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# Decomposition of intestine: contribution of *Escherichia coli* in cadaveric phenomena

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## Abstract

**Background:** The determination of the *postmortem* interval (PMI) can provide valuable information and can be assessed through the study of cadaveric phenomena, which involves changes in the microbial load of deceased tissues. *E. coli* is a commensal microorganism commonly found in the intestine, making it potentially significant. **Objective:** This study aimed to explore whether the death of tissues promotes or suppresses the growth of intestinal bacteria. It also examined whether environmental factors, such as heat and dryness, can significantly influence microbial proliferation and lead to noticeable tissue changes. The findings are expected to offer deeper insights into the relationship between cadaveric decomposition and (necro)microbial activity. **Methods:** For pre-inoculum preparation, *E. coli* was cultured on LBA and incubated for 24 h at 37°C. For the inoculum, the cells were inoculated in LB broth and incubated for 18 h at 37°C. After 16 h, the OD of the inoculum was adjusted to $OD_{600}$ = 1, corresponding to $10E^8$-$10E^9$ cells/mL. Fresh pig intestine was used. The procedure was conducted in an *in vitro* simulation, at 37°C and 5% relative humidity. The inoculum was placed under conditions mimicking a hot and dry environment using an incubator. Intestinal pieces were placed in 6-well plates with RPMI-1640 medium, allowing bacterial growth. For each designed time point (0, 5, 24, 48 and 120h), 20µL was pipetted, and dilutions were made (from -1 to -8) in a 96-well plate previously filled with 180µL of PBS. The plates were then inoculated for CFU counting by pipetting 10µL onto LBA solid agar plates for the -6, -7 and -8 dilutions. **Results:** Results were analyzed by counting CFU, and the plates were photographed. In the *E. coli* trial, proliferation was observed to be so extensive across all evaluated time points that precise quantification could not be achieved. To minimize the risk of reporting inaccurate data and drawing uncertain conclusions, it was conservatively concluded that *E. coli* continued to replicate beyond the 120h mark. **Conclusions:** *E. coli* may prove useful in estimating longer PMI; however, an increased number of dilutions will be required to achieve accurate and reliable quantification. Further in-depth and large-scale studies will be necessary to draw definitive conclusions.

**Keywords:** *E. coli*; forensic; PMI

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