In many research genotoxic potential of food additives has been investigated. However there are few findings about the effect of artificial food colourings (AFC) on DNA. In this experimental study, we aimed to analyze whether in utero exposed artificial food colourings would have effect on DNA and cause damage. Thirteen female rats were included to the study which were equally divided into two groups as control (CG, n = 15) and food colouring (FCG, n = 15) groups. A mixture of nine food colours were given daily to FCG by oral gavage from preconception to birth. No adverse effect level (NOAEL) of artificial food colourings for each colouring was administered to FCG. Three months after the birth, 6 offspring from each group were selected randomly as control (CG) and experiment (EG) groups. Then they were sacrificed under anesthesia. For performing the Alkaline comet comet assay leukocytes were separated from whole blood samples. The alkaline comet assay was performed. The extent of DNA damage was assessed from the length of DNA migration derived by subtracting the diameter of the nucleus from the total length of the image and graded into 5 categories and these grades were converted into arbitrary unit (AU). Differences between the means of data were compared by Independent Samples T test. The results were given as the mean+SD, p values of less than 0.05 were considered as statistically significant. Although the extent of DNA damage was higher in EG, the comparison of experiment (13.50 + 1.76) and control (11.66 + 1.36) groups showed no statistical difference (p = 0.072).