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A MIX OF LACTOBACILLUS MODULATES IMMUNE SYSTEM AND AMELIORATES INTESTINAL MORPHOLOGY AND SALMONELLA TYPHIMURIUM COLONIZATION IN HEAT-STRESSED CHICKENS

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The heat stress and *Salmonella* spp. infection are one of the most important issues of poultry industry. The combination of heat stress and *Salmonella* infection decreases performance parameters, causes immunosuppression, intestinal inflammation and increases diseases susceptibility. The use of probiotics could be the alternative to improve the intestinal health in heat stress and *Salmonella* infection situations. In this way, the aim of the current study is to examine the effects of *Lactobacillus salivarius*, *Lactobacillus acidophilus* and *Lactobacillus reuteri* mix on intestinal morphology and *Salmonella* colonization in heat-stressed broiler chickens experimentally infected with *Salmonella* Typhimurium. In addition, the expression of cytokines and macrophage activity were assessed. Heat stress decreased villus:crypt ratio and increased the number of intra-epithelial lymphocytes (IEL). Heat stress also increased *Salmonella* colony formation unit (CFU) in caecum and liver/spleen and modulated the cytokine expression into Th2 profile (IL13 and TGF- β upregulation). In the other hand, the mix of *Lactobacillus* ameliorated intestinal morphology in heat-stressed and *Salmonella*-infected broiler chickens, increasing villus:crypt ratio and decreasing IEL. In addition, the mix of lactobacillus decreased *Salmonella* CFU in caecum and liver/spleen. Lactobacilli mix also upregulated expression of IFN- γ , IL-6, IL-12, IL-17 and IL-18 levels (Th1 profile) and increased macrophage activity in heat-stressed and *Salmonella*-infected broiler chickens. In conclusion, the mix of *Lactobacillus* improves the intestinal morphology and modulates de immune system in chickens, decreasing *Salmonella* susceptibility of broiler chickens submitted to heat stress and *Salmonella* infection. *Lactobacillus* mix reverses the negative effects of heat stress and *Salmonella* Typhimurium infection.