

## Evaluation of Methods for Simultaneous Extraction and Purification of Fungal and Bacterial DNA from Vaginal Swabs

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**Abstract :** Background: The interactions between bacteria and fungi in the human vaginal microbiome are fundamental to the concept of health and disease. The means by which the microbiota and mycobiota interact is still poorly understood and further studies are necessary to properly characterize this complex ecosystem. The aim of this study was to select a DNA extraction method capable of recovering high qualities of fungal and bacterial DNA from a single vaginal swab. Methods: 11 female volunteers ( $\geq 20$  to  $< 55$  years old) self-collected vaginal swabs in triplicates. Three commercial extraction kits: Masterpure Yeast Purification kit (Epicenter), PureLink™ Microbiome DNA Purification kit (Invitrogen), and Quick-DNA™ Fecal/Soil Microbe Miniprep kit (Zymo) were evaluated on the ability to recover fungal and bacterial DNA simultaneously. The extraction kits were compared on the basis of recovery, yield, purity, and the community richness of bacterial (16S rRNA - V3-V4 region) and fungal (ITS1) microbiota composition by Illumina MiSeq amplicon sequencing. Results: Recovery of bacterial DNA was achieved with all three kits while fungal DNA was only consistently recovered with Masterpure Yeast Purification kit (yield and purity). Overall, all kits displayed similar microbiota profiles for the top 20 OTUs; however, Quick-DNA™ Fecal/Soil Microbe Miniprep kit (Zymo) showed more species richness than the other two kits. Conclusion: In the present study, Masterpure Yeast purification kit proved to be a good candidate for purification of high quality fungal and bacterial DNA simultaneously. These findings have potential benefits that could be applied in future vaginal microbiome research. Whilst the use of a single extraction method would lessen the burden of multiple swab sampling, decrease laboratory workload and off-set costs associated with multiple DNA extractions, thoughtful consideration must be taken when selecting an extraction kit depending on the desired downstream application.

**Keywords :** bacterial vaginosis, DNA extraction, microbiota, mycobiota, vagina, vulvovaginal candidiasis, women's health

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