Electrochemical DNA biosensor for detection of porcine oligonucleotides using [Ru(bpy)2PIP]2+ complex

ABSTRACT

An electrochemical DNA biosensor for detection of porcine oligonucleotides based on ruthenium (II) complexruthenium(II) complex, [Ru(bpy)2(PIP)]2+, (bpy = 2,2ɔbipyridine, PIP = 2-phenylimidazo[4,5-f[[1,10-phenanthroline]) as label redox have been developed. The study was carried out by immobilization of porcine aminated DNA probes sequences on screen printed electrode (SPE) modified with succinimide-acrylic microspheres and [Ru(bpy)2(PIP)]2+ to detect DNA hybridization event. The electrochemical detection by redox active ruthenium (II) complex was measured by cyclic voltammetry (CV) and differential pulse voltammetry (DPV). The results indicate that the interaction of [Ru(bpy)2(PIP)]2+ with hybridization complementary DNA has higher response compared to single-stranded and mismatch complementary DNA. Under optimized condition, this porcine DNA biosensor shows linear response range towards target DNA within range of 1 x10 -5 uM to 1x10-13 uM.

Keyword: DNA biosensor; Ruthenium; Electrochemical