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Skin & intestine decomposition: *Candida albicans and E. coli* contribution to cadaveric phenomena

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Abstract

Background: The PMI determination provides valuable insights through the study of cadaveric phenomena and variations in the microbial load of decomposing tissues [1]. Microorganisms such as the fungus *Candida albicans* and the bacteria *Escherichia coli* are natural constituents of the human microbiome and can have impact on the cadaverization process. As decomposition progresses, the necromicrobiome changes, and understanding how these microbial populations evolve under different environmental conditions is important for forensic investigations [2-3]. **Objective:** This study aims to determine whether, fungal growth (*C. albicans*) on the skin tissue and bacterial proliferation (*E. coli*) in the intestine are enhanced or inhibited after death. It further investigates how environmental factors, such as heat and dryness, can influence microbial proliferation and tissue alterations. **Methods:** Cultures of *C. albicans* and *E. coli* were prepared using selective media (SDA and LBA respectively) and incubated as 37°C. Inocula were standardised to concentrations of ~1x10^8 to 10^9 cells/mL. Experimental conditions include controlled hot/dry for both and cold/humid specifically for skin. Pig skin (1cm^2) and intestinal pieces were placed in 6-well plates with RPMI-1640 medium to support microbial growth. The development was monitored and quantified through CFUs and photography at 0, 3, 24, 48 and 120 hours [2-3]. **Results:** The CFUs of *C. albicans* increased during the first 48h *postmortem*, before stabilising, suggesting that higher temperatures and humidity levels favour fungal proliferation. In contrast, regarding the *E. coli* trail, the proliferation was so extensive across all the time points that precise quantification could not be achieved, it was concled that replication continued beyond the 120h mark. **Conclusions:** The increase in *C. albicans* skin load up to 48h appears relates to nutrient availability, while subsequent stabilization follows nutrient reduction and the presence of toxic compounds. *E. coli* may prove useful in estimating longer PMI, although increased dilutions are required for accurate quantification. Both microorganisms may serve as tools to predict PMI, though further in-depth studies are necessary.

Keywords: *Candida albicans*; *Escherichia coli*; forensic

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