

Evaluation of a Cosmetic Anti-Dandruff Shampoo on Scalp Microbiome, Scalp Health, and Hair Condition

Gerald Pedrassi¹, Martin Ost¹, Karen Dodd², Liz Burrows², Keith Wadsworth²

¹STADA Arzneimittel GmbH, Bad Vilbel, Germany. ²Thornton & Ross, Huddersfield, United Kingdom

INTRODUCTION & OBJECTIVES

Dandruff, affecting ~50% of the global population, is a prevalent scalp condition linked to microbial dysbiosis and inflammation, significantly impacting quality of life. Dandruff and scalp discomfort are frequently linked to alterations in the microbial ecosystem, often accompanied by symptoms such as erythema, flaking and sensitivity. Beyond efficacy, cosmetic scalp formulations are increasingly expected to support microbial harmony and enhance hair performance. This study aimed to assess the effects of a cosmetic anti-dandruff shampoo formulated with Propanediol Caprylate and Salicylic Acid on clinical scalp outcomes, microbial dynamics, and perceived hair quality.

MATERIALS & METHODS

A 4-week open-label observational study was conducted in 60 adult volunteers presenting seborrheic dermatitis-prone scalp, ranging from mild to severe. Following a 3-day washout period, participants applied the product according to a standardized cosmetic protocol. Microbiota composition was analyzed via qPCR targeting 20 bacterial and fungal taxa at baseline, week 2 and week 4. Scalp health evaluations focused on erythema, flaking and sensitivity, while structured questionnaires captured user perception of scalp comfort, hair condition and cosmetic acceptance.

RESULTS

After 4 weeks, the significant positive correlation between *Staphylococcus aureus* and scalp sensitivity observed at baseline was no longer present, suggesting stabilization of the scalp environment. The significant correlation between *Staphylococcus caprae* and past eczema observed initially disappeared after 4 weeks, indicating improved scalp resilience.

Malassezia spp. and *Malassezia restricta* were initially positively correlated with perceived scalp hydration, but this association was no longer significant after 4 weeks, suggesting balanced hydration without *Malassezia* overgrowth.

The formulation maintained microbiome stability and supported commensal enrichment over time. No significant disruption in alpha or beta diversity was observed.

Clinical assessments showed full resolution of erythema (**100%**) by week 4, with additional reductions in flaking and scalp sensitivity (**~24.8%**).

Hair related endpoints included a 42.9% reduction in perceived brittleness, with parallel improvements in smoothness (+23.3%) and overall hair health (+27.5%) all values p<0.001.

Secondary Endpoints

Dermatological assessment and Participant Perception outcomes

Parameter	Week 4	Conclusion
Scalp Sensitivity	-24.8%	Significant reduction, enhanced scalp health
Scalp heathh and balance	+37.2%	Significant improvement, enhanced scalp health
Hair shine	+19.3%	Significant improvement, enhanced hair health
Hair brittleness and weakness	-42.9%	Significant reduction, enhanced hair health
Erythema	-100%	Significant reduction, enhanced scalp health

Table1. Study Design - anti-dandruff shampoo vs washout

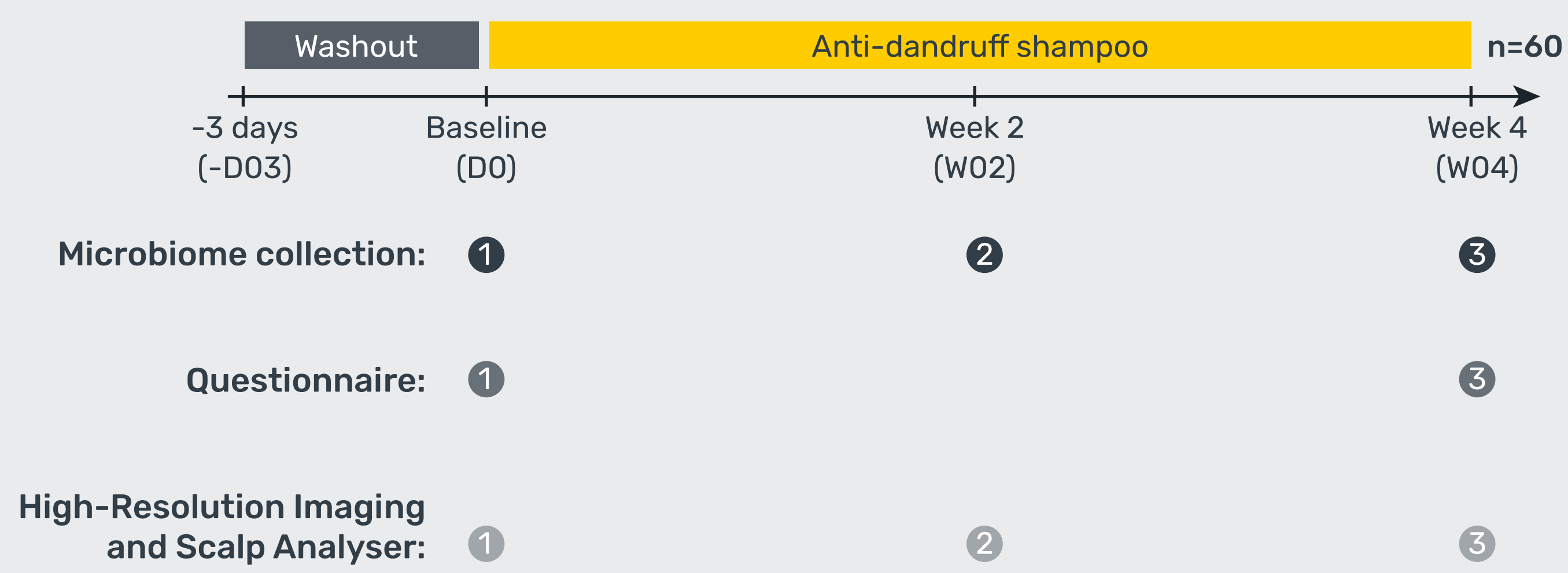
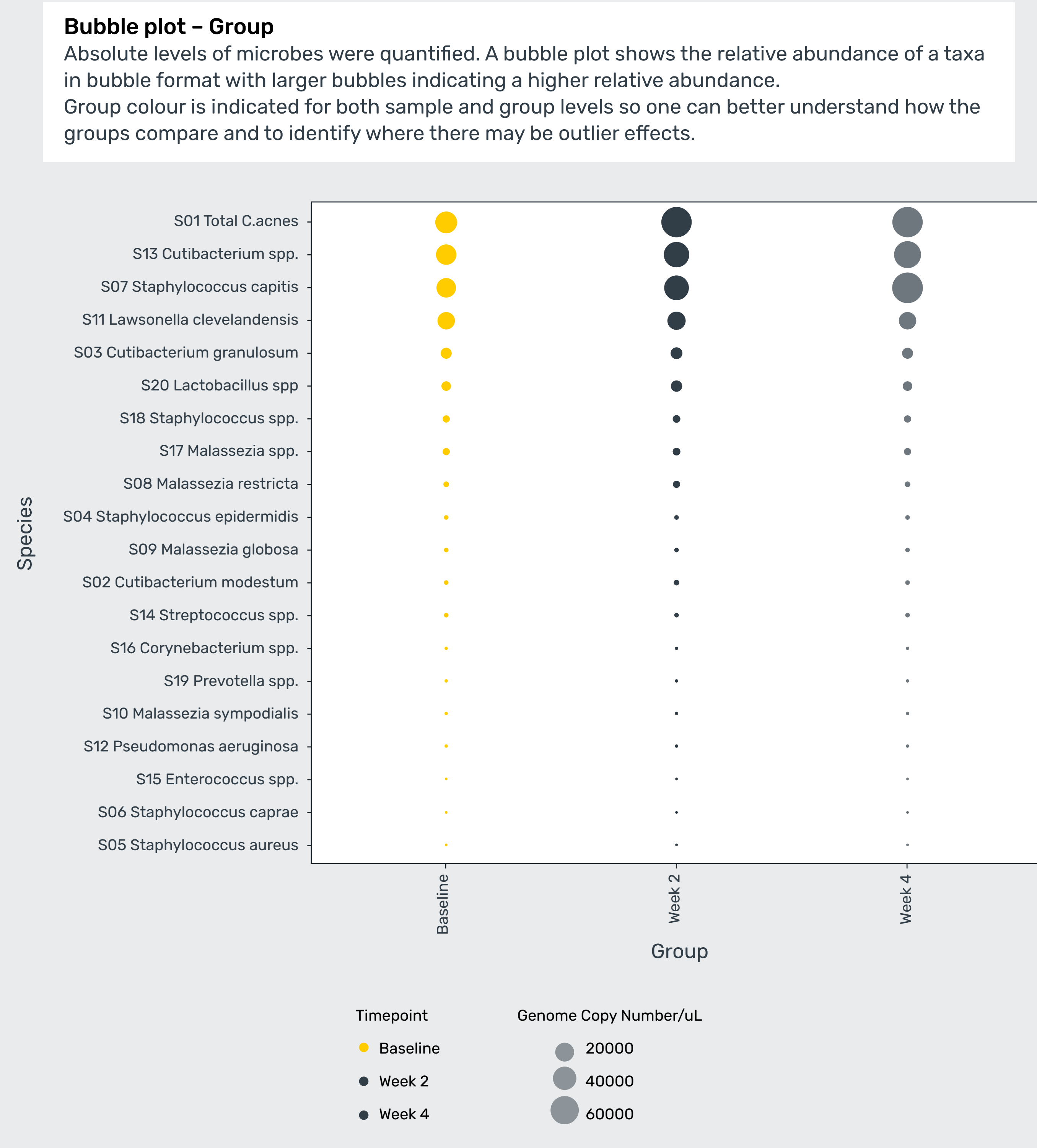


Table 2. Anti-dandruff Shampoo maintains and supports scalp commensal bacteria and fungi growth over time



CONCLUSIONS

This cosmetic anti-dandruff shampoo effectively reduced visible signs of seborrheic dermatitis-prone scalp, and improved subjective hair quality, while optimizing the scalp’s microenvironment in favor of physiological balance. These findings support its potential role in microbiome-conscious scalp care strategies where both clinical efficacy and cosmetic performance are expected. The product is also Certified to Maintain the Microbiome, based on quantifiable data and scientifically significant markers.

References:

- Borda LJ, Wikramanayake TC. Seborrheic Dermatitis and Dandruff: A Comprehensive Review. J Clin Investigat Dermatol. 2015;3(2): 10.
- Sergio Vano-Galvan, Pascal Reygagne, Daniel Fernandes Melo, Victoria Barbosa, Wen-yu Wu, Hoda Moneib, Bianca Maria Piraccini. A comprehensive literature review and an international expert consensus on the management of scalp seborrheic dermatitis in adults. European Journal of Dermatology. 2024;34(1):4-16.

Keywords: Dandruff, Scalp microbiome, Cosmetic shampoo, Hair health, Commensal bacteria