

**TITLE:** INFLUENCE OF STARTER CULTURE ON THE CONTROL OF COLIFORMS AND *ESCHERICHIA COLI* IN ARTISANAL CHEESES

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**ABSTRACT:**

Canastra cheese, produced in the Serra da Canastra region, has a relevant cultural and socioeconomic importance for the state of Minas Gerais. This cheese is made with raw milk and the addition of a natural whey starter, named “pingo”. It is ripened for 22 days, however, there are still some concerns about quality and safety of this raw milk cheese. The aim of this study was to evaluate the influence of “pingo” on coliforms and *E. coli* population during manufacture and ripening of an artisanal cheese produced according to cheesemakers practices of Serra da Canastra. The raw milk was donated by a dairy industry and thermized to reduce the initial count of coliforms and *E. coli*. The natural starter culture “pingo” was obtained from a cheesemaker from Serra da Canastra and inoculated (0.3 %) in thermized milk. The control cheeses were produced without the addition of “pingo”. Counts of coliforms, *E. coli* and lactic acid bacteria (LAB), pH and water activity ( $a_w$ ) were determined during production and cheese ripening. The logistic model was fitted to counts during 24 h of manufacture and the maximum specific growth rate ( $\mu_{max}$ ) was determinate. The Weibull model was adjusted to the data during the 60 days of ripening and the time for the first decimal reduction ( $\delta$ ) was estimate. Both models showed good fit measures,  $R^2$  ranging from 0.954 to 0.998 and RMSE from 0.034 to 0.398. The  $\mu_{max}$  (1/h) for coliforms and *E. coli* was significantly ( $p < 0.05$ ) higher in control ( $0.75 \pm 0.06$ ,  $0.68 \pm 0.03$ , respectively) than in cheeses with “pingo” ( $0.54 \pm 0.03$ ,  $0.52 \pm 0.01$ , respectively), showing that the presence of “pingo” inhibited the growth of those sanitary quality indicators microorganisms. No difference was observed for  $\mu_{max}$  of LAB. During the 60 days of ripening counts declined faster in cheeses with “pingo”. The  $\delta$  value (days) was  $15.6 \pm 1.2$  for coliforms,  $15.6 \pm 0.8$  for *E. coli* and  $14.5 \pm 0.3$  for BAL in cheeses with pingo, while in control cheeses  $\delta$  were significantly ( $p < 0.05$ ) higher ( $35.0 \pm 4.7$  for coliforms,  $30.8 \pm 1.7$  for *E. coli* and  $27.3 \pm 3.1$  for BAL). The pH value on the first day of ripening differed significantly ( $p < 0.05$ ) between cheeses ( $5.6 \pm 0.1$

for cheese with "pingo" and  $6.5 \pm 0.2$  for control). There was no significant difference ( $p > 0.05$ ) in the  $a_w$  reduction profile for cheeses. Our results demonstrated that the cheese produced with "pingo" had higher microbiological quality and could be ripened for a shorter period.

**Keywords:** Canastra cheese; Raw Milk; Thermized Milk; Microbiological Quality

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