

THE CONCENTRATION OF FAT IN SOWS' MILK FROM SUCKLED AND UNSUCKLED GLANDS DURING LACTOGENESIS

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The transition from colostrum to milk in sows during lactogenesis is characterised by an increase in the concentrations of fat and lactose, which are important energy sources for the newborn piglet. The initiation of fatty acid synthesis in the mammary glands of the rat has been shown to be related to the removal of milk (Martyn and Hansen, 1980). This contrasted with lactose synthesis which is initiated by the withdrawal of progesterone. The present study was undertaken to determine whether the increase in milk fat during lactogenesis in the sow was related to the removal of milk from the glands.

Samples of milk (0.05 - 1 ml) were collected from 11 - 14 glands in six sows at various intervals from 240 min prior to farrowing and at approximately 20 min intervals from the commencement of farrowing until 30 min after the placenta was delivered. The piglets were weighed every 10 - 15 min from birth and a video camera was used to record the suckling pattern of the piglets. The amount of milk removed from each gland was assigned according to the gland(s) the piglets were observed to suckle and the weight increases of the piglets (weigh-suckle-weigh). Samples of milk were stored at -70°C until analysed for fat content.

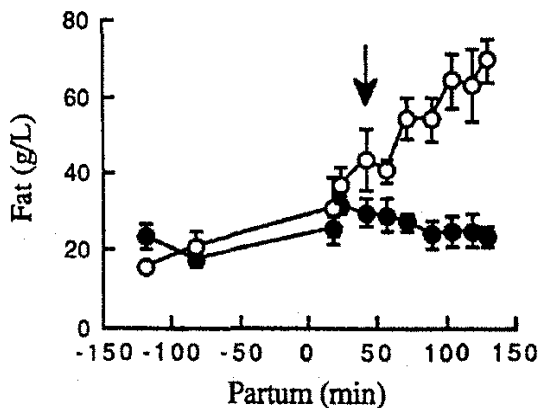


Fig. 1. Milk fat (mean \pm S.D.) in suckled (○) and unsuckled (●) glands from one sow. The arrow indicates time of first milk intake.

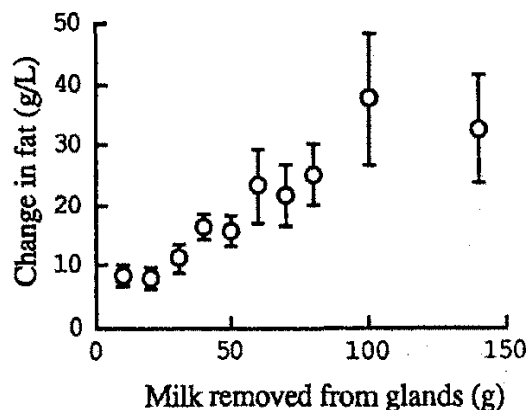


Fig. 2. Change in the concentration of milk fat (○, mean \pm S.E.) on milk removal

The concentration of milk fat (mean \pm S.D.) from suckled ($n=4$) and unsuckled ($n=7$) glands in one sow is shown in Fig. 1. The total amount of milk removed from each suckled gland was $84.3 \pm 8.5\text{g}$. The concentration of milk fat (mean \pm S.E.) from six sows (11 - 14 glands) in the last samples prior (2 - 82 min) to farrowing was $45.0 \pm 7.4\text{ g/L}$ (range 18.6 - 66.9 g/L). This was not significantly different from the concentration of fat ($52.5 \pm 2.2\text{ g/L}$) in the milk from unsuckled glands 125 to 270 min after farrowing. A significant correlation ($r=0.706$; $P < 0.001$; $n=42$) existed between the change in the concentration of milk fat from pre-farrowing concentrations and the volume of milk removed from the suckled glands (Fig. 2).

The present study suggests that the increase in milk fat during farrowing was related to removal of milk from the glands by the newborn piglets. The amount of milk removed from the gland therefore determines how quickly milk fat becomes available to the newborn piglet. Further studies are required to determine if this increase in milk fat from suckled glands is due either to increased fatty acid synthesis, as has been found in the rat, or to the removal of fore milk making available hind milk of a greater fat concentration.

MARTYN, P. and HANSEN, I.A. (1980). *Biochem. J.* 190: 171.

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