



COLLOQUIUM

Conform artikel 4.6.8 van het SSNS-wb.

Vakgroep: Technische Stromingsleer

In het kader van zijn masteropdracht zal

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een voordracht houden getiteld:

Viscosity of Sputum

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Summary:

Morbidity and mortality of patients with Chronic Obstructive Pulmonary Disease (COPD) are for a large part related to acute exacerbations. COPD is a smoker's disease which leads to deterioration of the human lung. It is the fifth cause of death in the western world. An exacerbation, which occurs one to three times a year, can be explained as a negative change from the baseline, reported by the patient, in dyspnoea, sputum volume, sputum color/purulence and cough. Sputum is the (normally) thin fluid layer covering the inside of the lung but its quantity and consistency do change as function of lung disease. The aetiology of exacerbations is heterogeneous and still under discussion. Undoubtedly bacteria play a role in COPD exacerbations. However, the exact role of bacterial pathogens is still under debate. Antibiotic therapy in the treatment of acute exacerbations is widely used, but the efficacy is debatable. In often cited literature it is stated that COPD patients with a negative change of sputum color/purulence most likely suffer from a bacterial infection. Considering that bacterial infections should be treated with antibiotics, a prescription of antibiotics is advised during a negative change of sputum color/purulence. Sputum color/purulence is normally only macroscopically determined (by just inspecting it visually). The aim of the present study is to find a more objective method for obtaining the color/purulence of sputum. Specifically the viscosity of sputum has been investigated. Because sputum is often inhomogeneous and its volume varies from about 1 to 5 ml, a method has been sought which is able to measure very small amounts of fluid. This led to a measurement setup based on a Quartz Crystal Microbalance. A Quartz Crystal Microbalance is a piezoelectric quartz crystal which can easily be brought in resonance. When the resonance is disturbed by addition of mass and/or liquid the frequency and damping of the crystal will change. The change in frequency and damping can be related to the amount of added mass and/or the viscosity of the added fluid.

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