

1 **Abstract for Online Oral Presentation of**

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3 **Electrochemical Monitoring of Biointeraction Between Glyphosate and DNA By**
4 **Using Disposable Pencil Graphite Electrodes**

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13 **Abstract**

14 Glyphosate (GLY) is a worldwide known chemical used to control non-specific vegetation. It is evaluated as
15 “probably carcinogenic to humans” by The International Agency for Research on Cancer. Its cytotoxic
16 effects was investigated on tropical frog larvae, mouse oocytes, plants, humans and animals and it was
17 reported that GLY causes DNA double strand-breaks. Therefore, the use of GLY containing pesticides is
18 controversial in many countries. Herein, biointeraction between GLY and double stranded DNA (dsDNA)
19 was performed and this biointeraction was monitored by using disposable pencil graphite electrodes (PGEs).
20 In this study, as the first step, dsDNA was immobilized at the surface of PGEs, then, the biointeraction was
21 done in the presence of GLY. Electrochemical monitoring of the biointeraction was performed using
22 differential pulse voltammetry (DPV) technique. The oxidation signal of guanine base was monitored at
23 +1.0V and the changes at the guanine signal were evaluated in terms of the biointeraction process.
24 Electrochemical monitoring of the biointeraction between dsDNA and GLY containing pesticide was also
25 studied. The biointeraction was investigated using 25-150 µg/mL GLY or 5-25 µg/mL GLY contained
26 pesticide during different exposure time varying from 5 to 30 min. The most decrease at the guanine signal
27 was obtained in the presence of 100 µg/mL GLY or 15 µg/mL GLY contained pesticide during 5 min
28 interaction. The results suggested that GLY caused DNA damage and GLY contained pesticide had more
29 adverse effect on dsDNA structure. These results were in parallel to the results obtained by animal
30 experiments or single cell gel electrophoresis (SGCE) assay. This is the first study in the literature for the
31 electrochemical investigation of dsDNA and GLY interaction by using disposable PGEs.

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33 **Keywords:** DNA, electrochemical biosensor, glyphosate, pesticide-DNA interaction, pencil graphite
34 electrode.

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