ABSTRACT

Indigenous community/ healers have their own conventional medicine system which may use single or combination of different plant parts. The plant *Morus indica* L. used for hepatoprotective purposes by local tribes of Bodoland Territorial Area District (BTAD), Assam was well supported by the *in-vivo* experimental model conducted on Carbon Tetrachloride (CCl_4) induced acute liver damage in wistar albino rats. Treatment with different doses of root of *Morus indica*-ethanolic extracts (RoMi-EE) (100 mg and 200 mg), the elevated levels of alanine transaminase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP) were markedly decreased and increased concentration of total cholesterol (TC), triglyceride (TG), low-density lipoprotein (LDL), very-low-density lipoprotein (VLDL), total bilirubin, gamma-glutamyltransferase (GGT), creatinine were notably checked and depleted levels of high-density lipoprotein (HDL), albumin and total protein were recovered considerably. Meanwhile, significant increase in the superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx) and glutathione (GSH) activity and reduction of malondialdehyde (MDA) content upto 48% was noted in the RoMi-EE and silymarin treated groups. The histopathological study after treatment with different concentrations of RoMi-EE, the severity of CCl_4 induced liver and kidney intoxication was reduced in a dose-dependent manner, although the treatment with silymarin showed much better result.

In-silico molecular docking with 1NFK & 3LN1 proteins revealed that the ligand 2, 6, 10-Dodecatrien-1-ol, 3, 7, 11- trimethyl-9-(phenyl sulfonyl)–(E,E)- showed best docking score (ΔG binding affinity) of -4.95 (-45.35 kcal/mol) which is also comparable with that of silymarin and -9.78 (-27.8172 kcal/mol) respectively.

The *in-vivo* test so performed showed good results which are attributed to higher contents of phenolics, flavonoids, total antioxidant capacity and higher activity in total reducing power assay were obtained in the plant extract. Increase in radical scavenging activity was observed with increase in concentration in the *in-vitro* antioxidant tests of DPPH (2,2-diphenyl-1-picrylhydrazyl), ABTS [2,2'-azino-bis(3-ethylbenzothiazoline-6-sulphonic acid) and H_2O_2 (hydrogen peroxide) having lowest IC_{50} values observed in the RoMi-EE (130.57 ± 12.46), RoAc-EE (7.94 ± 1.33) and RoAc-EE (12.67 ± 1.58) µg/ml respectively. For ICC (iron chelating capacity) and FRAP (ferric reducing antioxidant power) assay, the lowest EC_{50} value and highest $FeSO_4.7H_2O$ concentration was observed in RoPt-EE (535.16 ± 121.56 µg/ml) and RoAc-AE (2512.7 ± 157.37 µM/mg) respectively. Presence of various phytochemicals *viz*: phenols, flavonoids, tannins, resins, terpenoids, glycosides and steroids have been detected from the selected plants through qualitative test.

The GC-MS analysis have revealed the presence of various bioactive compounds that are reported for the first time from the ethanolic extract of RoMi and reported to have various biological activities such as antibacterial, anti-inflammatory, anti-diabetic, anticancer, anti-arthritic, hepatoprotective, effective against asthma and HIV-1 entry.

From the study, it is evident that RoMi-EE, showed high contents of antioxidant and *in-vivo* activity, making it highly potential as an alternative for treating liver disorders.