

Effect of Coffee Components on Glutathione S-Transferases: a Potential Mechanism for Anticarcinogenic Effects

A. C. HUGGETT, C. CAVIN, D. HOLZHÄUSER, I. PERRIN, B. SCHILTER

Quality and Safety Assurance, Nestlé Research Centre, Vers-chez- les- Blanc, P.O. Box 44,
CH-1000 Lausanne, Switzerland

SUMMARY

There is increasing evidence that coffee and some of its major components may protect against certain cancers. We have previously proposed that the anticarcinogenic activity of the coffee-specific diterpenes cafestol and kahweol may involve a modulation of the enzymes, which activate and detoxify carcinogens. The glutathione S-transferases constitute a family of enzymes whose induction has been linked to the anticarcinogenic activity of several chemoprotective agents. We have investigated the effects of coffee and its components cafestol and kahweol on the expression of different glutathione subunits in the liver, the organ most involved in the detoxification of carcinogens. Dietary administration of cafestol and kahweol to rats resulted in a rapid and reversible, dose-dependent increase in the expression and/or activity of certain specific glutathione S-transferase enzymes. The most notable were an augmentation in glutathione S-transferase Yp and Yc2 subunits. These effects were confirmed *in vitro* using primary hepatocytes. The detoxification of carcinogens such as benzo[*a*]pyrene and aflatoxin B1 is catalysed by glutathione S-transferase Yp and Yc2 respectively. *In vitro* studies demonstrated the efficacy of C+K as protective agents against DNA adduct formation by these carcinogens. These findings demonstrate that the study of the effects of coffee and its components on the modulation of particular glutathione S-transferases may allow the prediction of anticarcinogenic effects of these dietary constituents against specific carcinogens.