

OPTIMAL SYNERGETIC EFFECT

Champ-Green - A unique combination of carefully chosen bio-active fat components and essential herbal oils ensuring optimal feed intake and support to the animal throughout the entire gastrointestinal tract.

Antibiotic resistance is one of the world's most pressing public health problems. The un-careful use of antibiotics in livestock has drastically increased the rise of antibiotic resistant bacteria in livestock, which in turn can cause antibiotic resistant infections in humans – and these illnesses are difficult to cure.

Unless we take effective action, it will become more and more difficult to treat the world's most serious diseases.

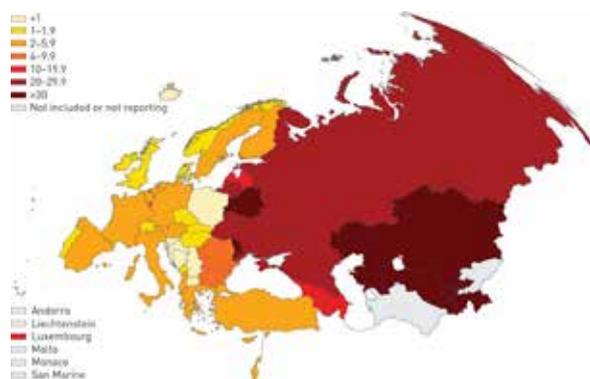
Previous common practice was to use antibiotics as a preventive measure to improve productivity of livestock. Luckily, alternatives for antibiotics are readily available and have been proven to improve health and thereby production of livestock. By replacing antibiotics as preventive measures with sustainable alternatives we can drastically reduce the usage of antibiotics. In turn this expected to reduce risk of further resistance development (Figure 1).

Support the animals – Prevent pathogenic growth

Unfortunately, current available antibiotic replacers are no one-to-one replacer solution for antibiotics but have to work in a more broad range – enhancing the natural weapons of birds against pathogens. The key to an antibiotic free environment lies in a healthy gut and strong immune system. High performance requires a good balance of the micro flora in the gut.

Most 'bad' bacteria are normal inhabitants of the intestine of the animal – with low number they are not causing (sub)clinical problems. Therefore it is neither

Figure 1: Percentage of notified tuberculosis cases with multidrug resistance. Source: World Health Organization European Region, 2011



possible nor healthy to completely eradicate them. A healthy situation is an intestine with high numbers of ‘good bacteria’ and low numbers of ‘bad’ bacteria. To keep a healthy balance it is important to maintain healthy gut conditions such as the right pH environment, the right temperature and the availability of nutrients for the healthy micro flora.

Around 70 percent of all immune cells in the body are located in the gut associated lymphoid tissue. This to give an insight in how the gut is the essential organ for the birds health – it is the most essential barrier against pathogens and a selective barrier for digested feed. The intestine is considered the premium site for immune activation and immune development in broilers as well as layers. The micro flora forms a complex ecosystem that influences the immune system, feed efficiency and health of the bird in general. It is therefore essential for antibiotic replacers to enhance a healthy and balanced gut environment and micro flora population to induce a high performance.

Improving animal performance and health

Champ-Green is a mixture of Medium Chain Fatty Acids (MCFA’s) balanced blend of essential herbal oils and vitamins and minerals.

Active components include linalool, thymol, eugenol and carvacol which have proven antibacterial and fungicidal properties. Furthermore, they stimulate production and secretion of digestive enzymes, which results in a higher digestibility of the feed and absorbance in the gut.

The MCFA’s present are easily digestible and ensures that energy is available in the critical stages of development and under stressful conditions. In addition, they are known to have strong antimicrobial properties. The hydrophilic/lipophilic balance

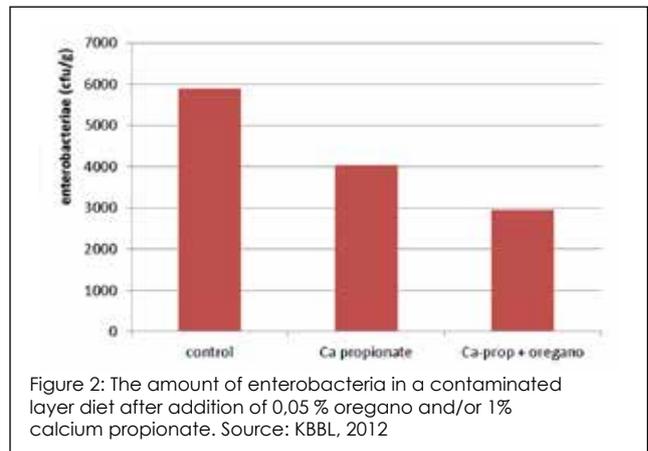


Figure 2: The amount of enterobacteria in a contaminated layer diet after addition of 0,05 % oregano and/or 1% calcium propionate. Source: KBBL, 2012

(a measure of the attraction to water or repellece to water) of MCFA’s is similar to that of the cell membrane of pathogens. The presence of MCFA’s in the bacteria cell will acidify the normally near-neutral intracellular environment. The acid intracellular environment will inhibit DNA duplication and thereby bacterial growth, eventually leading to death of the bacteria. MCFA’s therefore provide an effective pathogen barrier resulting in growth inhibition and killing of pathogens, reduced disease persistence and thereby promoting a beneficial microbial ecosystem. As an easy digestible source of energy, and with a decreased infection pressure, MCFA’s improve the intestinal health and thereby the digestive capacity, which results in a higher feed-efficiency.

The synergistic combination of MCFA’s and essential herbal oils together disturb the coordinated behaviour of bacterial pathogens – preventing explosive colonisation of pathogenic cultures in the gut. Champ Green can increase intestinal health,



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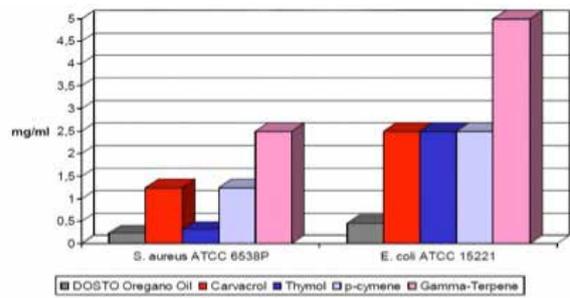


Figure 3: The antimicrobial effect of different essential herbal oils against the gram-positive bacterium *Staphylococcus aureus* and the gram negative bacterium *Escherichia coli*. Thymol and oregano oil are most effective against *S. aureus*, while P-Cymene and Carvacrol are most effective against *E. coli*. Source: MIC, Cristani et al., University of Messina, 2007.

Table 1: Summary of results of antimicrobial activity out of different in vitro/ in vivo studies

CHAMP GREEN	MCFA'S	OREGANO EXTRACTS
Salmonella spp.	↓ ↓	↓
E.Coli	↓ /0	↓ ↓
Clostridium perfringens	↓	↓ ↓

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enhance reparation of gut wall lesions and thereby it improves the immune system. The synergetic effect of stimulating gut health and immune system on one hand, and killing pathogens on the other hand, creates a healthy balance in the gastrointestinal tract.

Effects and functions

Research has shown the synergetic effect of the combined essential oils in Champ Green; combined essential oils have greater antibacterial effect than individual essential oils alone according to various in vitro studies (Figure 2 and 3).

The essential oils in Champ-Green have positive influence on the micro flora in the gastrointestinal tract by supporting the beneficiary bacteria. Also, the essential oils have a positive effect on animal-specific enzyme production and therefore improves nutrient digestibility as well as stimulate feed intake.

In vivo studies have shown that gut morphology is further improved by the MCFA's; the bioactive fat components present in the product have antioxidant effect and thus help protect the living cells (Table 1).

The key to an antibiotic-free environment is a healthy gut and strong immune system. Studies have shown both the individual, as well as their synergetic effects of the components of Champ Green in improving the immune system and supporting the gastrointestinal tract. Champ Green enhances the natural weapons of poultry against pathogens. Thereby Champ Green provides an accurate and broad response that is required to achieve an antibiotic-free animal production.

Conclusion

Our product leads to improved animal performance, lower mortality and fewer antibiotics being needed. It has antibacterial and fungicidal properties, a broad antimicrobial effect, protection of living cells as well as being aromatic and appetising. It improved gut morphology, animal-specific enzyme production and nutrient digestibility. Remember... it is always better to prevent than to cure!