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Hepatoprotective Activity of Phytosomal Silymarin, Piperine and their Combination in Experimental Type 2 Diabetic Rats †

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Abstract: Diabetes mellitus (DM) is a risk factor for the development of various disorders. The present study aims to prepare and characterize phytosome of silymarin and piperine and also examine the effect of streptozotocin (STZ)-induced DM on the promotion of 2-Nitropropane (2-NP) induced hepatotoxicity. Further, we investigated the effect of phytosomal preparation on experimentally induced diabetic-hepatotoxicity. Phospholipid complexes were prepared by using the antisolvent precipitation technique. DM was induced by STZ (55 mg/kg b.w. i.p.) and hepatotoxicity by 2-NP (120 mg/kg b.w. i.p.). All diabetic animals were treated orally once daily for 56 days. Metformin (250 mg/kg) was used as standard; Phytosomal silymarin (equivalent to 50 mg/kg silymarin) and phytosomal piperine (equivalent to 40 mg/kg piperine) were used as the individual treatment group. Phytosomal silymarin (50 mg/kg) with piperine (20 mg/kg) and piperine (40 mg/kg) used as combined treatment. On 57th day, 2-NP dissolved in olive oil was injected and treated with the same dose as in antidiabetic activity. One week later, the blood and liver samples were collected to study biochemistry and histopathology. Both phospholipid complexes (molar ratio-1:1) have good percentage yield, drug content, loading capacity, complexation efficiency, and stability. FTIR, XRD, and DSC confirmed the presence of physical and chemical interactions. Well-formed vesicles were revealed by TEM. The STZ induced diabetes promoted the hepatotoxicity of 2-NP. The treatment significantly maintained the body weight, reduced glucose level, improved OGTT, reduced glycosylated hemoglobin, increased plasma insulin level and decreased HOMA-IR index, and improved lipid profile. Liver dysfunction markers and antioxidant enzymes in liver tissue were also improved. Histopathological examination indicated that treatment exhibited great reversal of all changes. The STZ can be used to promote the 2-NP induced hepatotoxicity. Treatment with phytosomal silymarin, piperine, and their combination attenuates the effect of STZ+2-NP induced hepatotoxicity akin to metformin.

Keywords: Diabetes mellitus (DM); phytosomal; diabetic-hepatotoxicity.

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Conflicts of Interest

The authors declare no conflict of interest.