**Aim**: α-lipoic Acid (A α-L) is a pleiotropic compound with potential pharmaco therapeutical value against a range of pathophysiological diseases. The present study evaluates the protective role of α-lipoic acid against AlCl3-induced toxic effects in Wistar Albino rats.

**Methods**: The experiment was performed on 40 female rats in five groups of 8 rats each: control group (A), group 2 treated with (AlCl3 ) at (100mg/kg body weight), group 3 treated with alpha lipoic acid (A α-L); group 4 (AlCl3+ A α-L) treated with aluminum chloride and alpha lipoic acid (100 mg/kg body weight) at the same time and group 5 (A α-L -AlCl3) treated with alpha lipoic acid after aluminum chloride intoxication. The treatment is continued for three weeks.

**Results**: The biochemical assessment revealed a significant increase in blood glucose. The levels of progesterone and LH showed a significant difference between the two groups (pubescent and pre-pubescent), (p<0.05). The results showed serious alterations (the appearance of severe cellular lesions, infiltration of inflammatory and tissue degeneration at the level of hepatic parenchyma). A decrease in plasma glucose concentration was noted in the alpha lipoic acid-treated groups and in the AlCl3 and A combination-treated groups α-L. In the group treated with Aα-L alone, a significant decrease in urea levels was observed compared to the other groups.

**CONCLUSION**: A α-L, as a dietary supplement, has shown a potential role in cognitive functions with an improvement of the cholinergic system thus having an interesting therapeutic effect.