



Clinical study on the influence of regular use of alcohol-based hand rubs on the skin microbiome

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BACKGROUND

In healthcare settings, alcohol-based hand rubs (ABHR) are used extremely frequently, in some cases up to 100 applications per day, making hand disinfection the single most important measure for the prevention of healthcare-associated infections. Sustaining high compliance with hand hygiene is therefore crucial. However, impaired skin health caused by repeated ABHR exposure is a major risk factor for reduced compliance, as skin disorders represent one of the leading causes of absenteeism among healthcare workers. The skin microbiome plays a key role in maintaining skin integrity and resilience. Consequently, this study aimed to investigate the impact of frequent ABHR use on the skin microbiome and its potential implications for skin health and hand hygiene compliance.

METHOD

20 participants were enrolled. They received a liquid ABHR (desmanol pure active ingredient 75 g propan-2-ol/100 g) and were instructed to disinfect their hands at least ten times on weekdays and five times on weekends over 28 days. Samples were taken using the “glove juice method” according to ASTM E2755-22 before the first disinfection, after 3, and 24 hours, on days 14, 28, and 3 days after last disinfection. Quantification of 16S rRNA for determination of the total bacterial count and Gram differentiation was performed using real-time PCR. Illumina V3 chemistry was used for sequencing. To compare the Shannon index between groups and samples, a Kruskal-Wallis H test was calculated with ANOVA ($p \leq 0.05$).

CONCLUSION

Study design suitable demonstrating the effect of ABHR on skin microbiome

Skin microbiome adapts quickly within 2 weeks to use of the product

Subsequently, influence on microbiome was significantly reduced

Tested product demonstrated good microbiological skin tolerance

CONFLICTS OF INTEREST

Do any of the authors have conflicts of interest related to the studies presented in this abstract? Yes

RESULTS

20 participants completed the study, and all planned samples were collected. The molecular biological analyses showed an increase of the diversity until day 14, which then stabilizes. Overall, gram-negative bacteria are in the background (approx. 30%). Diversity decreases until day 28 for all bacteria. This continues after the end of use until day 3. However, the difference is still statistically significant different compared to pre-values. (figures 1, 2, 3).

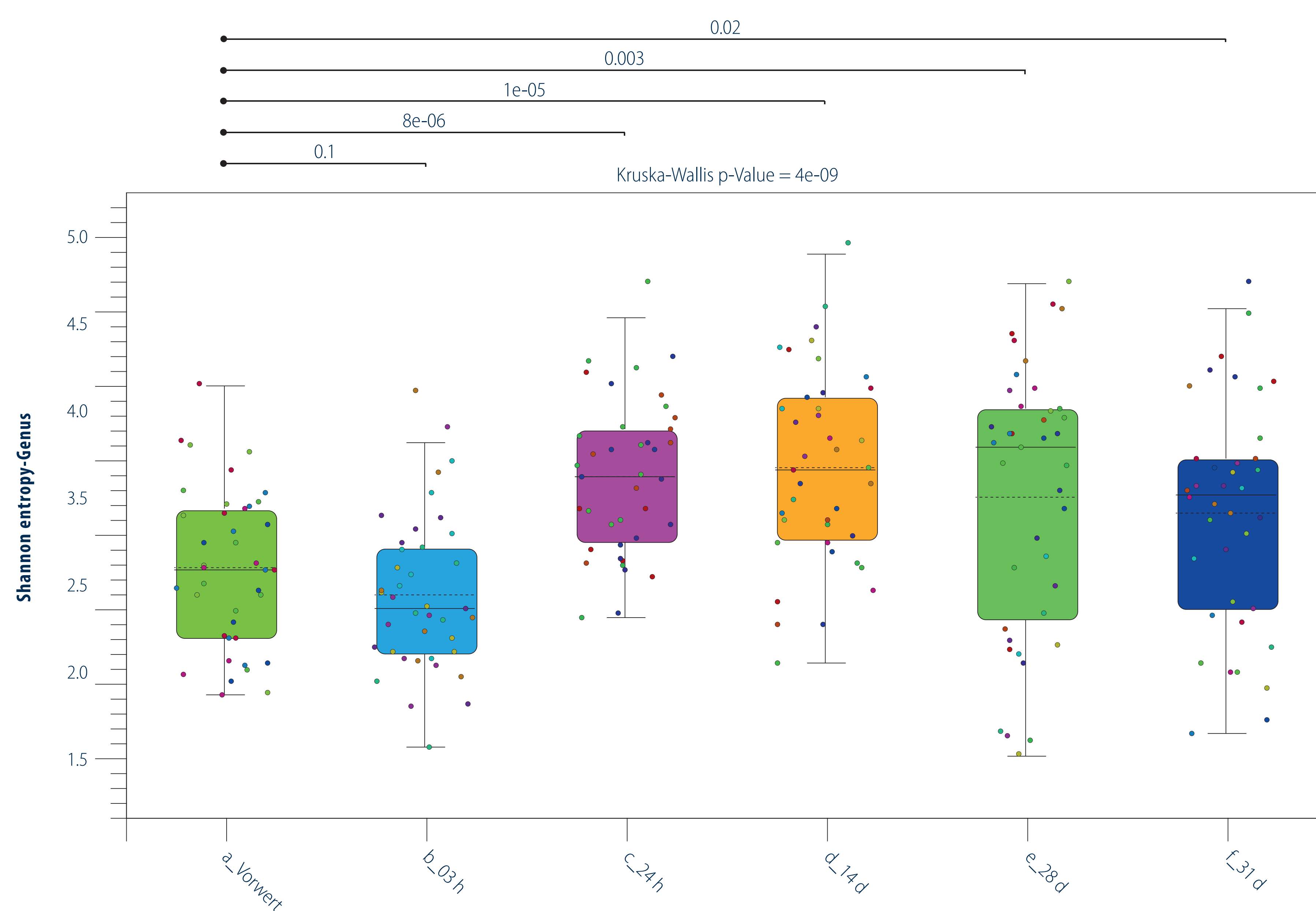


Figure 1: Alpha diversity calculated based on Shannon values aggregated per sampling point for all participants. Statistics: Kruskal-Wallis-H-Test with $p < 0.05$ evaluated as statistically significant.

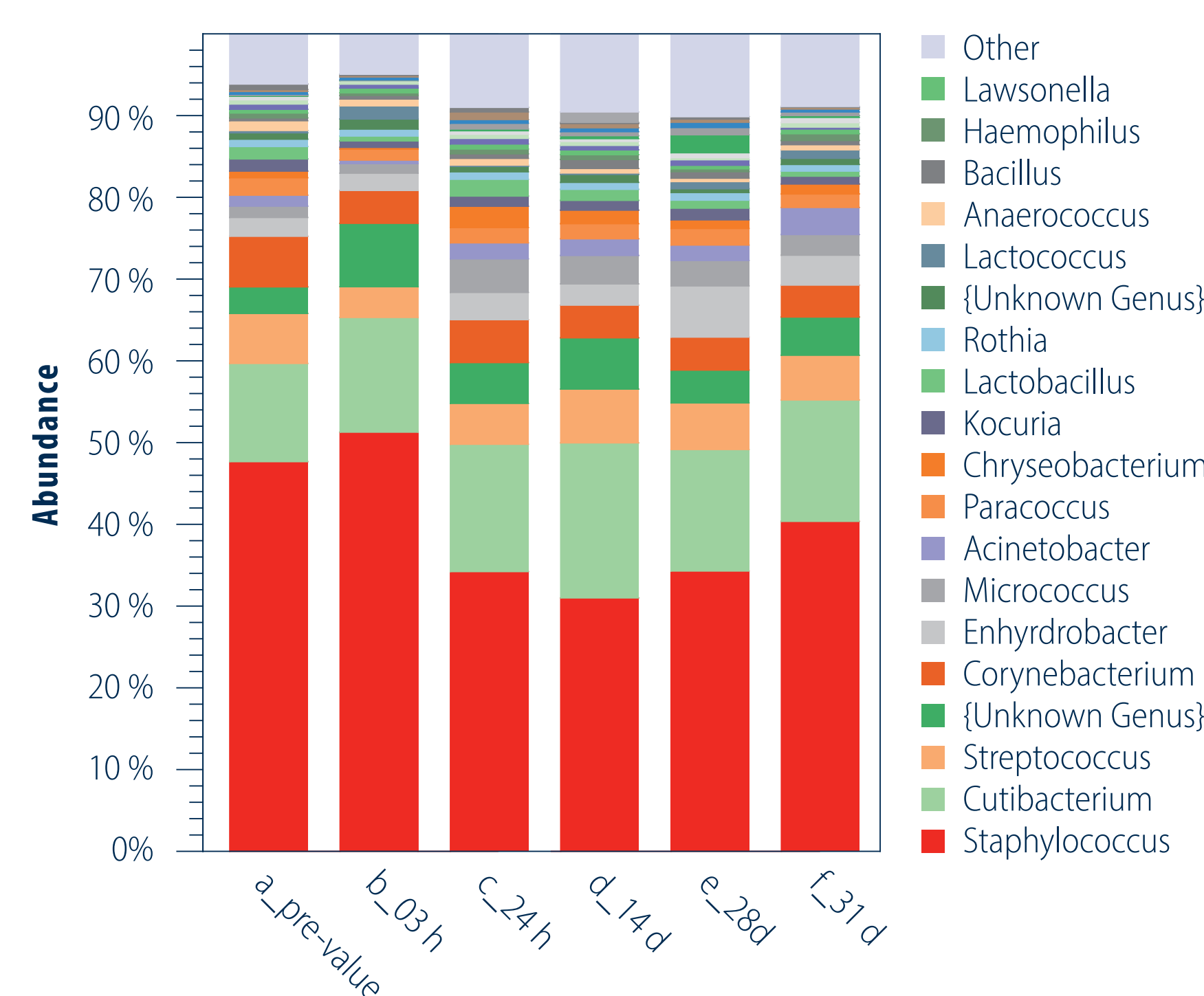


Figure 2: Composition of the skin microbiome of all participants aggregated per sampling point.

● Total number of bacteria per sampling point
● Gram-positive bacteria per sampling point
● Gram-negative bacteria per sampling point

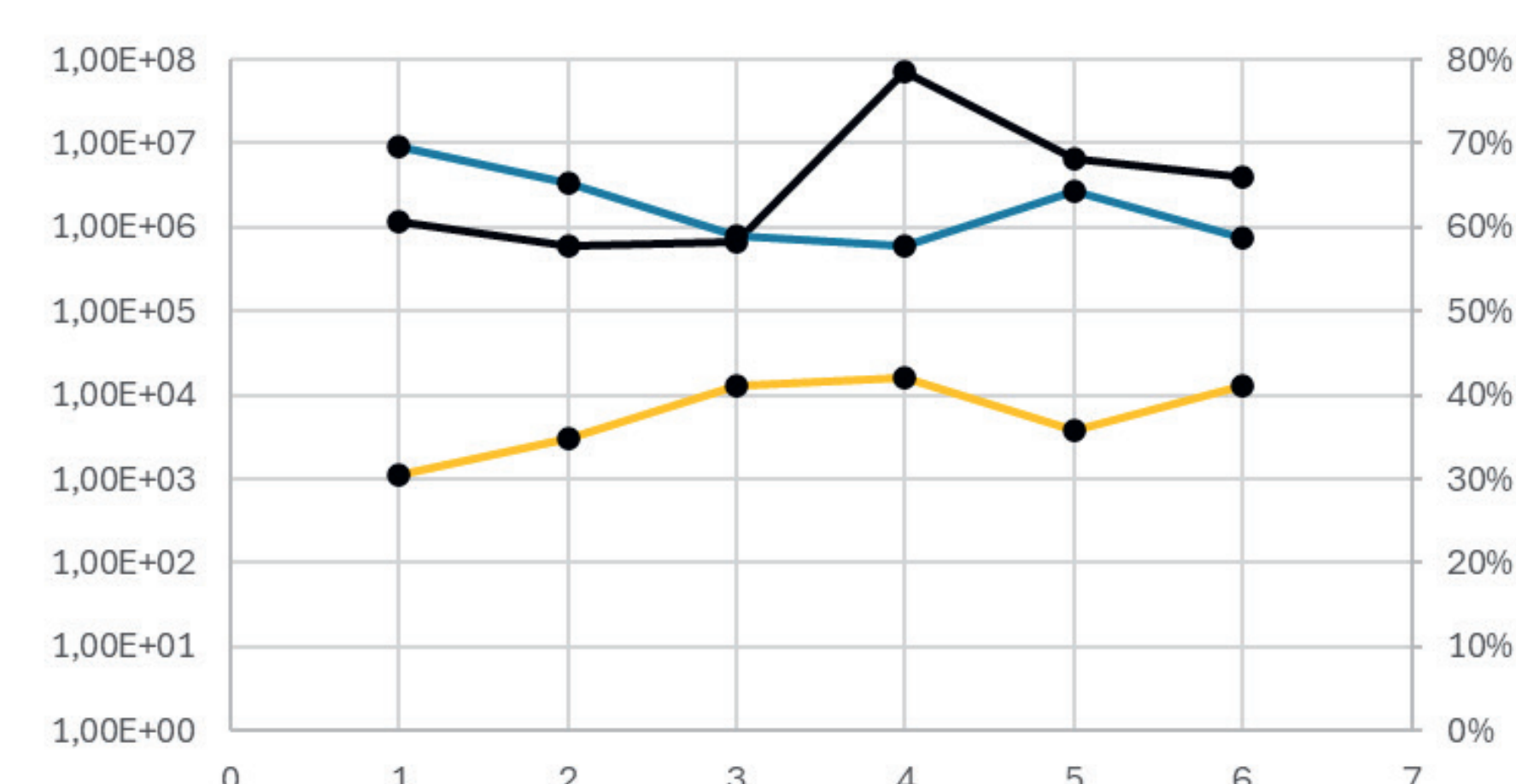


Figure 3: Number of bacteria per sampling point measured by qPCR.

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