

1 Popular Scientific summary: How to investigate the effects of skin care products on skin bacteria.

It has been said that the human body consists of more bacterial cells than human. Whether this is true or not it is a fact that we are landlords to millions of tiny tenants living on and inside our bodies. Most people have heard of the gut microbiome, the microbial community of the intestines, but it is not the only bacterial community paying rent to us. The skin is also home to a vast selection of bacteria, and it is becoming more and more clear that it might equal the role the gut microbiome plays in our health and well-being. From arming our budding immune systems as babies to acting as security guards against pathogenic bacteria colonizing our skin, the skin microflora fulfills a lot of different functions that help keep us healthy throughout our entire lives.

However, there is still much to learn about the skin micro flora, how is it affected by the hosts' diet and hygiene routines? Which bacteria are responsible for certain skin conditions and which helps keep others away? To answer these questions more research and investigation is needed. This project has focused on developing a method which can be used for that purpose, by testing different sampling and analysis techniques. To assess the different techniques samples were collected and the amount of bacterial cells collected with the method counted, quantified, using PCR-technique. The resulting method uses the ESwab 480C from Copan, PureLink™ Microbiome DNA Purification Kit from Thermofischer and the ToughMix® 2x master mix from Quantabio for sampling, sample processing and qPCR analysis. The method was then tested with samples containing various skin care products to investigate what effects the presence of skin care products would have on the method. It was shown that skin care products can have an adverse effect on the qPCR analysis, but that the Toughmix master mix is very adapt at mitigating these effects, producing accurate results anyway.

The analysis did only involve quantification at this stage, although PCR is a very powerful and versatile tool for microbiological analysis, and could be adapted to produce more results than simple quantification of bacteria present in a sample. The PCR protocols can be adapted to enable detection and sequencing of bacteria with very high accuracy, meaning that bacteria present even in very small quantities could be detected and identified in a sample.

By doing this bacterial profiles can be generated for different subjects, and then screened for changes with time, change in hygiene routine, etc. By understanding the skin flora we might find treatments for various skin conditions, find ways to prevent infections caused by antimicrobial-resistant bacteria and mechanisms to boost weak immune systems. To do this we need to have a better understanding of the interactions between ourselves and the microorganisms living on our skin. Hopefully this research method can contribute to the improvement of that understanding and help uncover more knowledge in the future. Illustration created by author from sourced image, see ref. list. **(Image)**

