Chicken intestinal microbiota function with a special emphasis on the role of probiotic bacteria

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Abstract

Bacterial colonization of the chicken gut by environmental microbes begins immediately after hatching. Composition of the intestinal microbiota is dependent on the surrounding environment, diet variation, pathological conditions, antibiotic therapy, and others. The genomes of all these intestinal microbes form a microbiome which by far outnumbers the host's genome. As a consequence, the microbiome provides additional metabolic functions to the host, including nutrient utilization and absorption, fermentation of non-digestible dietary fiber, synthesis of some vitamins, biotransformation of bile acids, and the well-being of their chicken host. Microorganisms can also directly interact with the lining of the gastrointestinal tract, which may alter the physiology and immunological status of the bird. Since newly hatched broiler chickens demonstrate delayed commensal colonization and low bacterial diversity, the most effective and harmless method available to control the development and composition of the intestinal microbiota is a competitive exclusion treatment by applying probiotic bacteria. Additionally, recent research has shown that probiotic bacteria have a variety of beneficial effects, including counteraction of dysbiosis, promotion of gut health and homeostasis, enhancement of immune defenses and antagonization of infectious agents.

Key words: chicken intestinal microbiota, probiotics

Introduction

Microbiota is a term defining a set of commensal, autochthonic microorganisms, co-existing with a host without causing any harm (Sekirov et al. 2010). The chicken gastrointestinal tract (GIT) is colonized by a variety of such microorganisms. The number of each microbial group is dictated by the local GIT conditions, such as pH, feed passage rate, composition of nutrients, and oxygen content. Members of the gut microbiota belong to various taxa, including Bacteria, Archaea and Fungi. The GIT is sparsely colonized by viruses, protists and helminths as well; however, because of their abilities to disrupt the microbial balance, most of them are considered pathogens (Permin et al. 2006, Qu et al. 2008, Danzeisen et al. 2011). Interestingly, some bacteriophages, which are commonly found in the GITs of various hosts, including...