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In-Vitro Hepatoprotective Activity of *Glycyrrhiza glabra* Root Extract on Hepg2 Cell Line

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ABSTRACT

In vitro, assays are important in the evaluation of plants with hepatoprotective activity. In this study compares the D-galactosamine and without D-galactosamine with glycyrrhiza glabra extract root on Hepg2 cell. Dexamethasone was used as a positive control. Then determine the cytotoxicity assay.

INTRODUCTION

Hepg2 cell is one of the most common worldwide diseases and there is no treatment to date liver cancer is the second most common disease of cancer death worldwide, it causing about 746,000 deaths in 2012. Liver disease is one of the major and serious health diseases. Liquorice is a traditional plant that has been used in the food and treatment of various diseases. Liquorice is the triterpenoid, saponin from the *Glycyrrhiza glabra* root. It consists of one molecule of glycyrrhizin acid and another two molecules of glucuronic acid. *Glycyrrhiza glabra* has various pharmacological activities such as anti-inflammatory, anticancer, antimalarial, and anti-oxidant. Phytochemical investigation of aqueous extract of *Glycyrrhiza glabra* root extract showed the presence of the flavonoid, saponin, tannins, glycoside and other chemical constituents. According to Ayurveda the plant of *Glycyrrhiza glabra* root extract is used for cancer, liver disease, and blood disease. And also used in antipyretic, laxative and diuretic. D-galactosamine is well established as a hepatotoxin, it induced liver injury of human hepatitis, and inflammation and resembling of drug-induced liver disease in humans. The toxicity of D-galactosamine is related to the uridine pools that are associated with ribonucleic acid (RNA) and protein synthesis, thus the hepatocellular function. In the present study dexamethasone is a positive control, it has been evaluated for its hepatoprotective activity against D-galactosamine induced the Hepg2 cell line. Therefore, this study in this study, Dexamethasone was used as the positive control to compare the cytotoxicity of *Glycyrrhiza glabra* against the D-galactosamine-induced hepatotoxicity.

MATERIAL AND METHOD

Plant material-

The plant material was purchased from Mankarnika Aushadhalya, Sadashiv Pethnagnath Park, Pune. The plant would be authentificated by Regional Ayurveda Research Institute for fundamental research center Kothrud, Pune.

Material & method

Four doses of the test solution (50,100,150,200ug/ml) were tested on D-galactosamine induced Hepg2 cell and without D-galactosamine induced Hepg2cell. MTT assay was performed to determine the hepatoprotective activity.

Hepg2 cell culture & dose determination

Hepg2 cell lines were obtained from the National center cell science, Pune, India. Cells were incubated in a humidified atmosphere& 5% co_2 in 37^0C incubator. Cell was grow in Minimum essential medium (MEM) was from- and Fetal bovine serum (FBS) was from-, Dimethyl sulfoxide (DMSO) trypsin obtained from Hi Media, 3-(4,5-dimethyl thiazol 2-yl)-2,5-diphenyltetrazolium bromide (MTT) was purchased from Hi media (Mumbai, India), D-galactosamine (Hi media lab Limited), Dexamethasone (Hi media lab Limited), MTT assay was determine the dose range for hepatoprotective study. four doses of glycyrrhiza glabra that is 50,100,150, 200ug/ml.

Preparation of the aqueous extract

50gm dried Liquorice root macerated in 1000ml of distilled water for 24 hours. Shaking frequently for six hours and being allowed to stand for eighteen hours by rotary incubator. Under the temperature 37^0c & 80 rpm. Further extraction the aqueous extract was filter through double filter paper or Whatman filter paper. The filtrate was collected in a sterile flask, and the extracts were concentrated using a lyophilization process and then formed the dried powder.

D-galactosamine induced Hepg2 cell line

HepG2 cell were adjusted to be $4x10^6$ cell/well in MEM supplemented with 10% FBS and 200µl of cell suspension were plated into 96 well culture plate kept for overnight incubation at 37^0C with 5% co_2. When the confluent monolayer was formed, the medium was removed, and washed once with plane medium (MEM without serum). Then the cells were treated with different concentrations (50,100,150,200µg/ml) of the test substance & plate was again incubated for 24 hours. After completion of incubation the cell were treated with 10Mm of D-galactosamine and plate was further incubated for 37^0C with 5% co2 for 3 to 4 hours. The supernatant was removed

carefully and 100µl of DMSO (100%) was added to dissolve the crystals. Then, the plate was kept for shaking at 180 rpm for 2 to 3 minutes on a plate shaker. Finally, readings were recorded at 550 nm with the help of the ELISA plate reader.

Without D-galactosamine induced Hepg2 cell line

Hepg2 cell were adjusted to be $4x10^6$ cell/well in MEM supplemented with 10% FBS and 200µl of cell suspension were plated into 96 well culture plate kept for overnight incubation at 37^0C with 5% CO_2. When the confluent monolayer was formed, the medium was removed, washed once with plane medium (MEM without serum). Then the cells were treated with different concentrations (50,100,150,200µg/ml) of the test substance & plate was again incubated for 24 hours. After completion of incubation the cell were treated with 10Mm extract solution & plate was further incubated for 37^0C with 5% CO_2 for 3 to 4 hours. The supernatant was removed carefully and 100µl of DMSO (100%) was added to dissolve the crystals. Then, the plate was kept for shaking at 180 rpm for 2 to 3 minutes on a plate shaker. Finally readings were recorded at 550 nm with the help of the ELISA plate reader.

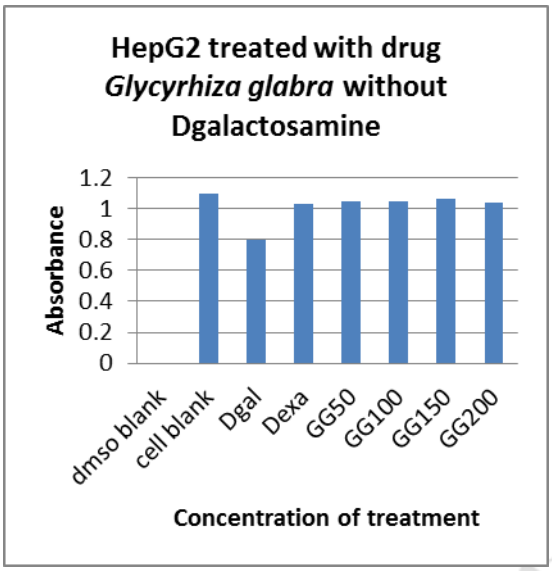
RESULT

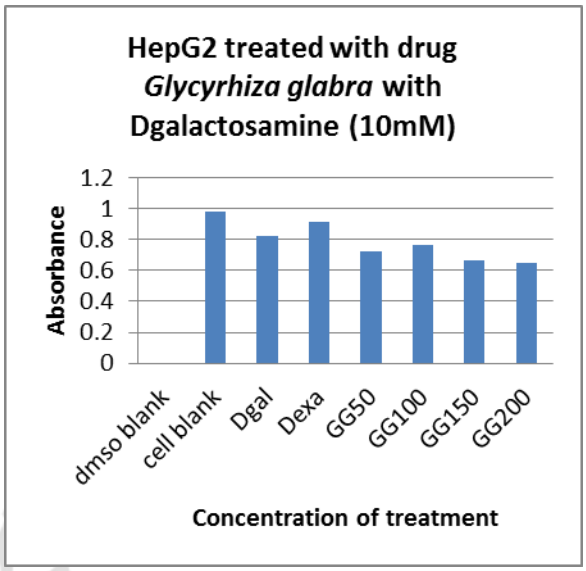
On the treatment with the different concentrations (50-200ug/ml) for 24hrs. D-galactosamine induced cytotoxicity & the activity was comparable with the without D-galactosamine. Hepg2 cell were treated with D-galactosamine (10mM standardized with experiment) for 24 hours to induce hepatic toxicity. At the same time the hepatoprotective drug was also added in a gradient to check its activity against the toxic effect of D-galactosamine. Dexametansone was kept a positive control, to check if it drug is inducing any toxicity blank for the same were also maintained. The cells treated with only the drug showed no toxicity but also supplemented the growth of the cells. It was observed that the cell number of cells treated with D-galactosamine (10mM) increased with a sudden group of cells at higher concentration.

DISCUSSION

In this study, we used the Hepg2 cell line to evaluate the hepatoprotective activity of *Glycyrrhiza glabra* root extract against the liver damage induced by the D-galactosamine on the treatment with the different concentration (50-200ug/ml) for 24hrs for D-galactosamine induced

cytotoxicity and the activity comparable with the without D-galactosamine. Phytoconstituents such as flavonoids, terpenoids, tannins, and steroids. In recent years due to their diverse pharmacological activity including hepatoprotective activity. In the presence of such *Glycyrrhiza glabra* root extract is responsible for the hepatoprotective activity.





CONCLUSION-

Based on the result the glycyrrhiza glabra root extract was demonstrated a significant hepatoprotective activity against D-galactosamine-induced the cytotoxicity.

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