SHORT-TERM EXPOSURE TO THE GLYPHOSATE-BASED HERBICIDE LEADS TO OXIDATIVE DAMAGE IN IMMATURE RAT LIVER

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INTRODUCTION AND OBJECTIVES: Roundup®, a glyphosate-based pesticide, is currently the most widely used herbicide. Recently, glyphosate has been classified as carcinogenic to humans by the World Health Organization (WHO), alerting to the consequences of the use of this pesticide. The aim of this study was to investigate the effect of in vitro exposure to Roundup® on oxidative stress parameters in hepatic tissue of immature rats. MATERIALS AND METHODS: Liver slices from 15 day-old pups were pre-incubated in HBSS for 15 min and then incubated during 30 min with or without 0,001% of Roundup®. The liver was homogenized in 20 mM phosphate buffer containing 0.1% Triton X-100 and 150 mM NaCl, 1:20 (w/v) for determination of TBARS and enzymatic activity of glutathione peroxidase (GPx) and glutathione reductase (GR). The activity of gamma-glutamyl transferase (GGT) and glutathione levels (GSH) were determined in tissue homogenates in Tris-HCl pH 8.5 and 12% TCA, 1:10 (w/v), respectively.

RESULTS: Results showed increased TBARS concentration, suggesting that herbicide exposure causes lipid peroxidation in liver of immature rats. Corroborating the oxidative insult, results showed increased enzymatic activity of GGT after Roundup® exposure, while the activity of GPx and GR were inhibited by the herbicide. However, the hepatic GSH levels were unaltered by pesticide exposure. CONCLUSION: Our results demonstrate that Roundup® induces oxidative stress in the hepatic tissue of immature rats. Data from this study suggest that the herbicide exposure might compromise different metabolic pathways in the liver and then induce hepatotoxicity.

Key words: glyphosate, liver, oxidative stress.
Acknowledgements: CNPq, CAPES, PPGBQA-UFSC, PGFAR-UFSC