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Skin decomposition: *Candida albicans* contribution to cadaveric phenomena

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Abstract

Background: In corpses, yeasts grow in the dead skin, and with the help of bacteria and other microorganisms they work together to dissolve the dead into the soil. The fungi of the necromycobiome change as the human body decays. For example, the bloat phase has the greatest diversity of fungi found in the body [1]. There is a need to better understand how microbial populations evolve in different environments following death, particularly considering the implications for forensic investigations, since microorganisms can play a crucial role in determining the *Postmortem* Interval (PMI) [2]. Fungi species, such as Candida albicans, are part of the human microbiome and can influence the cadaverization process. Dependently on the place and yeast load, the presence of *C. albicans* can indicate fungal infection [3]. Studying these microorganisms in human tissues and under controlled conditions, mimicking real-world scenarios, aids in understanding forensic PMI. The growth patterns of *C. albicans*, can shed light on the interplay between cadaveric decomposition and microbial development, thus contributing to the advancement of forensic science. **Objective:** This study aims to determine whether, after death, there is a propensity or inhibition of fungal growth on the skin, which can provide a comprehensive insight into the interactions between cadaveric decomposition and microbial development in different forensic contexts. **Methods:** *C. albicans* was cultured on SDA (Sabouraud Dextrose Agar) and incubated for 24 hours at 37°C. Afterwards, an inoculum of ~1x10^8 cells/mL was prepared and the impact in two different controlled environments, hot/dry (37°C/5% relative humidity) and cold/humid (4°C/60% relative humidity), was assessed. *C. albicans* inoculum was placed in conditions mimicking reality, with 1 cm^2 of pig skin, in 6-well plates with RPMI-1640, allowing growth over 24 hours. Results were analyzed through colony-forming units (CFUs) and photographed to verify tissue structure at 0, 5, 24, 48, and 120 (5 days) hours. **Results:** *C. albicans* CFUs increased in the first 48 hours *postmortem*, followed by a stabilization as expected, it seems that higher temperatures and increased humidity are enhanced microbial growth. **Conclusions:** After 48 hours, the increase of the skin load of *C. albicans* seems to be related to the presence of nutrients in the skin, while the subsequent stabilization/decrease follows the probable tissue nutrients reduction and presence of compounds that are toxic to yeast cells. This scenario shows that the necromycobiome, particularly related to *Candida* may be used as another tool to predict PMI. Nonetheless, further, and deeper studies are still needed.

Keywords: *C. albicans*; cadaveric; skin

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References

1. Money, N.P. Molds, Mushrooms, and Medicines: Our Lifelong Relationship with Fungi, Princeton University Press, (2024).
2. Postmortem Microbiome and Forensics: «Microbial Fingerprinting: Postmortem Microbiome and Forensics». ASM.Org, https://asm.org:443/Articles/2022/June/Microbial-Fingerprinting-Postmortem-Microbiome-and. Accessed March, 31st (2024).
3. Schwarz, P.; Dannaoui, E.; Gehl, A.; Felske-Zech, H.; Birngruber, C.G.; Dettmeyer, R.B.; Verhoff, M.A. Molecular identification of fungi found on decomposed human bodies in forensic autopsy cases. Int J Legal Med (2015) 129, 785-91.