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Antioxidative effects of curcumin, {beta}-myrcene and 1,8-cineole against 2,3,7,8-tetrachlorodibenzo-p-dioxin-induced oxidative stress in rats liver.

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Abstract

The aim of this study was to investigate the effectiveness of curcumin, β -myrcene (myrcene) and 1,8-cineole (cineole) on antioxidant defense system in rats given a persistent environmental pollutant (2,3,7,8-tetrachlorodibenzo-p-dioxin, TCDD). Rats ($n = 112$) were divided randomly into 8 equal groups. One group was kept as control and given corn oil as carrier. TCDD was orally administered at the dose of $2 \mu\text{g}/\text{kg}/\text{week}$. Curcumin, myrcene and cineole were orally administered at the doses of $100 \text{ mg}/\text{kg}/\text{day}$, $200 \text{ mg}/\text{kg}/\text{day}$ and $100 \text{ mg}/\text{kg}/\text{day}$, respectively, by gavages dissolved in corn oil with and without TCDD. The liver samples were taken from half of all rats on day 30 and from the remaining half on day 60 for the determination of thiobarbituric acid reactive substances (TBARS), reduced glutathione (GSH), catalase (CAT), glutathione peroxidase (GSH-Px) and CuZn-SOD levels by spectrophotometric method. The results indicated that although TCDD significantly ($p \leq 0.01$) increased formation of TBARS, it caused a significant decline in the levels of GSH, CAT, GSH-Px and CuZn-SOD in rats. In contrast, curcumin, myrcene and cineole significantly increased GSH, CAT, GSH-Px and CuZn-SOD levels but decreased formation of TBARS. Additionally, the antioxidative effects of curcumin, myrcene and cineole were increased at day 60 compared to day 30. In the TCDD groups given curcumin, myrcene and cineole, oxidative stress decreased by time. In conclusion, curcumin, myrcene and cineole showed antioxidant activity and eliminated TCDD-induced oxidative stress in rats in a time-dependent manner.

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