

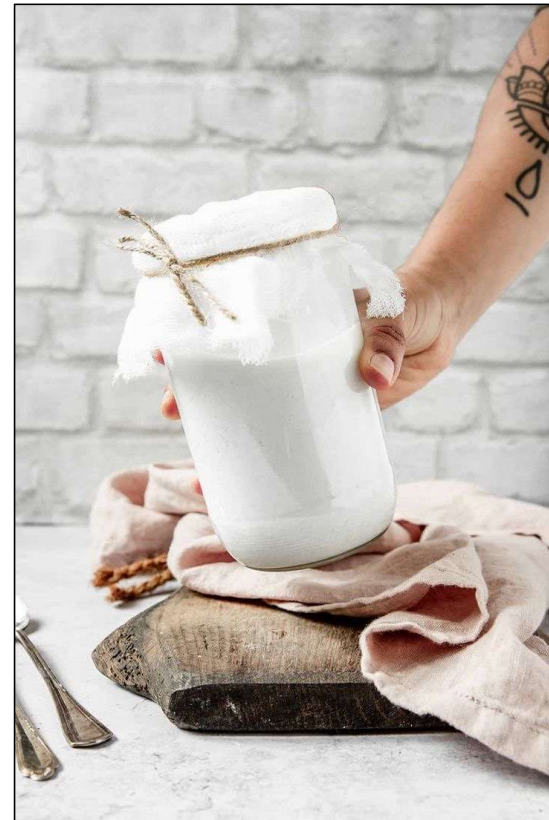
Analysis of the Microbial Composition of Homemade and Commercial Kefir Milk

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Biotiful Kefir | Homemade Irish Kefir Milk



Methods



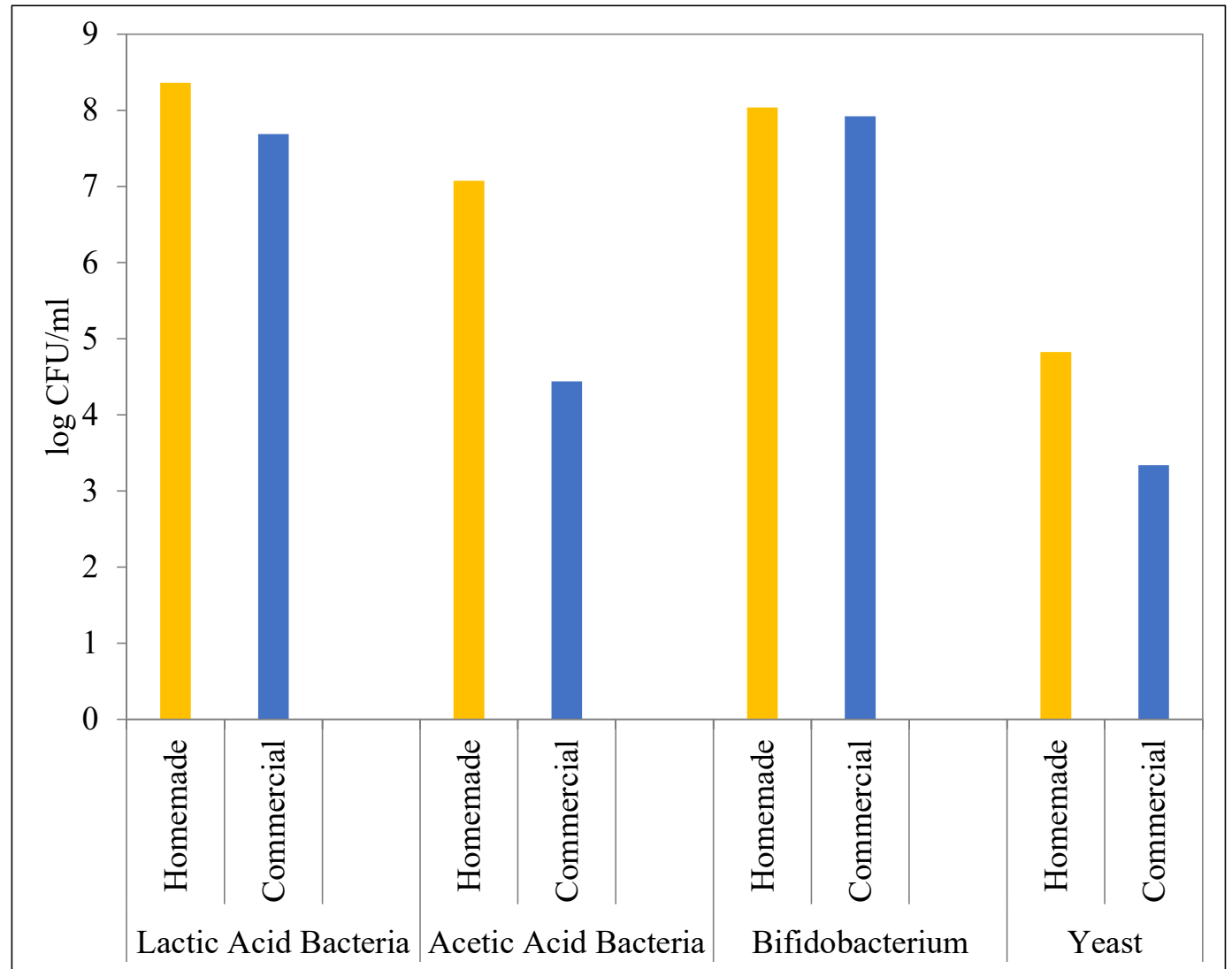
Culture-dependent analysis

- Pour plate
- Spread plate
- Enumeration
- Re-streaking for isolation
- Gram stain
- Catalase test
- Colony PCR

Culture-independent analysis

- Zymo Fungal/Bacterial Miniprep kit for DNA extraction
- Polymerase chain reaction (PCR)
- Gel electrophoresis
- 16S sequencing (pure culture & community)
- ITS sequencing

Microbial composition enumeration



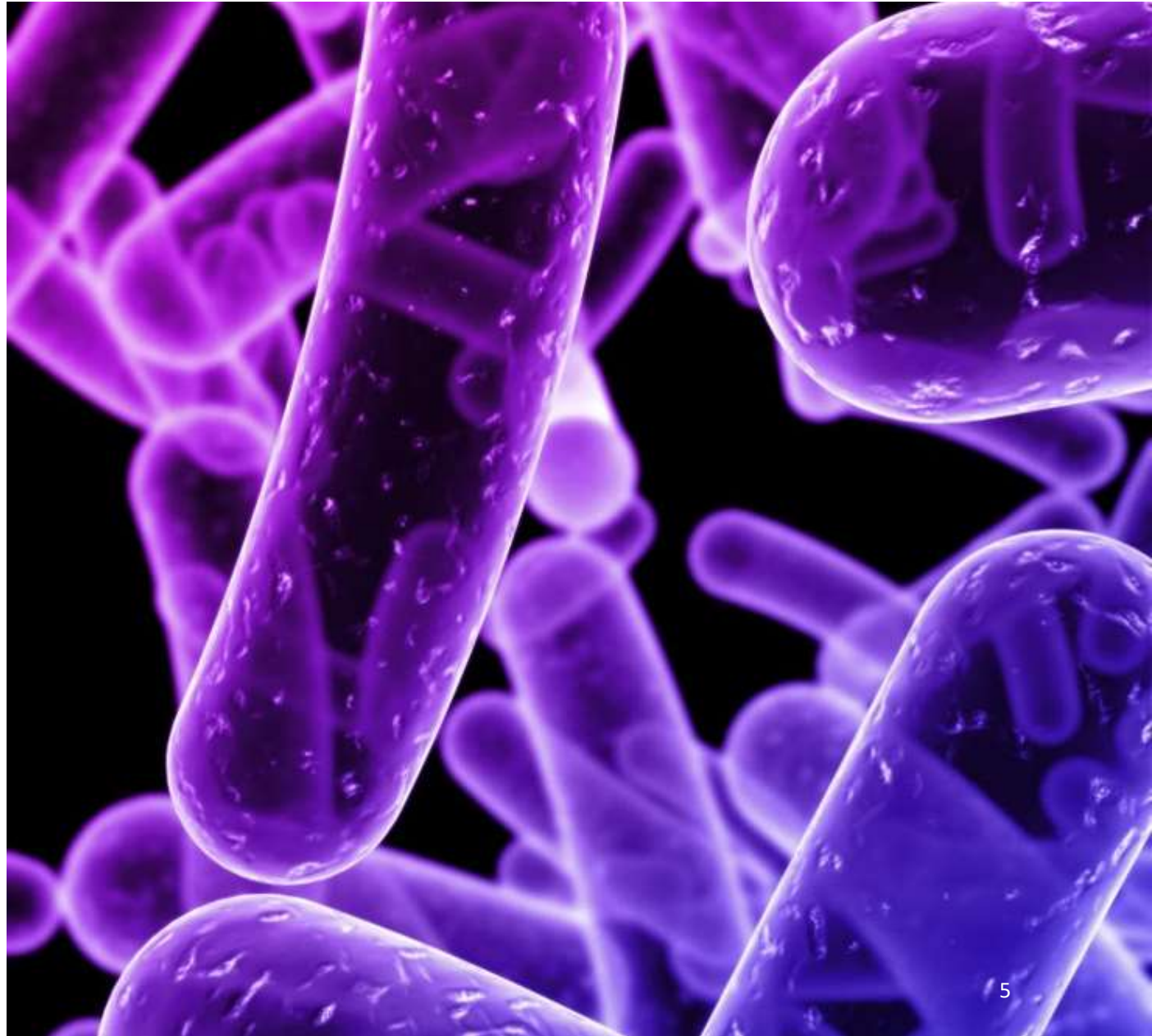
16S Bacterial Sequencing Analysis

Homemade

- *Leuconostoc*
- *Acetobacter*

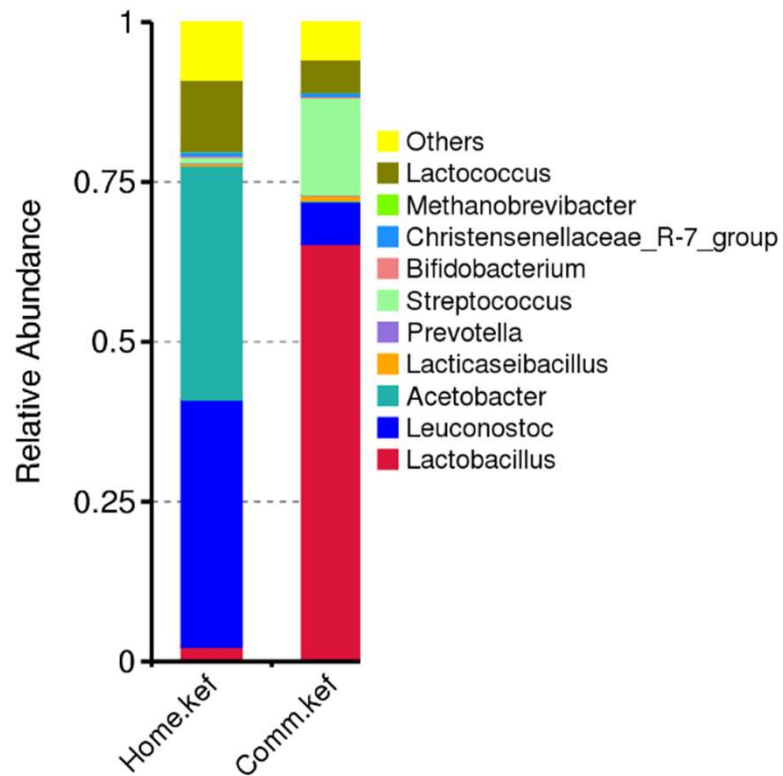
Commercial

- *Lactobacillus*
- *Streptococcus*

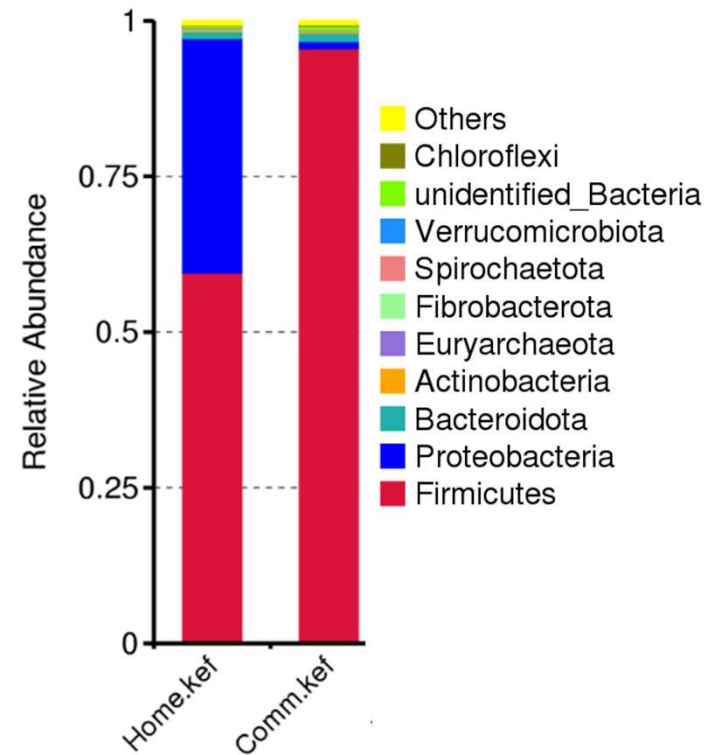




Top 10 common bacterial genera detected

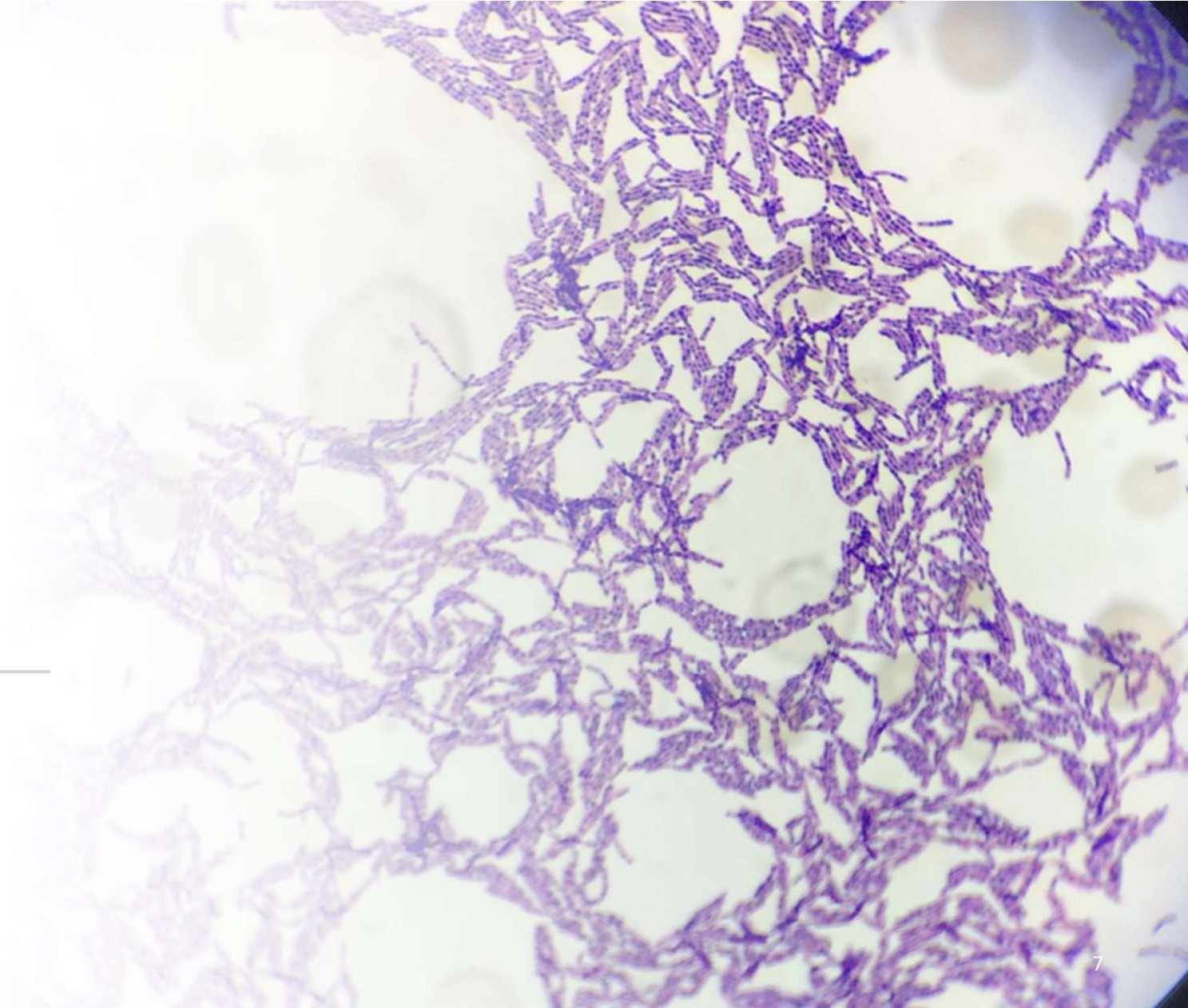


Top 10 common bacterial phyla detected

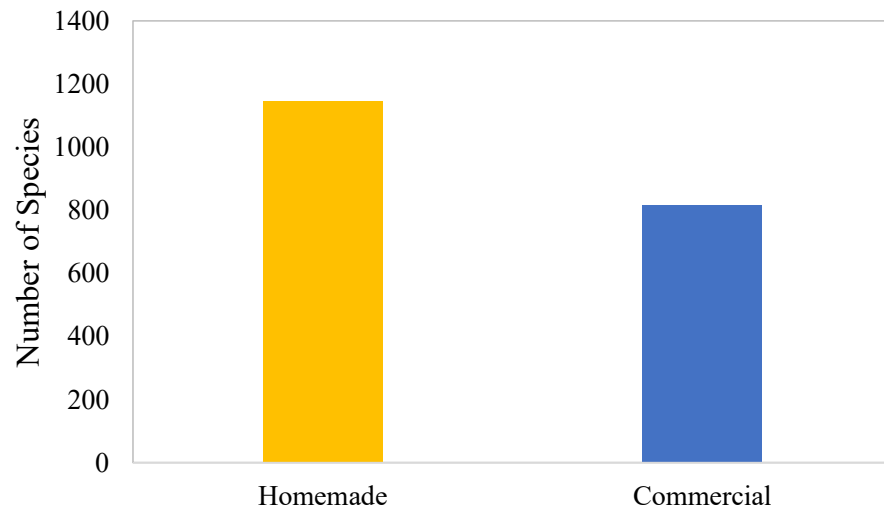




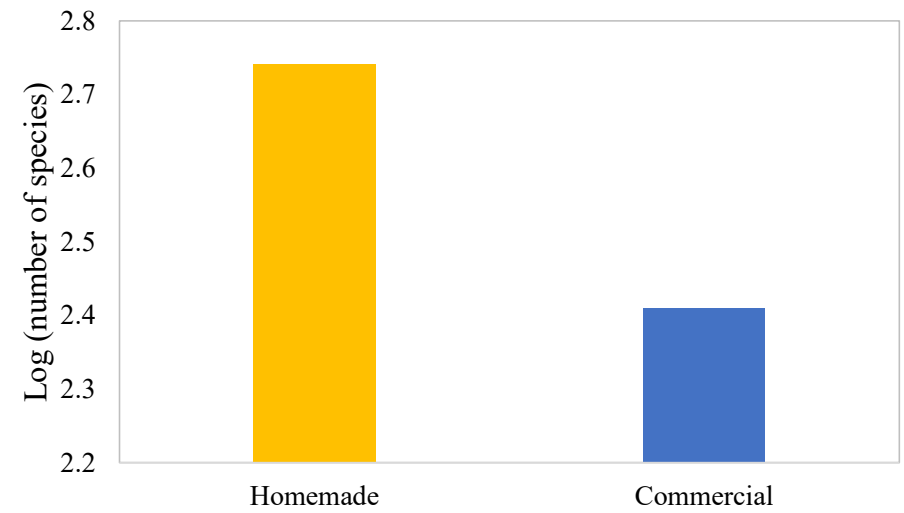
Alpha Diversity



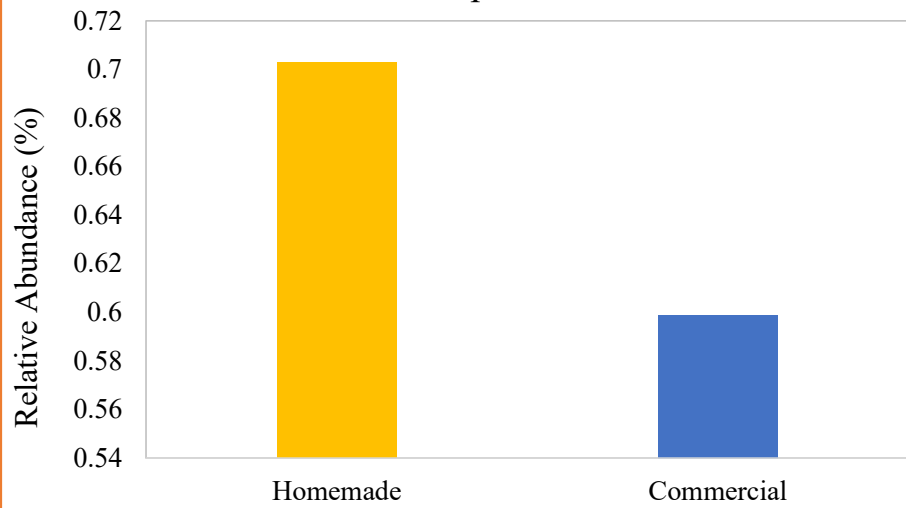
Observed Species



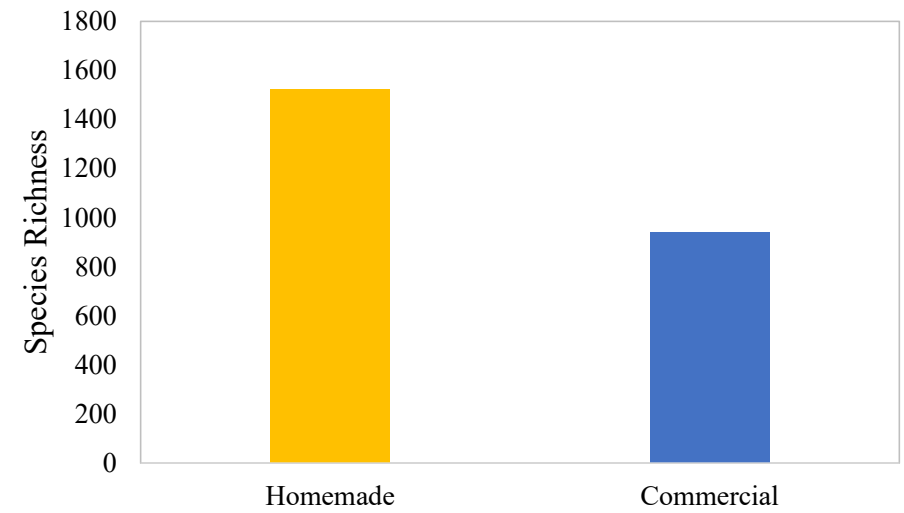
Shannon




Simpson



Chao1





ITS Sequencing Analysis



| Sample no. | Sample type | Closest relative | Query cover | Percentage similarity |
|------------|--|--------------------------------|-------------|-----------------------|
| 1 | Homemade kefir 10 ⁻³ dilution | <i>Geotrichum candidum</i> | 95% | 99.14% |
| | | <i>Galactomyces geotrichum</i> | 99% | 98.36% |
| | | <i>Dimorphospora</i> | 99% | 98.36% |
| 2 | Homemade kefir 10 ⁻⁴ dilution | <i>Geotrichum candidum</i> | 95% | 99.70% |
| | | <i>Dimorphospora</i> | 98% | 99.42% |
| | | <i>Dipodascus</i> | 96% | 99.41% |
| 3 | Homemade kefir 10 ⁻³ dilution | <i>Geotrichum candidum</i> | 94% | 99.11% |
| | | <i>Dimorphospora</i> | 98% | 98.58% |
| | | <i>Saccharomycetales</i> | 98% | 97.43% |
| 4 | Homemade kefir 10 ⁻⁴ dilution | <i>Geotrichum candidum</i> | 95% | 98.57% |
| | | <i>Galactomyces geotrichum</i> | 99% | 98.09% |
| | | <i>Saccharomycetales</i> | 97% | 98.04% |
| 5 | Commercial kefir milk DNA positive control | <i>Geotrichum candidum</i> | 92% | 96.36% |
| | | <i>Galactomyces geotrichum</i> | 92% | 96.36% |
| | | <i>Saccharomycetales</i> | 92% | 95.76% |



Conclusions

- The homemade kefir exhibited a greater microbial diversity compared to the commercial kefir sample Biotiful.
- Microbes present within the kefir are likely to be impacted by the type of milk that was used, the pH of the milk, the fermentation time and conditions and where the grain originated from.
- The microbial composition of kefir milk is a vital piece of information as it contributes to the health benefits that kefir is known for.

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Thank you for listening. Any questions?