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Influence of a liquid surface on the reaction chemistry of a cold atmospheric pressure plasma jet

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Cold atmospheric pressure plasma (CAPP) sources are of interest for applications in the field of plasma medicine and plasma agriculture. The biological response is based on different aspects of the complex plasma system, e.g. excited and charged species, (V)UV radiation, radicals and energy influx [1]. To understand the influence of the different contributions one has to tailor the discharge operating in controlled regime and to find ways controlling the production of different chemical compounds. In particular, the interaction of the plasma with liquid media is of special interest.
In this study a cold atmospheric plasma jet kINPen Sci (neoplas, Germany) [2] was operated above a distilled water reservoir with a shielding gas device producing an annular flow of a defined gas surrounding the effluent of the plasma jet [3]. Nitrogen (N_2) to oxygen (O_2) mixtures were used for different atmospheres surrounding the effluent of argon.
Reactive O_2 and N_2 species (RONS) in the far field downstream region of the jet were measured. Introducing a liquid surface into the system leads to an increase of nitric oxide and resulting RONS by a factor of 2-3. It follows that water from natural humidity of biological tissues cannot be neglected.
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Keywords
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