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ABSTRACTS

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21OCT
2022

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Development of a biosensor for detection of *Escherichia coli* in urine

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Urinary tract infections (UTI) are part of the range of infectious diseases and correspond to the abnormal presence of pathogens in some regions of the urinary tract. Although UTIs also affect men, the incidence rate in women is much higher (80% to 90%). (Haddad & Fernandes, 2019). The main causative agent of UTI (approximately 75% of cases) is *Escherichia coli* (*E. coli*). (Flores-Mireles et al., 2015). Patients with symptomatic infections will have $>10^5$ bacteria/mL and inflammatory cells in their freshly excreted urine. (Chu & Lowder, 2018)

UTIs usually have their treatment summarized by taking antibiotics, therefore, in this project, a characterization of the antibiotic resistance of the different strains used are also made. In the present work, we aimed to develop a biosensor to facilitate the early diagnosis of UTIs. Polyclonal anti-*E. Coli* antibodies of capture (conjugated with Ulfa-Tag) and detection (conjugated with gold) were used to detect the presence of *E. Coli* through immunochromatography on a nitrocellulose membrane impregnated with anti-Ulfa-Tag antibodies based on the methodology of lateral flow tests. As a control, the gold-conjugated streptavidin-biotin complex was used.

Four distinct strains of *E. coli* were tested, *E. coli* S3R9, *E. coli* S3R22, *E. coli* ATCC 8739 and *E. coli* ATCC 25922, at concentrations from 10^3 to 10^{10} bacteria/mL. Evaluating the results, it was possible to detect the presence of *E. Coli* at concentrations higher than 108 in samples with intact cells and in extracts. Although it is only possible to detect the presence of *E. Coli* at very high concentrations, the biosensor developed may, in the future, undergo protocol optimizations in order to detect lower concentrations.

In short, we can conclude that the development of a biosensor for the detection of UTIs caused by *E. Coli* (without the need for the previous culture), will be a decisive milestone in the early diagnosis of this type of infection with direct implications for treatment and prognosis, idealizing a better quality of life for society.

Keywords: *Escherichia coli*, infection, urinary, biosensor

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