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Probiotics in feed for companion animals

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Probiotics are beneficial microorganisms that can be consumed through food or as feed additives. They help balance intestinal microflora, boost immunity, and promote healthy growth. This article explores the current understanding of how probiotics enhance animal health. Bruker's MALDI Biotyper® instrument can rapidly identify both animal pathogens and probiotic organisms, providing results within minutes from colony material, while the IR Biotyper® can help with strain discrimination, helping to further develop probiotics for animal health.

As companion animals, dogs and cats are increasingly favored by pet owners. Their health has garnered widespread attention, especially with the continuous improvements in living standards for both humans and animals. Antibiotics are commonly used to treat pet diseases, significantly improving animal wellbeing. However, antibiotics not only cure bacterial infections, but also negatively impact the normal gut flora with varying repercussions on the animal's health. In addition, the use of antibiotics is currently under critical review, and alternatives are highly encouraged, especially given the global rise of antimicrobial-resistant (AMR) bacteria.

A recent review highlights several successful applications of probiotics to improve companion health. Just to mention two examples, dogs on diets supplemented with the canine-derived probiotic *Bifidobacterium animalis* AHC7 experienced a significantly faster resolution of acute diarrhea compared to those receiving a placebo. Administering *Lactobacillus rhamnosus* MP01 and *L. plantarum* MP02 strains isolated from canine milk, significantly increased the presence of *Lactobacillus* and *Faecalibacterium* in feces, preventing gastrointestinal infection.[1]

Furthermore, probiotics normalize intestinal conditions by altering the local acidity of the digestive tract and releasing short-chain fatty acids. They help inhibit the growth of pathogens like *Salmonella* spp. by competing for the same nutrients and resources. Boosting the population of beneficial bacteria limits the food available for pathogenic bacteria, reducing their numbers to levels that dogs can better tolerate.[2]

A recent trend in companion health is "Proactive Care", suggesting the administration of probiotics several days before stressful events like boarding or moving. Incorporating probiotics into a dog's daily health care routine can provide long-term benefits, leading to a happier, healthier life. Probiotics enhance the balance of intestinal microflora, promoting smooth digestion and better nutrient absorption.[2]

Let's move on to our feline friends, and here as a matter of fact, obesity in cats is a serious issue, with approximately 60% of cats being overweight or obese. *L. plantarum* L11 significantly reduces blood triglyceride levels and increases the abundance of *Bifidobacteria*. However, studies suggest that probiotics alone are not sufficient to combat cat obesity; adding fiber to the diet to increase satiety and reducing protein and fat content is also necessary. Further research on probiotics in the context of feline obesity is required.[3]

Several microbes are associated with dermatitis, including *S. aureus* and *Malassezia* yeasts. The complex relationships between microbes within the skin microbiome include various species. *Malassezia* yeasts form a unique cluster of lipophilic fungi living almost exclusively on the skin and mucosal sites of warm-blooded vertebrates. Overgrowth of commensal *Malassezia* yeasts can occur due to alterations in the skin's surface microclimate, leading to an inflammatory skin disease.[4] MALDI-TOF MS has been utilized for the identification of *Malassezia* yeasts, and Fourier Transform Infrared Spectroscopy (FT-IR) has been successfully applied to discriminate *Malassezia* yeast isolates starting from colony material the same day, significantly reducing the time-to-result compared to sequencing-based methods. Current studies with probiotics and yeasts are promising. A recent study assessed the impact of *Lactobacillus* and *Lacticaseibacillus* on skin mycobiome-bacteriome modulation, which could be applicable for both humans and pets in the future.[5]

In summary, probiotic applications in animal health present an exciting and highly promising market opportunity, with significant economic potential. It requires rapid, easy and cost-efficient detection technologies to further grow. Here, the MALDI Biotyper offers high precision for confirming pathogens like *Salmonella* and reliably identifying pathogenic or commensal bacteria as well as yeasts, including *Malassezia* yeasts. MALDI-TOF MS allows for better characterization of complex microbial communities on the skin, in the gastrointestinal tract, or various mucosa, such as in the mouth. Starting from colony material after cultivation on agar plates it delivers fast and reliable identification results. The IR Biotyper enables strain comparison based on FT-IR technology starting from colony material for many strains of *Salmonella*, *E. coli*, or *Malassezia* yeasts. Its speed and cost-effectiveness make it particularly valuable for root-cause analysis and comparison of environmental and pathogenic strains, delivering results within three hours and incurring lower operational costs compared to other methods, including sequencing.

References

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