



Europe
2018



Radboudumc
university medical center



D4 & E4: MEDUWA-Vecht(e)

D4: **Alfons Uijtewaal**, The EU INTERREG-VA MEDUWA-Vecht(e) project, a general introduction, post@huizeaarde.nl

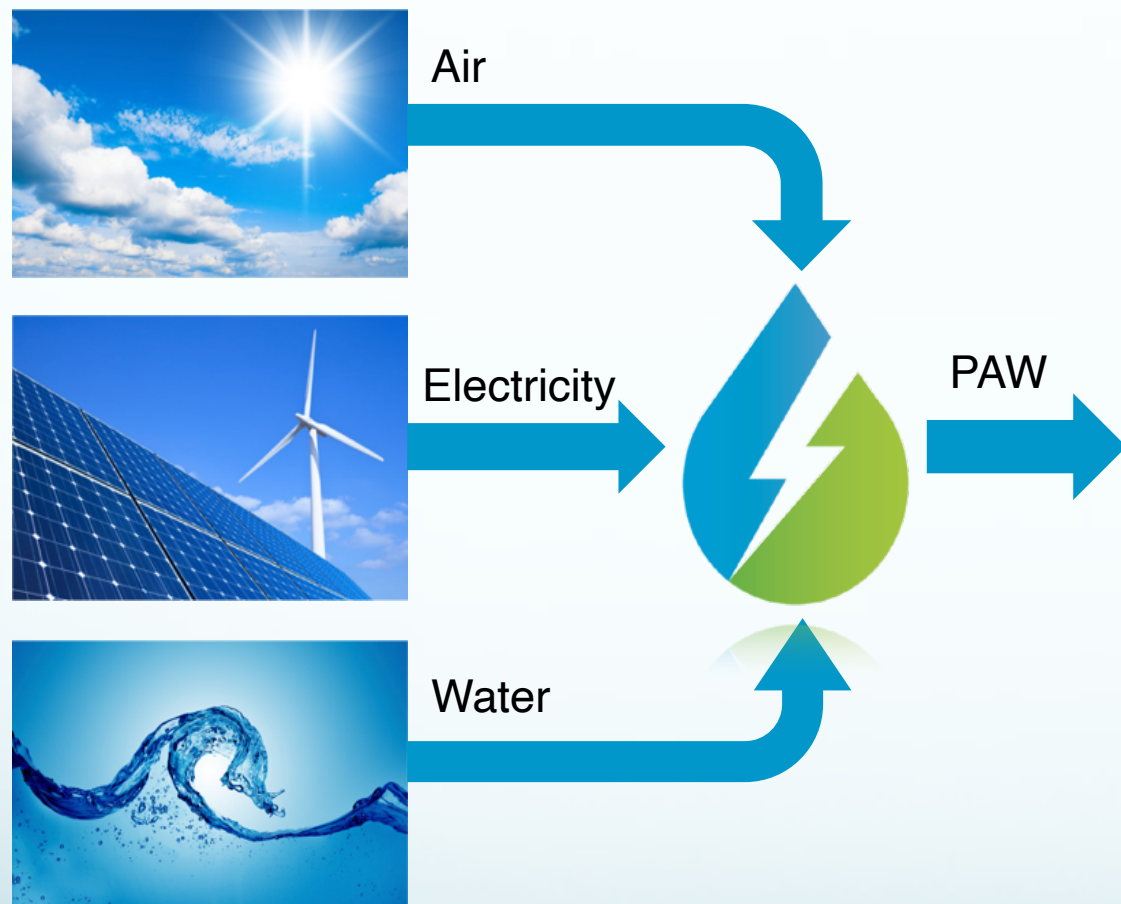
D4: **Ad Ragas**, Estimation and prioritization of hospital pharmaceutical (API) emissions, a.ragas@fnwi.ru.nl

E4: **Paul Leenders**, Plasma Activated Water Treatment, paul.leenders@vitalfluid.nl

E4: **Martien Graumans**, The use of plasma activated water and UV/H₂O₂ for the degradation of cyclophosphamide in wastewater, martien.graumans@radboudumc.nl



Plasma treatment of water



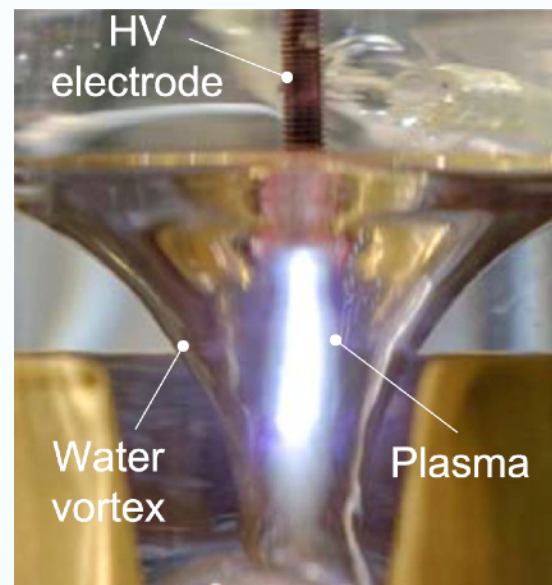
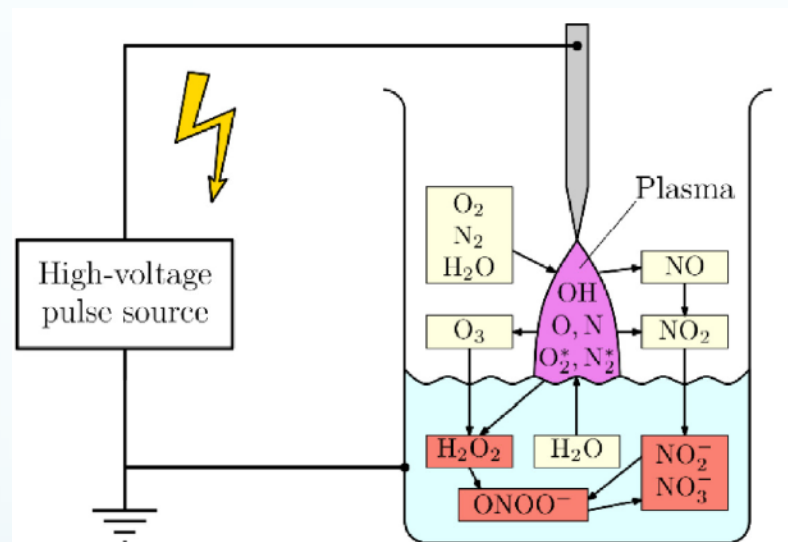
Air is brought into the plasma phase

Comparable with lightning striking on water

Reactive oxygen and nitrogen species are dissolved into water



Plasma Activated Water

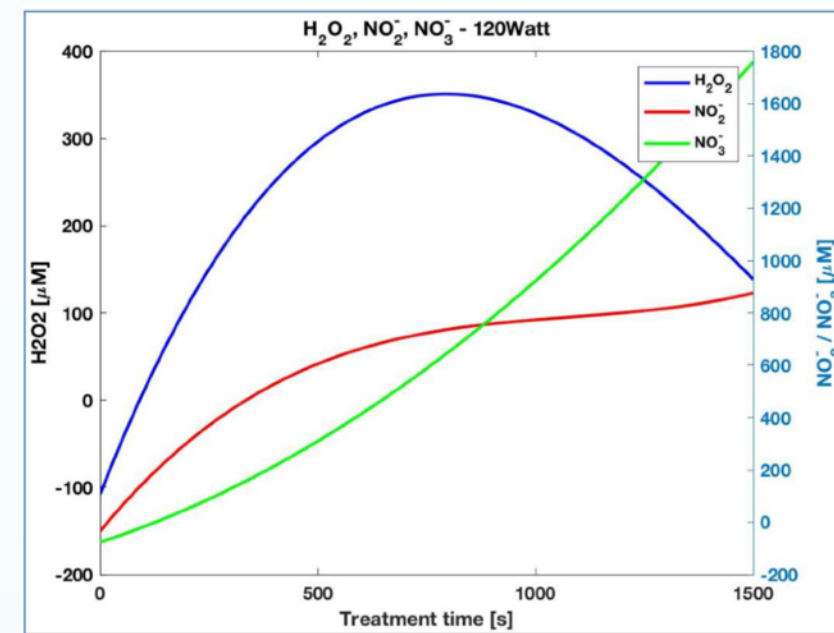
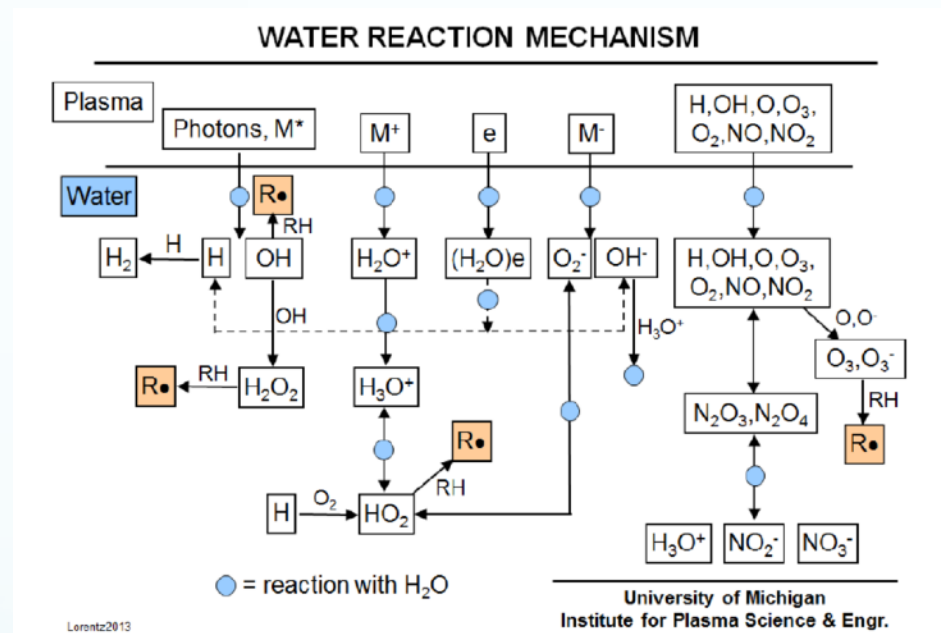


Biomimicry of a thunderstorm

Process is controllable and reproducible



Oxidative species



An avalanche of short lived reactive species are created in the plasma arc

ROS and RNS dissolve in water and have oxidizing properties



Applications

Agriculture

- Seed treatment (main focus)
- Crop protection
- Nitrogen fixation

Medical

- Skin & Hand disinfection
- Wound treatment

Water treatment

- Meduwa
 - Residues of medicines
 - Multiresistant micro-organisms
- Small scale purification

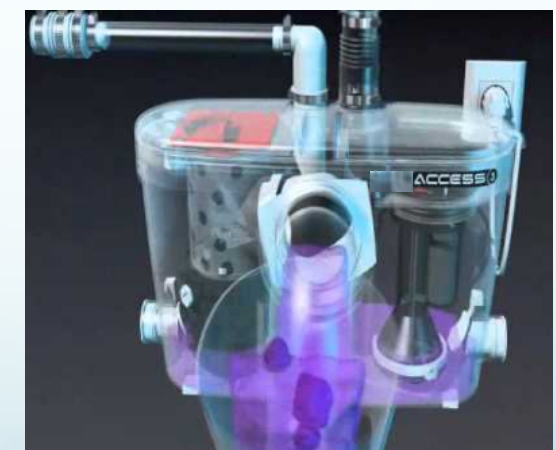
Food

- Shelf life
- Hygiene
- Cleaning (in Place)



Device impression

- Robust plasma treatment chamber
- Connectable on common toilets
- Water lock to prevent escape of gasses
- Option to separate liquid from solids



Technology can be upscaled for larger treatment systems



VitalFluid Lab Unit

1. Determine the desired goals and results for the application
2. Joint pilot testing with PAW Lab Unit to explore opportunities
3. Evaluation of the pilot test results
4. Go/NoGo decision for co-creation of the application





State of development

Currently 8 PAW Lab Units available for application research

R&D team VitalFluid controlling and upscaling the activation process

Short term development goal: 25 L PAW batch and flow through reactor