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# Using Gelatin Hydrogel as Skin Model to Evaluate the Feasibility of Plasma-Assisted Tattoos Removal

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☒ Oral presentation ☐ Poster presentation

## ABSTRACT

Non-thermal plasma technology has opened up many opportunities in dermatology since promising effects have been reported in wound healing, treatment of psoriasis, atopic dermatitis and skin cancer [1]. It has also been successfully reported as an advanced oxidation process able of oxidizing and decomposing persistent organic pollutants, like pigments and dyes, from wastewater [2]. Combining these two assets, it is natural to investigate if non-thermal plasma could be used to decompose artificial pigments in the skin, i.e. tattoos [3].

Plasma treatment is expected to be less selective than the current methods for tattoos removal (Q-switched lasers) but milder, possibly with less thermal effects. Moreover, plasma generates short-lived reactive species and UV radiation that are able to oxidize organic and inorganic molecules.

The aim of this work is to investigate the feasibility of removing tattoos with non-thermal plasma treatment at atmospheric pressure. To do this, we treated real tattoo inks dispersed in water solution and in gelatin (in solution or in solid films), as a model of the skin (Fig. 1).

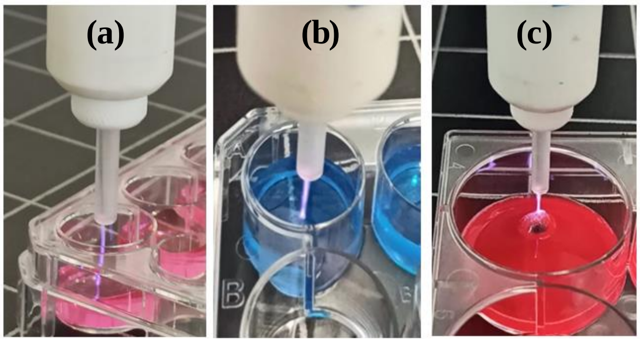


**Figure 1.** Pictures of an atmospheric pressure plasma jet during the treatment of tattoo inks dispersed in water (a), liquid gelatin solution (b) and gelatin hydrogel (c).

The treated samples were analyzed by UV-vis spectroscopy and reflectometry to understand the kinetics of pigments removal and by an IR camera to asses the temperature effect of the treatment on the samples. The extension of our results to more real scenarios allows us to conclude that non-thermal plasma cannot compete with the current laser technology in a real application.

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[2] P. Jamroz, A. Dzimitrowicz, P. Pohl, *Plasma Process. Polym.*, **15** (2018) 1700083.
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