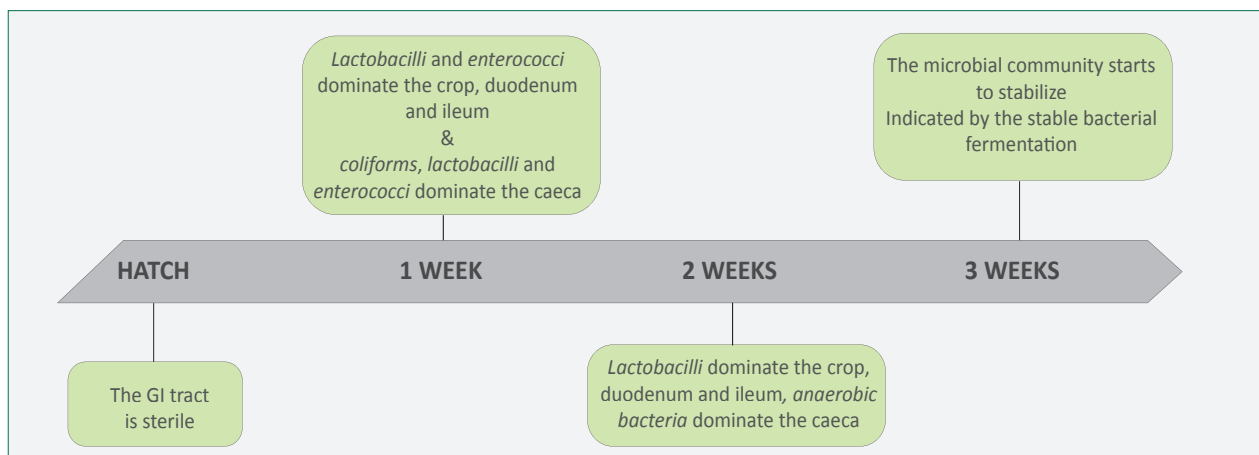
PROBIOTIC TO ESTABLISH A HEALTHY INTESTINAL FLORA

What is BioSol?

BioSol is a complementary feeding stuff to support a quick development of the intestinal flora right from the start. The time after hatching is highly significant for development and growth of the chicks and therefore has a crucial impact on lifetime performance. The two active substances in **BioSol**, *Enterococcus faecium* and betaine, are proven to effectively support chicks during this period.

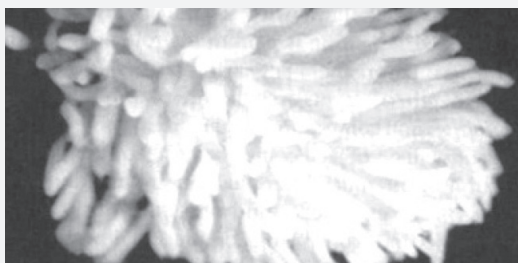
The benefits of BioSol

- + Fast inoculation of the intestine with beneficial probiotics
- + Stimulation of the immune system
- + Lower susceptibility for pathogens
- + Decreased mortality
- + Less antibiotic treatments
- + Improved uniformity of the flock

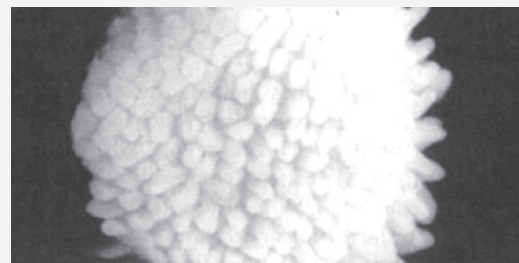


Development of intestinal bacteria community in chicks.

Presence of pathogens causes a reduction of absorption surface and therefore nutrient absorption capacity in the intestinal tract.



Normal Villus



Abnormal Villus (diarrhea)



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Mode of action *Enterococcus faecium*

Enterococcus faecium works as stabilizer of the gut microflora, by its high metabolic activity.

Enterococcus faecium in **BioSol** has a high efficiency in colonizing the epithelia cells.

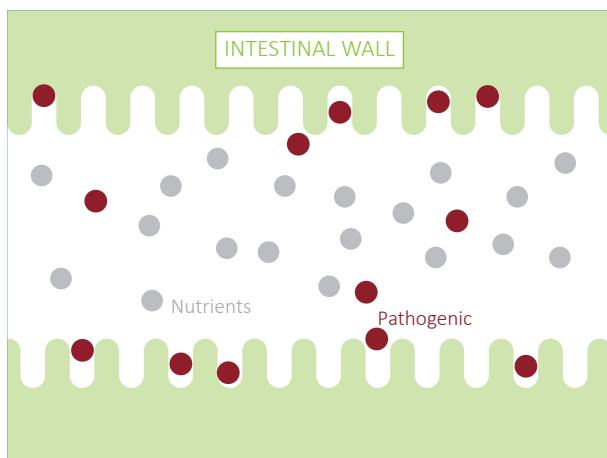
- + Competition with pathogens for nutrients
- + Inhibition of the pathogenic germs by metabolites

A stable gut microflora...

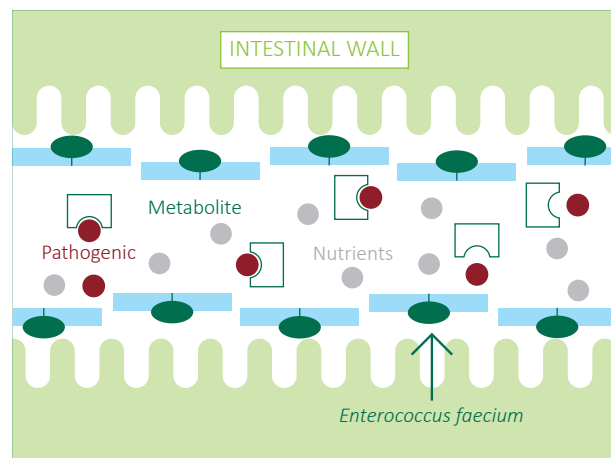
...is essential for the health status, optimal development and growth of the chicks

...protects the body against pathogenic microorganisms

...improves the function of the immune system through a healthy gut



Colonization and competitive exclusion with *E. faecium*.



The first days in chick's life are crucial.



Keep your chicks healthy right from the start.



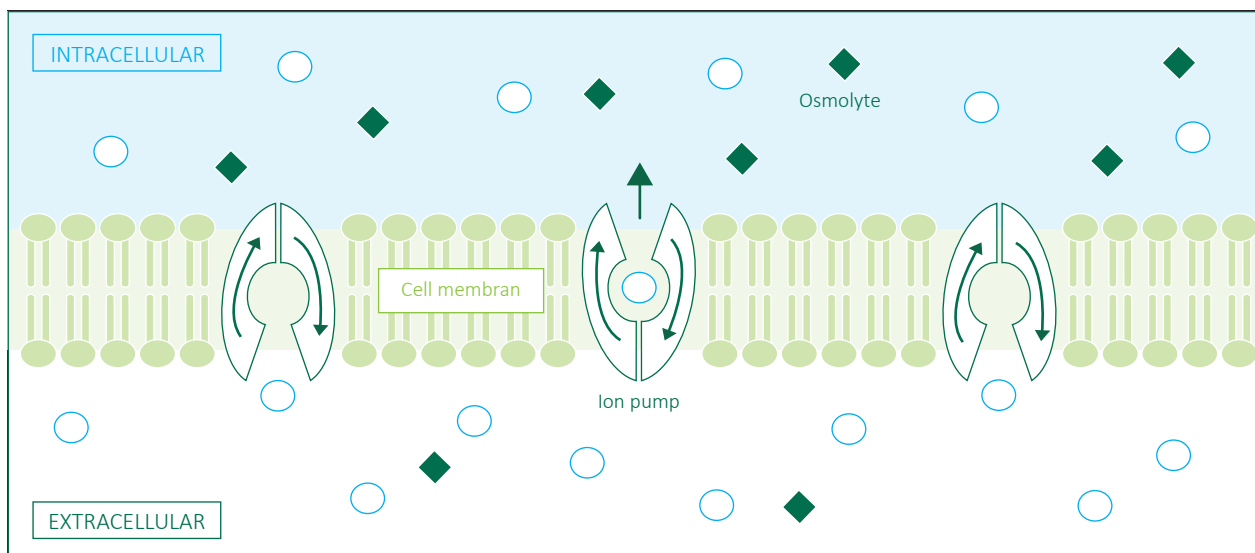
PROBIOTIC TO ESTABLISH A HEALTHY INTESTINAL FLORA

The osmolyte function

The osmolyte betaine controls the water balance of gut mucosa cells due to its osmoregulative effects. In case of hyperosmotic stress (e.g. diarrhea) water diffuses out of the cells and the concentration of inorganic salts increases. In consequence the activity of cellular enzymes is inhibited which can cause a dying off of mucosa cells.

Due to the osmolyte in **BioSol** the osmotic value inside the cells is increased, which keeps the water inside the cell.

- + Mucosa cells are less stressed
- + Function of the gut is stabilized



Osmotic effect of betaine.



- Reduced water and feed intake resulting in dehydration and decreased immune defense
- Feed shift from yolk to cereal based diets
- Diarrhea induced by *E.coli*
- Instable intestinal flora

Crucial topics in bird's life.



Healthy chicks with **BioSol**.



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Application guide of BioSol



Via water

- + First application: The chicks should receive **BioSol** from the first drop of water intake
- + Following applications: Apply in the morning, when the birds are thirsty



Via spray

- + Mix with fresh, cool distilled water
- + Use big drop size



Hatched baby chicks.



Sufficient water supply is essential for chicks.



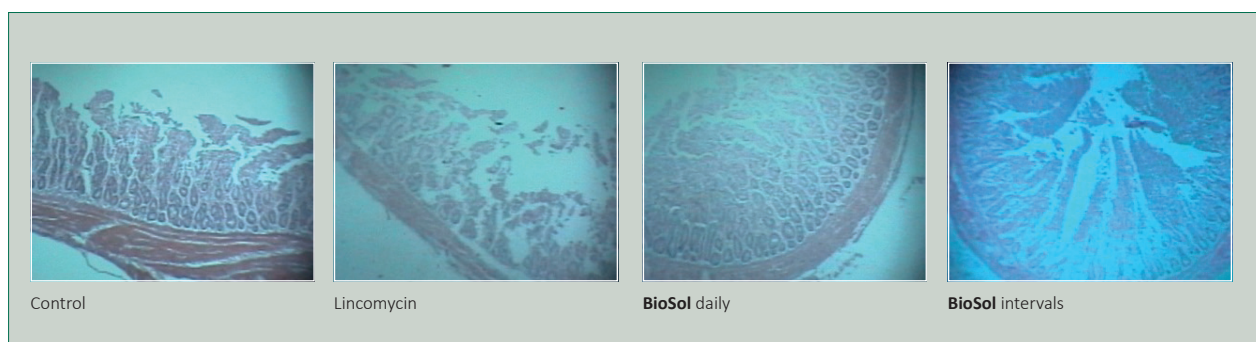
PROBIOTIC TO ESTABLISH A HEALTHY INTESTINAL FLORA

Proven efficacy in broilers

BioSol was tested in a field trial realized with the Poultry Production Dep. Faculty of Agric., Ain-Shams Univ., Cairo, Egypt and the Biology and Environ. Dep. Fac. of House Economic, Al-Azhar University, Tanta, Egypt. The target of the trial was to determine the effects of **BioSol** on the intestinal health versus control and Lincomycin.

The results show a significant increase of ileal villi length in the group treated with **BioSol**. In addition **BioSol** increased the counts of *Lactobacilli* and *Enterococci* and decreased the content of *E.coli*.

It can be concluded that the use of **BioSol** is inhibiting pathogenic bacteria and stimulating probiotic bacteria efficacy and improving the gut morphology at the same time.



Ileum of control and treated chicks, showing crypts and ileal villi.

| Items (CFU 10 ³ /g) | Control | Lincomycin | BioSol daily | BioSol intervals |
|--------------------------------|-------------------------|-------------------------|-------------------------|---------------------------|
| <i>E.coli</i> | 61.2 ^a ± 2.5 | 28.3 ^b ± 2.5 | 16.5 ^c ± 1.2 | 14.2 ^c ± 1.4 |
| <i>Lactobacilli</i> | 4.4 ^c ± 0.86 | 25.3 ^b ± 3.2 | 60.7 ^a ± 4.7 | 59.2 ^a ± 4.2 |
| <i>Enterococcus</i> | 2.2 ^c ± 0.34 | 7.5 ^c ± 0.67 | 13.3 ^b ± 1.2 | 16.3 ^{ab} ± 2.19 |
| Total aerobic | 23.0 ^a ± 3.6 | 6.5 ^c ± 0.73 | 10.2 ^c ± 2.1 | 5.47 ^c ± 0.62 |
| <i>Salmonella</i> | not detected | not detected | not detected | not detected |

BioSol increases the counts of *Lactobacilli* and *Enterococcus* and decreases the counts of *E.coli*.

Effect on bacteria.

| Items (CFU 10 ³ /g) | Control | Lincomycin | BioSol daily | BioSol intervals |
|--------------------------------|-------------------------|---------------------------|--------------------------|---------------------------|
| Villi height (µm) | 673 ^b ± 19 | 596 ^c ± 15 | 859 ^a ± 16 | 920 ^a ± 17 |
| Spleen weight (g) | 1.64 ^b ± 0.2 | 1.92 ^{ab} ± 0.29 | 1.79 ^b ± 0.36 | 2.03 ^{ab} ± 0.22 |
| Bursa weight (g) | 1.71 ± 0.33 | 2.39 ± 0.93 | 2.39 ± 0.93 | 2.19 ^{ab} ± 0.25 |

BioSol groups show a significantly higher villi length.

Effect on villi height, spleen and bursa weight.



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Improved performance in broilers

In March 2014, a field trial was conducted with 12,000 Hubbard broilers in Jordan.

The birds got **BioSol** in recommended dosage from day 3 to 5 via drinking water.

Starting with the same DOC weight, birds in the **BioSol** group gained 33 g more weight on average.

In addition, the **BioSol** group consumed less feed to gain weight.

The nutritional utilization was improved (Figure 1) and the **BioSol** group had around 0.5 % lower mortality rate (Figure 2).

Intestinal colonization with *Enterococcus faecium* in combination with the osmotic stabilization right from the start results in improved daily weight gain and health status throughout growing period.

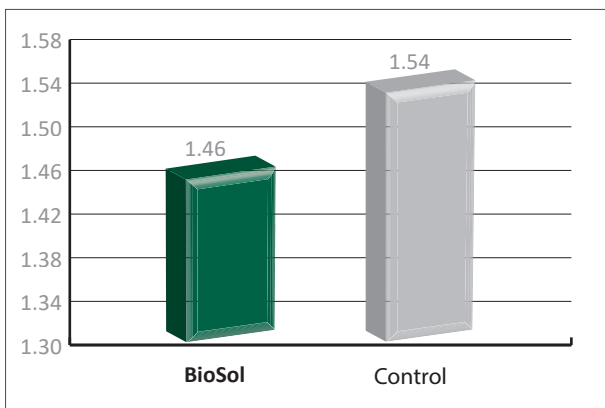


Figure 1: Feed conversion rate on day 34.

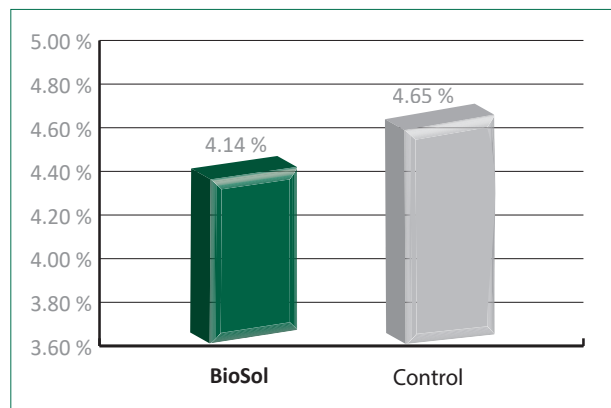


Figure 2: Relative mortality at slaughter.



- + Less mortality during the first 10 days
- + Higher performance
- + Higher count of positive microorganisms in the intestine
- + Less numbers of pathogen
- + Higher absorption surface
- + Improved immune and health status



With you all the way!



Biochem Zusatzstoffe Handels- und Produktionsgesellschaft mbH

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