

In vitro fermentation of broiler cecal content: The role of lactobacilli and pH value on the composition of microbiota and end products fermentation

Abstract

AIM:

To assess the probiotic effects of *Lactobacillus agilis* JCM 1048 and *L. salivarius* ssp. *salicinius* JCM 1230 and the pH on the cecal microflora of chicken and metabolic end products.

METHODS AND RESULTS:

An in vitro system, operated with batch bioreactor, was used for this assessment. Selected bacterial species were monitored at two pH values, over 24 h of batch culture incubation. The concentration of short chain fatty acids (SCFA) and lactate in the fermented material was also determined. The addition of *L. agilis* JCM 1048 and *L. salivarius* ssp. *salicinius* JCM 1230 into vessel 2 (Cc + P) increased the total anaerobes, lactobacilli and bifidobacteria after 24 h incubation. Moreover, lactobacilli supplementation decreased the total aerobes and streptococci, but it did not have any effects on coliforms. The supplementation of lactobacilli in vessel 2 (Cc + P) was found to significantly increase the production of lactate, propionate and butyrate. Furthermore, pH did not alter the formation of butyrate, whereas the production of acetate and propionate was significantly decreased at pH = 5.8.

CONCLUSIONS:

L. agilis JCM 1048 and *L. salivarius* ssp. *salicinius* JCM 1230, as probiotic bacteria, have the ability to re-establish proper microbial balance by the formation of lactate as well as propionate, and stimulate butyrate-producing bacteria to produce butyrate in the chicken cecum.

SIGNIFICANCE AND IMPACT OF THE STUDY:

This study was the first to report this under in vitro conditions, highlighting the probiotic roles of the two *Lactobacillus* strains in broiler cecal fermentation at different initial pH. These useful data can be helpful in improving the fermentation process in chicken cecum.