

Development of a Device for Detecting Fluids in the Esophagus

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Abstract : There is a great diversity of diseases that affect the integrity of the walls of the esophagus, generally of a digestive nature. Among them, gastroesophageal reflux is a common disease in the general population, affecting the patient's quality of life; however, there are still unmet diagnostic and therapeutic issues. The consequences of untreated or asymptomatic acid reflux on the esophageal mucosa are not only pain, heartburn, and acid regurgitation but also an increased risk of esophageal cancer. Currently, the diagnostic methods to detect problems in the esophageal tract are invasive and annoying, as 24-hour impedance-pH monitoring forces the patient to be uncomfortable for hours to be able to make a correct diagnosis. In this work, the development of a sensor able to measure in depth is proposed, allowing the detection of liquids circulating in the esophageal tract. The multisensor detection system is based on radiofrequency photospectrometry. At an experimental level, consumers representative of the population in terms of sex and age have been used, placing the sensors between the trachea and the diaphragm analyzing the measurements in vacuum, water, orange juice and saline medium. The results obtained have allowed us to detect the appearance of different liquid media in the esophagus, segregating them based on their ionic content.

Keywords : bioimpedance, dielectric spectroscopy, gastroesophageal reflux, GERD

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