

# IN VIVO GENOTOXICITY OF GROUND IVY (*Glechoma hederacea* L.) AND EFFECT ON HEMATOLOGICAL AND BIOCHEMICAL BLOOD PARAMETERS OF RAT



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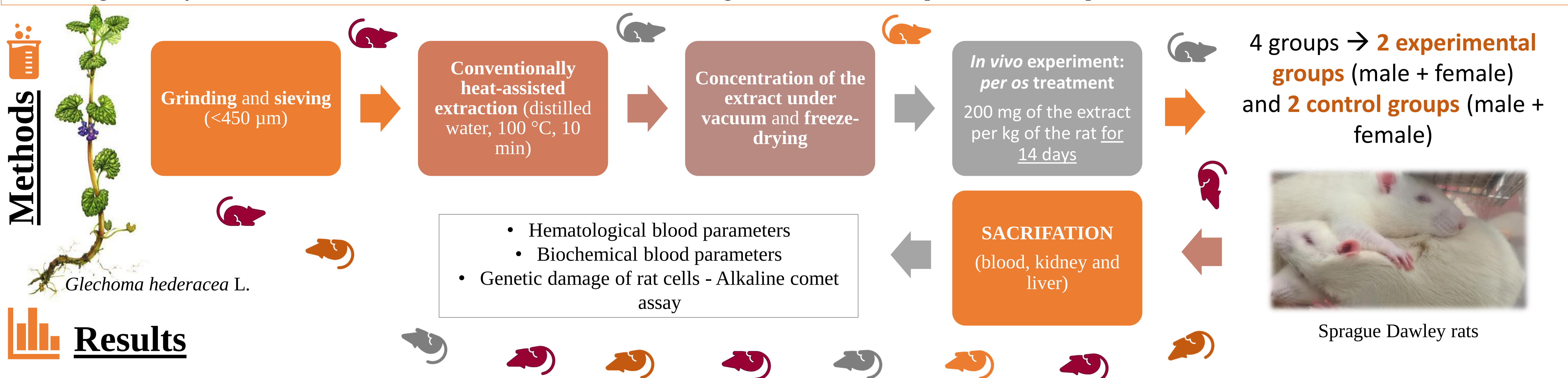


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**References**  
[1] S.T. Chou, et al., *Life Sci.* 231 (2019)

## Introduction

*Lamiaceae* is a large family of plants, many of which have been traditionally used in folk medicine due to various biological properties. *Glechoma hederacea* L., known as ground ivy, belongs to *Lamiaceae* family and is widespread in America, Asia and Europe. It has been used for centuries to treat various diseases such as cold, inflammation, diabetes, bronchitis, asthma, jaundice, gallstones, cholecystitis and urinary tract stones [1]. The aim of the present study was to evaluate *in vivo* genotoxicity of the water extract of ground ivy and to determine whether there was an effect on hematological and biochemical parameters blood parameters of rat.



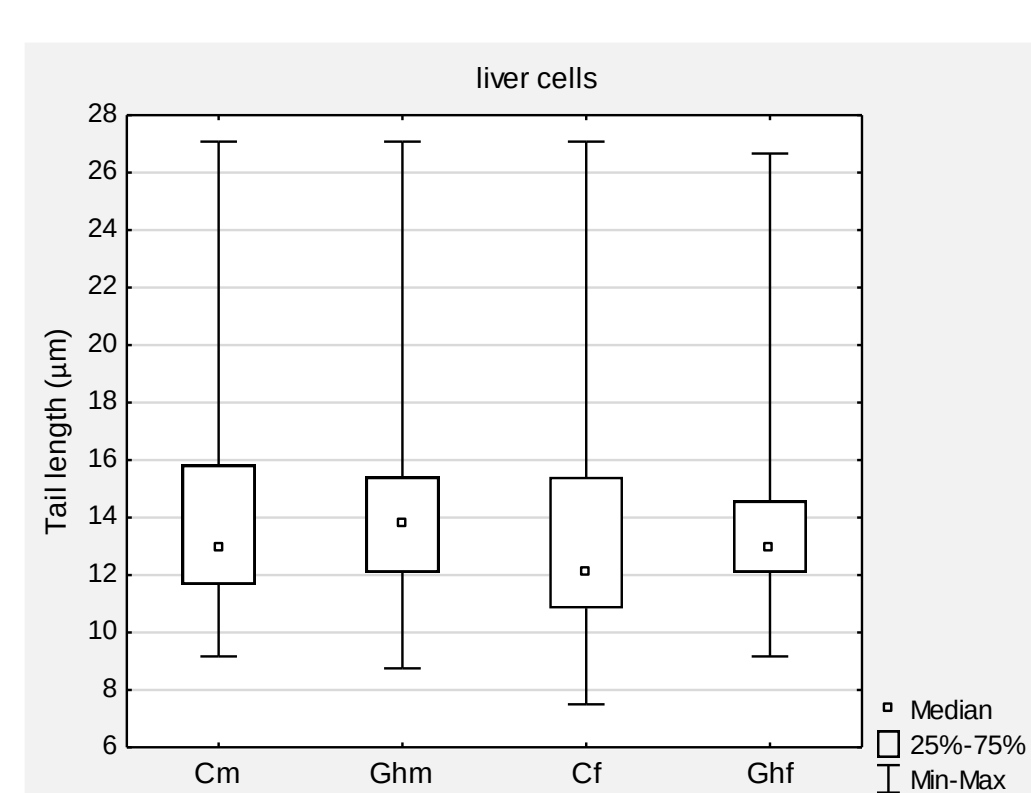
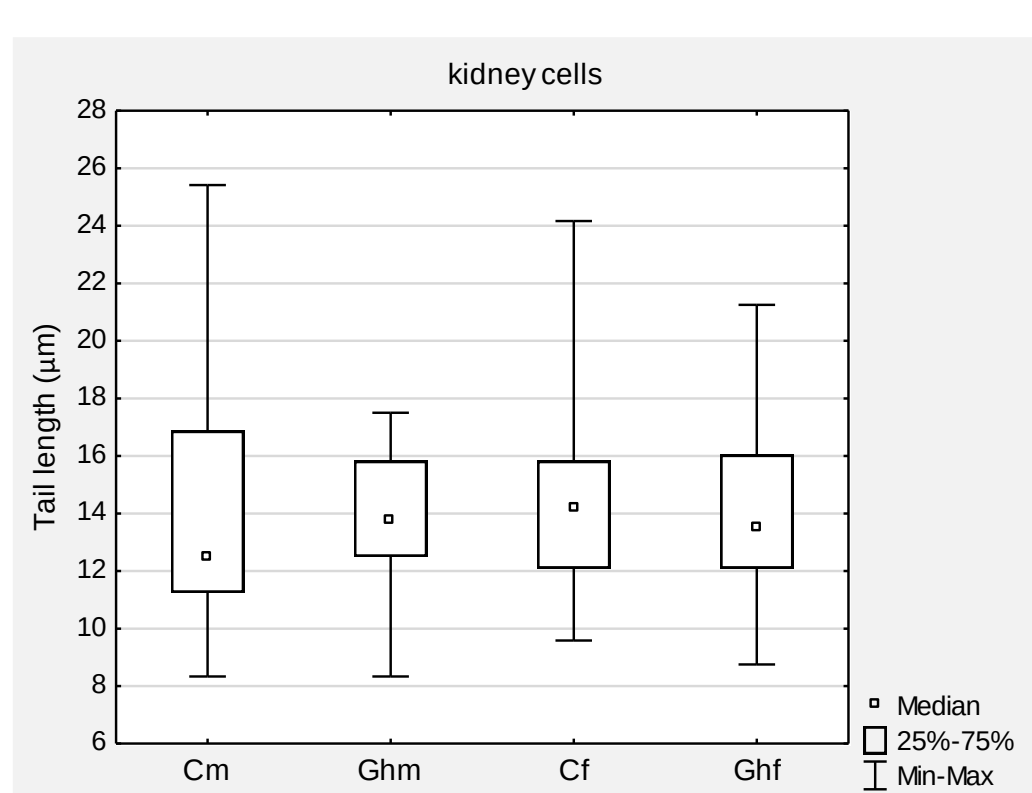
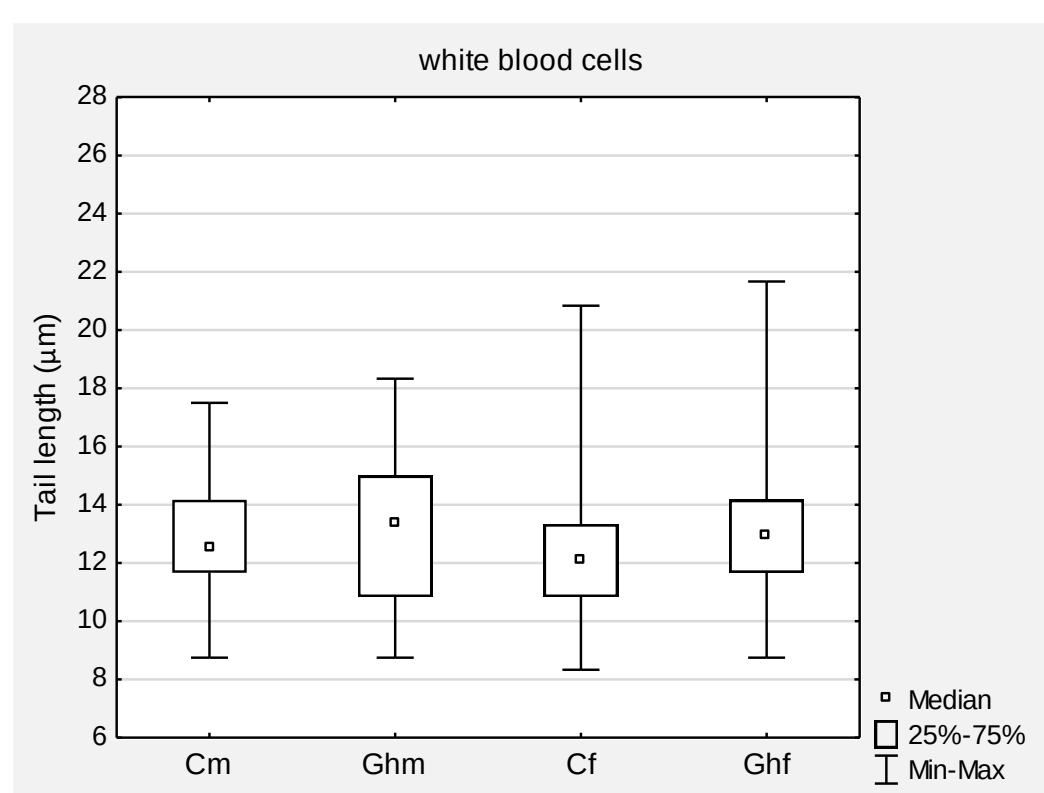
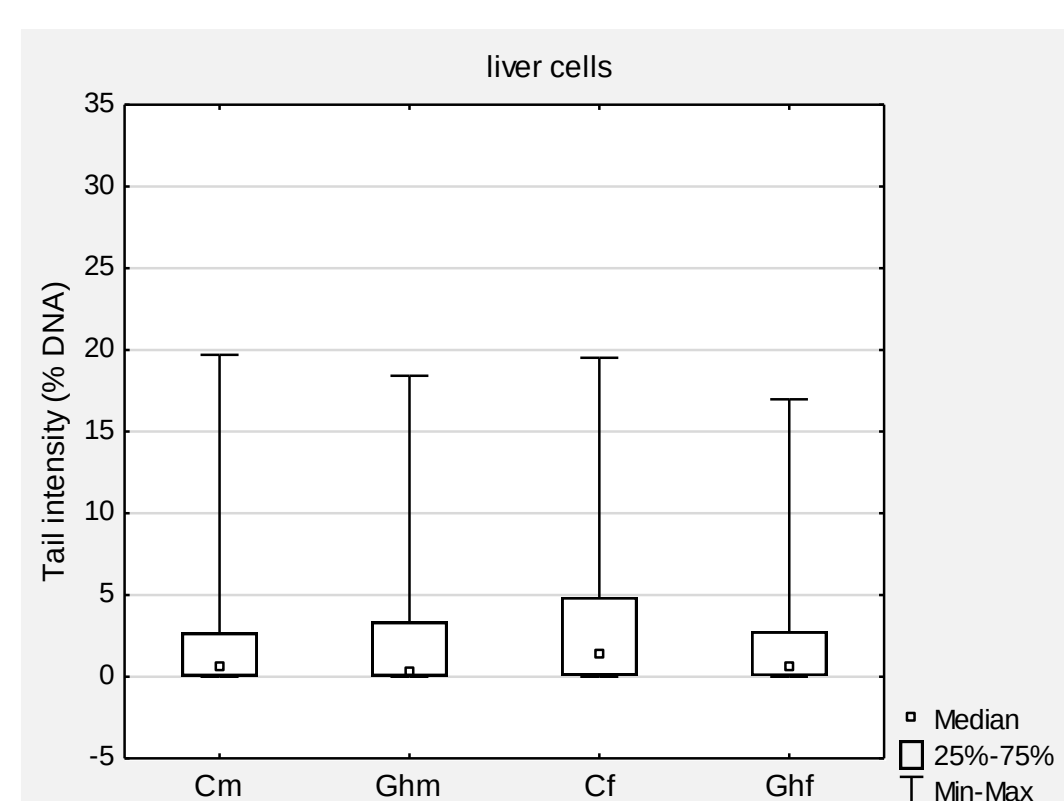
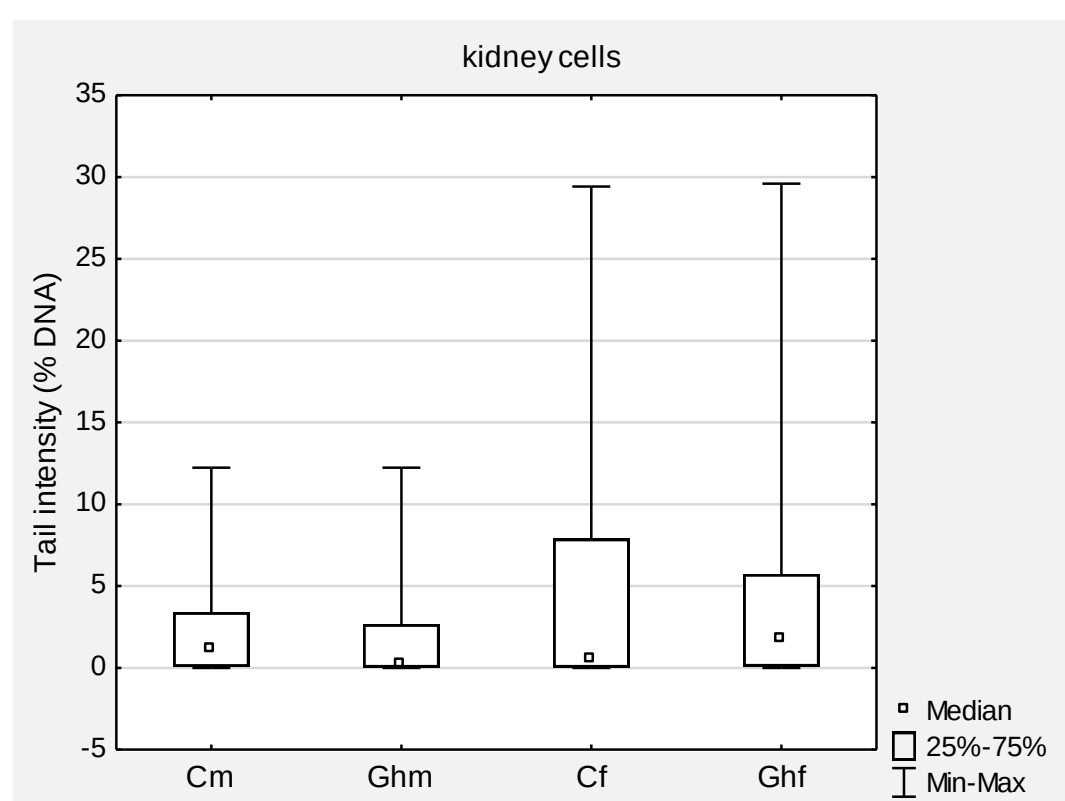
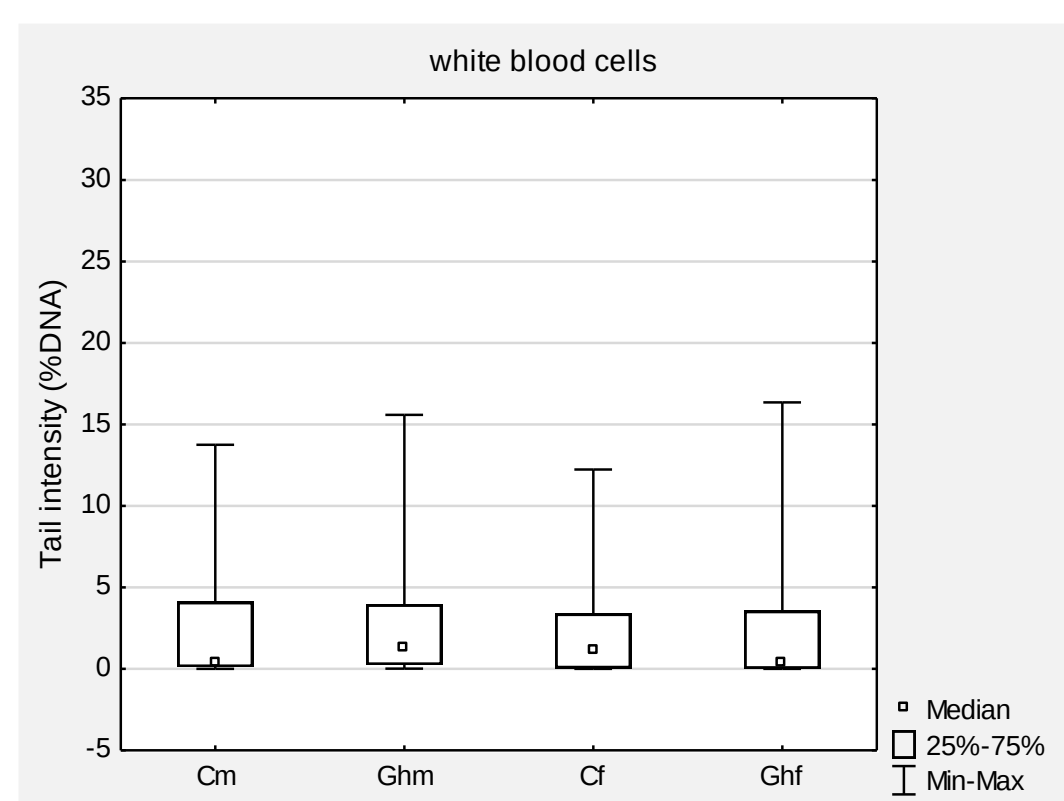
## Results

**Table 1.** Biochemical blood parameters of rats

| Group            | Total protein (g/L) | AST (U/L)         | ALT (U/L)         | LDH (U/L)           | Glucose (mmol/L) | Total bilirubin ( $\mu\text{mol/L}$ ) | Urea (mmol/L)   | Kreatinin ( $\mu\text{mol/L}$ ) |
|------------------|---------------------|-------------------|-------------------|---------------------|------------------|---------------------------------------|-----------------|---------------------------------|
| Control_Female   | 61.00 $\pm$ 3.24    | 98.25 $\pm$ 28.70 | 62.50 $\pm$ 21.65 | 289.00 $\pm$ 137.78 | 16.70 $\pm$ 3.08 | 0.90 $\pm$ 0.22                       | 7.15 $\pm$ 0.30 | 27.00 $\pm$ 3.39                |
| 200 mg/kg_Female | 63.00 $\pm$ 6.04    | 88.75 $\pm$ 5.45  | 46.50 $\pm$ 5.55  | 161.67 $\pm$ 23.61  | 14.20 $\pm$ 3.08 | 1.03 $\pm$ 0.45                       | 7.43 $\pm$ 0.86 | 29.00 $\pm$ 1.22                |
| Control_Male     | 59.67 $\pm$ 0.47    | 91.00 $\pm$ 9.42  | 44.33 $\pm$ 2.49  | 297.67 $\pm$ 70.36  | 17.27 $\pm$ 2.30 | 1.23 $\pm$ 0.42                       | 7.63 $\pm$ 0.26 | 30.67 $\pm$ 1.25                |
| 200 mg/kg_Male   | 69.05 $\pm$ 1.12    | 91.15 $\pm$ 2.25  | 52.27 $\pm$ 3.01  | 185.09 $\pm$ 59.78  | 11.10 $\pm$ 3.11 | 1.00 $\pm$ 0.08                       | 7.11 $\pm$ 0.42 | 29.63 $\pm$ 2.96                |

**Table 2.** Hematological blood parameters of rats

| Group            | Leukocytes $\cdot 10^9/\text{L}$ | Erythrocytes ( $\cdot 10^{12}/\text{L}$ ) | Hemoglobin (g/L)   | Hematocrit (L/L) | MCV (fL)         | MCH (pg)         | MCHC (g/L)        | RDW (%)          | MPV (fL)        | Thrombocytes ( $\cdot 10^9/\text{L}$ ) |
|------------------|----------------------------------|-------------------------------------------|--------------------|------------------|------------------|------------------|-------------------|------------------|-----------------|----------------------------------------|
| Control_Female   | 9.60 $\pm$ 0.22                  | 7.81 $\pm$ 0.89                           | 150.00 $\pm$ 5.00  | 0.45 $\pm$ 0.01  | 58.10 $\pm$ 0.64 | 19.20 $\pm$ 0.13 | 330.00 $\pm$ 1.12 | 11.60 $\pm$ 0.43 | 7.00 $\pm$ 0.03 | 976.00 $\pm$ 35.87                     |
| 200 mg/kg_Female | 8.65 $\pm$ 0.25                  | 6.80 $\pm$ 0.66                           | 125.33 $\pm$ 11.32 | 0.38 $\pm$ 0.04  | 55.17 $\pm$ 0.90 | 18.43 $\pm$ 0.25 | 334.33 $\pm$ 0.94 | 11.20 $\pm$ 0.41 | 7.07 $\pm$ 0.17 | 680.67 $\pm$ 449.38                    |
| Control_Male     | 10.65 $\pm$ 0.35                 | 7.94 $\pm$ 0.39                           | 152.00 $\pm$ 6.00  | 0.46 $\pm$ 0.02  | 57.65 $\pm$ 0.45 | 19.15 $\pm$ 0.15 | 332.50 $\pm$ 0.50 | 12.15 $\pm$ 0.55 | 7.15 $\pm$ 0.05 | 575.50 $\pm$ 282.50                    |
| 200 mg/kg_Male   | 9.25 $\pm$ 2.17                  | 8.44 $\pm$ 0.40                           | 159.00 $\pm$ 7.91  | 0.49 $\pm$ 0.03  | 57.53 $\pm$ 0.79 | 18.88 $\pm$ 0.38 | 327.75 $\pm$ 3.96 | 12.83 $\pm$ 0.36 | 7.13 $\pm$ 0.11 | 865.00 $\pm$ 37.70                     |



**Figure 1.** Primary DNA damage values of comet parameters: tail length and tail intensity [median and range (min–max)] in white blood cells, liver and kidney cells of male (m) and female (f) rats treated with extract of *Glechoma hederacea* (200 mg/kg). 200 comets per group (50 per animal) were measured.

ANOVA with post hoc Tukey test was used for evaluation of statistical significance ( $p < 0.05$ ). Cm – control male, Cf – control female, Ghm – male treated with *Glechoma hederacea*, Ghf – female treated with *Glechoma hederacea*

## Conclusions

- All animals survived the experiment and there were no evidence of genotoxic activity after exposure to the ground ivy extract.
- Tall intensity and tall length of DNA of experimental group did not differ significantly from those of control group.
- Hematological and biochemical blood parameters also did not indicate any harmful effect of the ground ivy extract.

## Acknowledgement

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