

Effect of oxidized frying oil and vitamin C levels on the hepatic xenobiotic-metabolizing enzyme system of guinea pigs

Chih-Chiang Chiu, Kuan-Pin Su, Tsung-Chi Cheng, Hsing-Cheng Liu, Ching-Jui Chang,
Michael E. Dewey, Robert Stewart and Shih-Yi Huang
Liu JF, Lee YW, Chang FC.

Abstract

The influence of oxidized frying oil (OFO) on the guinea pig hepatic microsomal xenobiotic-metabolizing enzyme system in the presence of different amounts dietary vitamin C was investigated. Weanling male guinea pigs were divided into four groups and were fed 15% oxidized frying oil diets supplemented with vitamin C at 300, 600, or 1,500 mg/kg (experimental diets) or a control diet that contained 15% fresh untreated soybean oil with 300 mg/kg of vitamin C, respectively. After 60 d, guinea pigs were euthanized and phase I and phase II xenobiotic-metabolizing enzymes in the liver were determined. Compared with the fresh oil diet fed the control group, the relative liver weight was higher in the OFO-fed groups. Hepatic microsomal protein and cytochrome P450 contents were significantly higher in OFO-fed guinea pigs than in the control group. Both values increased in response to increased intake of vitamin C. The activities of phase II relative components, including UDP-glucuronyl transferase, UDP-glucuronyl dehydrogenase and beta-glucuronidase, of guinea pigs fed the OFO diets supplemented with 300 mg vitamin C/kg were significantly higher than those of guinea pigs fed the control diet. However, the phase II relative components decreased with increasing vitamin C content in the diet. The results demonstrate that both dietary OFO and vitamin C in guinea pigs induce hepatic xenobiotic-metabolizing enzymes, but the level of induction is modulated by the dietary vitamin C level.