

## Pharmacokinetics of caffeine in rats following administration of caffeine, caffeine with tea infusion and caffeine with tea cream

M M G N K Abhayaruwan<sup>1</sup>, S S S B D P Soysa<sup>2\*</sup> and T P Andrahennadi<sup>2</sup>

<sup>1</sup> Faculty of Science, University of Colombo, Colombo 03

<sup>2</sup> Department of Biochemistry and Molecular Biology, University of Colombo, Colombo 08

Tea polyphenols form an insoluble complex with endogenous caffeine at low temperature, which is known as tea cream. Pharmacokinetic profile was studied in rats following administration of caffeine, caffeine with tea infusion and suspension of caffeine with tea cream.

Polyphenol content in standard tea infusion was estimated by modified method of Folin-Denis reaction. Pure caffeine (n=2), caffeine with standard tea infusion (n=2) and caffeine with tea cream (n=4) were orally administered to Sprague-Dawley rats. Caffeine dosage was 100 mg/kg body weight and the polyphenol concentration in tea infusion and tea cream were 4.35 mg / mL. Blood was drawn at 1, 2, 3, 5, 6, 17, 20, 22.5 and 24 h. Urine was collected over 24 h period. Serum and urine were analyzed by reverse phase High Performance Liquid Chromatography.

Data were fitted to open two-compartmental model with first order absorption and first order elimination. The mean  $\pm$  SEM values for maximum serum concentration ( $C_{max}$ ) were  $0.24 \pm 0.06$ ,  $0.42 \pm 0.11$  and  $0.18 \pm 0.04$  % of the administered dose per mL of serum, time taken to achieve  $C_{max}$  ( $T_{max}$ ) was  $3.80 \pm 0.45$ ,  $2.70 \pm 0.90$  and  $2.63 \pm 0.38$  h, area under the serum concentration – time curves (AUC) were  $2.41 \pm 0.15$ ,  $4.65 \pm 0.15$  and  $1.47 \pm 0.23$  %/ mL . h over 24 h period, absorption rate constants ( $k_{01}$ ) were  $0.42 \pm 0.19$  h<sup>-1</sup>,  $0.98 \pm 0.69$  h<sup>-1</sup> and  $0.89 \pm 0.29$  h<sup>-1</sup>, elimination rate constants ( $\beta$ ) were  $0.13 \pm 0.12$  h<sup>-1</sup>,  $2.45 \pm 2.17$  h<sup>-1</sup> and  $0.63 \pm 0.32$  h<sup>-1</sup> and elimination half lives ( $t_{1/2}$ ) were  $10.02 \pm 6.97$ ,  $1.32 \pm 1.17$  and  $2.10 \pm 0.79$  h for following administration of pure caffeine, caffeine with tea infusion and suspension of caffeine with tea cream respectively.

Tea infusion containing soluble polyphenols significantly ( $P < 0.05$ ) increased the AUC when compared with less soluble polyphenols in tea cream, indicating high exposure of caffeine with tea infusion.

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\* [preethisoysa@eudoramail.com](mailto:preethisoysa@eudoramail.com)

Tel: 011 2697485