

# Evaluation of the cleansing capacity of a monofilament debrider device compared to conventional cosmetic pads in a sebum model

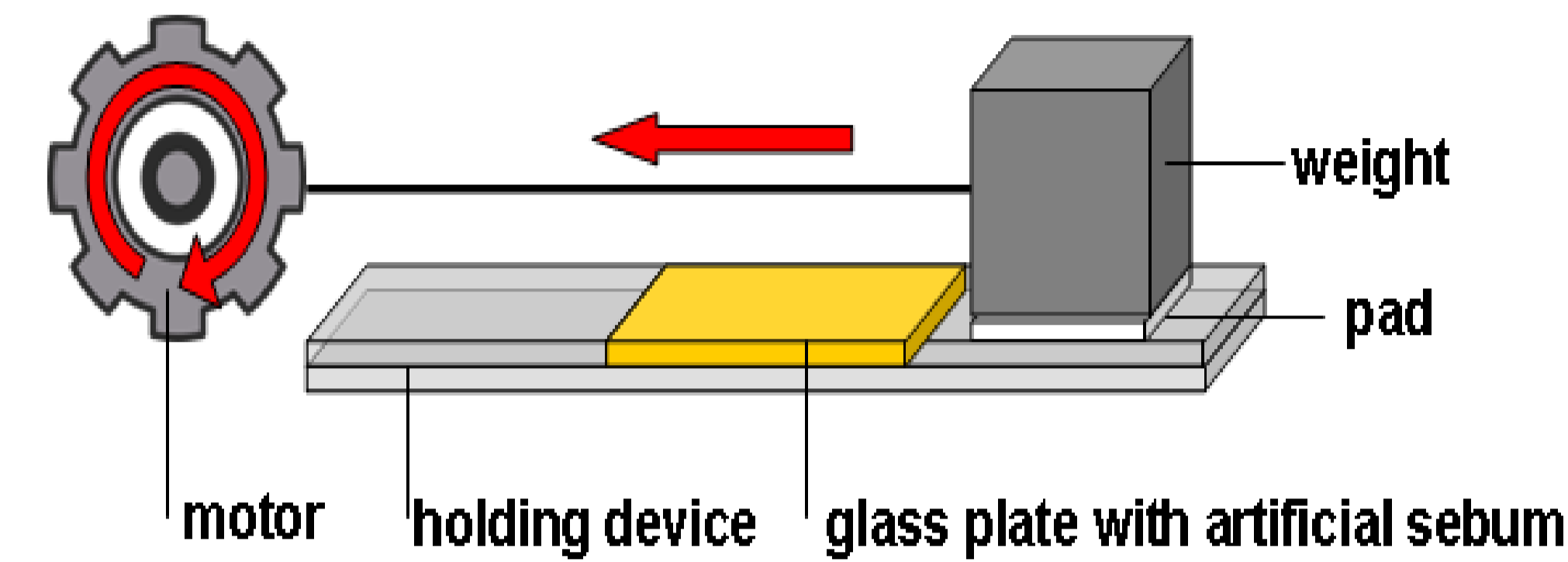
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## Introduction

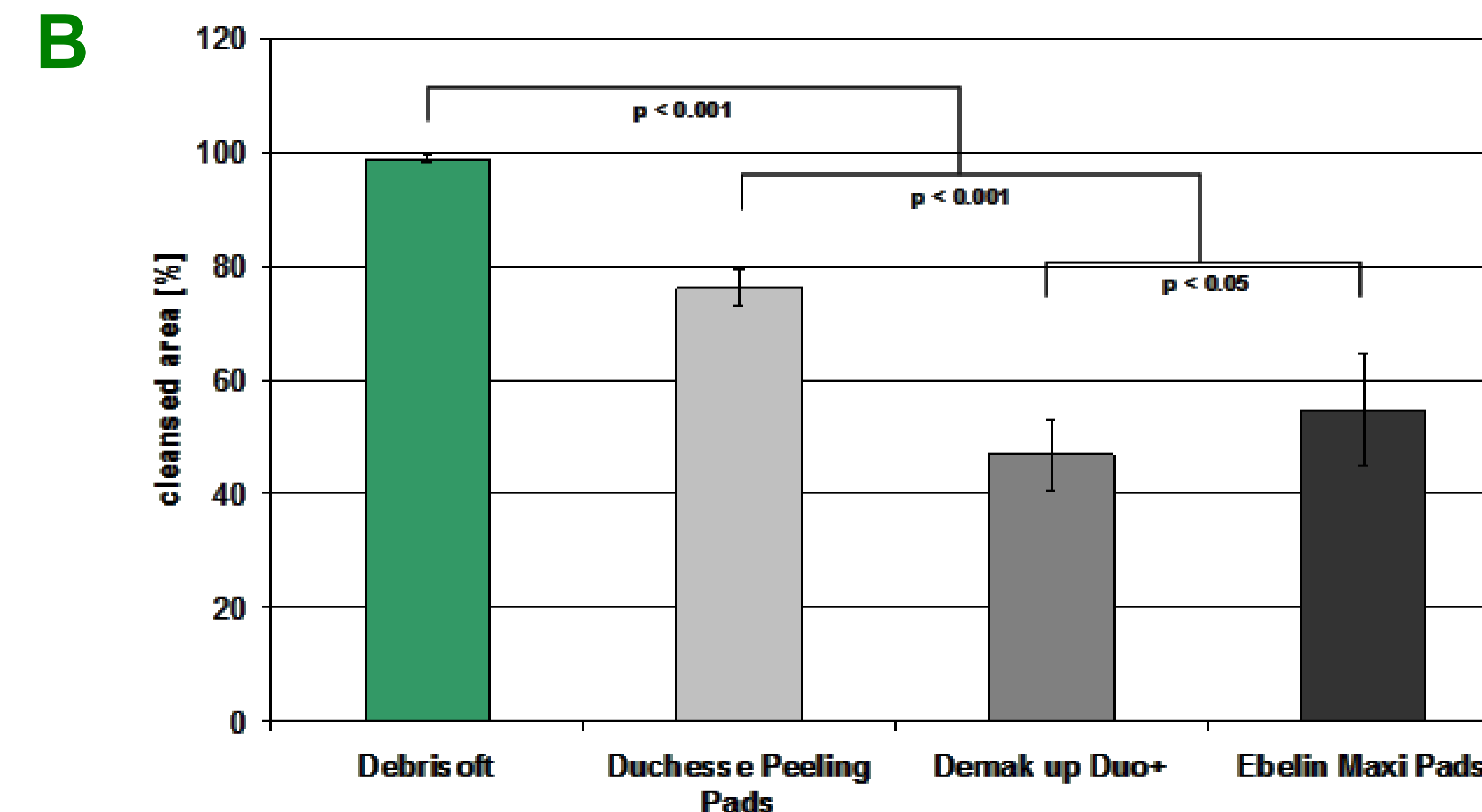
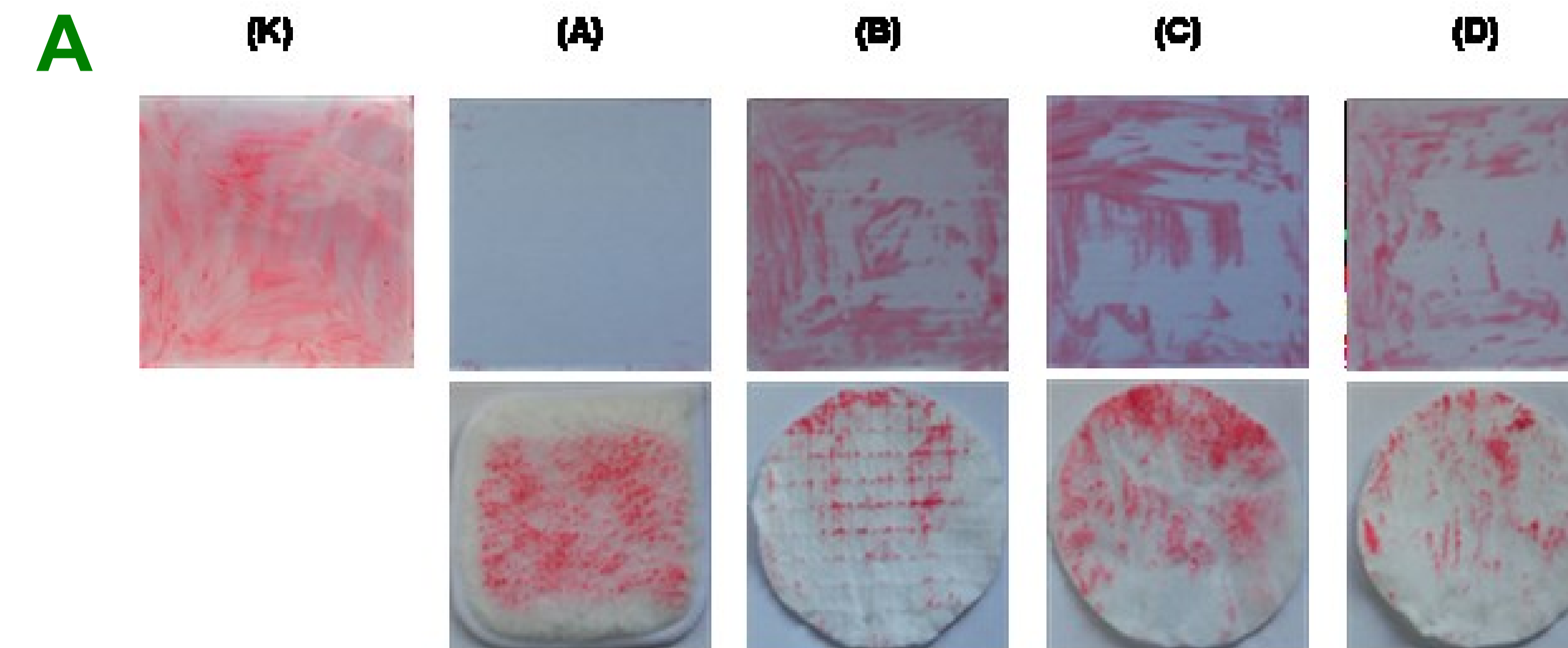
Acne is a long-term, multiform skin disease that is characterized by increased sebum production (seborrhea) and comedo formation (blackheads or whiteheads). However, over time, inflammatory papules, pustules, and nodules may develop. Mostly, adolescents at the age of 15 to 18 years are affected and the disease improves around the age of 20. In 2 to 7% of the cases permanent scarring is observed. For treatment of acne several options are available including benzoyl peroxide, antibiotics, retinoids, anti-androgen medications, antiseborrheic medications, hormonal treatments, salicylic acid, nicotinamide, or keratolytic soaps. It is the aim of the therapeutic strategies to normalize skin cell shedding and sebum production in the pore to prevent blockage and kill bacteria (such as *P. acnes*) to reduce inflammation. Hence, frequent cleansing of the skin is necessary without adding to the skin irritation. The recently introduced monofilament debrider device may present a beneficial option, removing the protein-rich crusts, effectively, fast, and pain-free. Therefore, the cleansing capacity of this monofilament debrider device was assessed *in vitro* and compared to commercially available cosmetic pads.



**Figure 1:** Schematic presentation of the model: a glass plate coated with artificial sebum is placed in a holding device and the pads are fixed to a weight which is then pulled over the glass plate.

## Material & Methods

The sebum model consists of glass plates coated with an oil-red-stained layer of artificial sebum (squalene, carnauba wax, glyceryl tristearate, stearic acid, palmitic acid, oleic acid, and cholesterol). The monofilament debrider device (Debrisoft®, Lohmann&Rauscher) and conventional cosmetic pads Demak Up Duo+, Groupe SCA; Duchesse Cosmetic Peeling Pads, CMC Consumer Medical Care; Ebelin Maxi Pads, dm-drogerie markt) were used to clean the glass plates under standardized conditions ( $p=0.067\text{N}/\text{cm}^2$ ,  $v=1.6\text{cm}/\text{s}$ ). Images were obtained before and after treatment and processed using ImageJ 1.45m.



## Results

The monofilament debrider Debrisoft® exhibited a significantly higher cleansing efficacy compared to the cosmetic pads *in vitro*. While the monofilament debrider was able to remove the artificial sebum almost completely (98.9% cleansed area), significantly lower efficiencies were noted for Demak Up Duo+ (46.9%), Duchesse Cosmetic Peeling Pad (76.2%), and Ebelin Maxi Pad (54.7%).

**Figure 2: A: Representative results for Debrisoft® (A), Demak Up Duo+ (B), Duchesse Cosmetic Peeling Pad (C), and Ebelin Maxi Pad (D) in the cleansing model with an artificial sebum layer stained with oil red O (K). B: Comparison of the cleansing efficacy of Debrisoft®, Demak Up Duo+, Duchesse Cosmetic Peeling Pad, and Ebelin Maxi Pad.**

## Conclusion

Treatment of acne vulgaris requires an efficient skin cleansing to remove surplus sebum and prevent pore blockage. However, added irritation of the skin should be avoided. Using a model with artificial sebum, it could be shown that the cleansing capacity of the new monofilament debrider is significantly higher compared to commercially available cosmetic pads.