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Electrochemical biosensors for rapid detection of *Escherichia coli* O157:H7

Meng Xu [1], Ronghui Wang [1], Yanbin Li [1, 2*]

[1]Department of Biological and Agricultural Engineering, University of Arkansas, Fayetteville, AR 72701, USA

[2]Center of Excellence for Poultry Science, University of Arkansas, Fayetteville, AR 72701, USA

[*]**Corresponding author:** 203 Engineering Hall, 1260 W. Maple St., Fayetteville, AR 72701, USA. Tel: (479) 575-2881; Fax: (479) 575-2846. yanbinli@uark.edu.

ABSTRACT

Electrochemical biosensors have shown great promise in the development of rapid methods for the detection of foodborne pathogens and have been intensively studied over the past two decades. The scope of this review is to summarize the advancements made in the development of electrochemical biosensors for the rapid detection of one of the most common foodborne pathogens, *Escherichia coli* O157:H7. The article is intended to include different configurations of electrochemical biosensors based on the sensing principles and measured electrical parameters, as well as the latest improvements of technology in the progress of electrochemical biosensor development to detect *E. coli* O157:H7. By discussing the current and future trend based on some of excellent published literatures and reviews, this survey is hoped to illustrate a broad and comprehensive understanding of electrochemical biosensors for the detection of foodborne pathogens.

Keywords: Electrochemical biosensors, Rapid detection, Detection strategy, *Escherichia coli* O157:H7.

1. INTRODUCTION

Foodborne illnesses caused by pathogenic bacteria have always been a serious threat to the health of people and to the economy of nations. The Centers for Disease Control and Prevention (CDC) has estimated that roughly 48 million people get sick, 128,000 are hospitalized, and 3,000 are dead every year in the United States due to foodborne illness [1]. Shiga toxin-producing *E. coli* (STEC) serotype O157:H7 are the most commonly mentioned in *E. coli* group in association with foodborne outbreaks. In the United States, there are estimated over 63,000 cases of *E. coli* O157:H7 infection occurred each year, about 2,100 of those cases involve hospitalization and up to 20 deaths occur. Especially due to the increasing consumption of minimally processed products, such as fruits, vegetables, and ready-to-eat (RTE) products, multistate foodborne outbreaks related to this pathogen in recent years have caused