

A B S T R A C T

One of the most serious complications of severe protein-energy malnutrition (PEM) is hepatic failure, which is usually associated with fatty infiltration of the liver. The precise biochemical cause of fatty liver is unknown. This study was designed to investigate the relationship between hepatic glutathione (GSH) and fat accumulation in the liver. Also, the experiment was designed in such a way as to determine the effects of different sources of dietary protein.

21 days old weanling rats were fed for 20 days on diets containing adequate protein (Purina Laboratory Chow) (PLC) and Casein (CC) - 23% protein), low protein (LP - 7% Casein), low protein supplemented with cysteine (LPC) to the level in the CC diet and, choline deficient diet (CD).

The animals were weighed on the days of weaning and sacrifice. On the day of sacrifice, the blood, liver and kidney were rapidly removed, liver and kidney blotted on filter paper weighed and GSH and fat measured using standard procedures.

Animals on the CD diet lost weight and had twice the hepatic GSH levels compared to rats on the LP diet. However, they did not develop fatty livers as expected due to the deterioration of the diet in storage.

Rats on the PLC diet had significantly greater body weight gains ($p < 0.01$), higher liver GSH and cysteine values and lower liver triglyceride (TG) values than rats on the CC diet. Thus, the CC diet was used as the reference diet since the test diets were casein-based formulae.

Rats on the LP diet showed reduced body weight gain and fat-free dry liver weight (FFDLW) values compared to the control. Liver glutathione (GSH) and cysteine concentrations were also reduced but there was no significant change in kidney and blood GSH concentrations. Liver fat and triglyceride (TG) values were significantly increased compared to the control ($p < 0.01$).

The addition of cysteine to the LP diet, dramatically increased liver GSH, FFDLW and body weight values and prevented liver fat and TG levels from increasing.

It is concluded that the hepatic GSH and fat levels in weanling rats depend not only on the cysteine content of the diet but, also on the quality and composition of protein in the diet. Also, that cysteine directly or by maintaining liver GSH levels, prevented the increase of liver fat found in weanling rats on the LP diet.