Antioxidant and anti-fibrotic properties of *Lythrum salicaria* root in CCL₄-induced liver fibrosis rat model

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**Objectives**
The study was conducted to investigate antioxidant and liver fibrosis protecting activities of *Lythrum salicaria* root

**Materials and Methods**
- **Materials**: Root of *L. salicaria* (LSR) was collected in the medicinal crop farm of RDA in 2004.
- **Methods**
  - Preparation of extract was conducted by extraction procedure with 50% ethanol at 85°C, for 2 hours for the study. Evaporation of the solvent in extracts filtered was conducted under vacuum atmosphere.
  - In vitro antioxidant activity against ROS and peroxynitrite in chemical environment and on cells such as Y PEN1 and BV2 were analyzed.
  - Animal and treatment: SD male rats were composed of normal group, CCL₄ single treated group (negative control), CCL₄ plus LSR-treated groups (0.5, 0.25g, 0.5g of LSR extract/Kg), CCL₄ plus silymarin-treated groups (0.5, 0.25g, 0.5g of LSR extract/Kg) and induced liver fibrosis with carbon tetrachloride three times for 6 weeks. Liver fibrosis of rats was induced by intra-peritoneal injection of 40% CCL₄ (1.0㎖/kg body weight) dissolved in 0.5㎖ of corn oil twice per week. TBA RS production and ratio of GSH/GSSG (reduced glutathione/oxidized glutathione) as antioxidant parameters, hydroxyproline content and microscopic analysis as collagen production indicators were investigated.

**Results**
Fifty percent ethanol extracts of *L. salicaria* root showed effective *in vitro* antioxidant activities on ROS and peroxynitrite. Ratio of hepatic GSH/GSSG in CCL₄ plus LSR extract (0.125~0.5g/Kg)-treated rats increased from 2.8 to 5.7 fold values compared to that of CCL₄-treated rats. Amounts of hydroxyproline in CCL₄ plus LSR extract-administrated rat livers were 5~10㎍/㎎ which were

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correspond to -44 to -72% of the value in CCL_4-treated rat livers (18㎍/㎎ tissue). This collagen reducing effect of liver tissue in CCL_4 plus LSR–treated rats was supported by immunohistochemical and histological observation. The results showed that the root of *L. salicaria* have efficient antioxidant potential and effective antifibrotic activities in liver fibrosis induced rat.

**Fig. 1.** Effect of LSR extract on the ratio of GSH and GSSH (a) and total collagen content (b) of fibrosis–induced liver of rat

**Fig. 2.** Histological observation for explaining the effect of LSR extract on collagen production in fibrosis–induced liver of rat (×100). N, vehicle–injected normal group; NC, negative control, CCL_4 (1㎖ of 40% CCL_4 /Kg body weight with 1.5㎖ of corn oil plus 1㎖ of distilled water, 2 times/week for 6 weeks) injected group Sil-0.25, Sil-0.5, 0.25g, 0.5g silymarin/Kg body weight/rat/day–supplemented & CCL_4–injected group; LSR-0.25, LSR-0.5, 0.25g, 0.5g of LSR extract/Kg body weight of rat/day–supplemented & CCL_4–injected group. Values with alphabet on each bar are significantly different at P<0.05.