ABSTRACT

*Morus indica* – MI occupies as important position in the holistic system of Indian medicine ‘Ayurveda’ which has its roots in antiquity and has been practiced for centuries. Present study investigated nutrient, phytochemical, antioxidant and lipid lowering properties in three of *Morus indica* species (MI-M5, MI-V1, MI-S36). The three plants were good sources of dietary fibre, minerals, trace elements etc. MI-S36 variety was rich in phytochemicals and antioxidants such as glutathione, β carotene, flavonoids, alkaloids, tannins. Five extracts methanol (MIM), 80% methanol (MI8M), dechorophylised (MIDc), aqueous cold (MIAQc) and aqueous hot (MIAQh) were prepared from the three plant leaf powders. The polyphenol content of the extracts was in the order of MIDc > MIM > MI8M > MIAQc and MIAQh. HPLC finger printing showed the presence of Coumarin in MIDc of MI-M5. The radical scavenging activity and reducing capacity of the MI-S36 was significantly (p ≤0.05) higher than the other two samples. The IC50 of the MI-S36 was less than MI-M5 and MI-V1. No significant difference in metal chelating capacity was observed between the samples. In food substrate (oil emulsion), the rate of inhibition of oxidation by MIM and MI8M extracts was significantly (p≤0.05) high at lower concentration. In the biological substrates, inhibition of oxidation in cholesterol by MIDc and MIAQc extracts of all the samples was significantly (p≤0.05) higher. In brain homogenate, the MI8M of MI-M5 and MI-S36 showed significantly (p≤0.05) higher oxidation inhibition and in liver microsomes MIM, MI8M and MIDc activity were significantly (p≤0.05) high. MIDc extract inhibited the activity HMG CoA reductase at higher percentage than the statins. In our laboratory, for the first time method based on digestion, hydration and diffusion of bile acids was optimized, which improved the bile acid binding of MI-M5 and MI-V1. Heat treatment resulted in significant (p ≤0.05) improvement of BARI (Bile acid retardation index). Based on *in vitro* and *ex vivo* experimental results, MI8M, MIDc and MIAQc extracts of MI-S36 was chosen for further *in vivo* studies. Acute toxicological studies at 2000mg/kg BW of the three extracts did not result in any notable adverse effects in animals. The MIDc and MIAQc were hepatoprotective against CCl4 toxicity. Both toxicity and hepatoprotective nature of the Morus extracts was supported by histopathological profiles of the liver. Treatment of hypercholesterolemic rats with 80% methanol and saponins extracts had resulted in a significant (p≤ 0.05) reduction in total cholesterol and LDL-C and also no significant difference was observed with the statins treated group. Lipid peroxides levels were significantly low and glutathione levels were significantly high in Morus treated groups. Histopathological sections of the liver showed no adverse effect or fat deposition, however, the fat percentage of the positive control liver was significantly higher than the healthy control and 80% methanol groups. It can be concluded that *Morus indica*, as good source of nutrients, phytochemicals and antioxidants with promising antioxidant activity and lipid lowering properties Morus may possibly be developed as an alternative cholesterol-lowering drug.