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Brief Communication

TRYPSIN INHIBITOR AND IMMUNOGLOBULINS IN PORCINE COLOSTRUM

The specific trypsin inhibitor in porcine colostrum first described by *Laskowski et al.* (1957) is assumed to protect maternal antibodies in colostrum during absorption from the gut of the neonatal piglets (*Baintner* 1973). Investigations of *Jensen & Pedersen* have shown that the serum levels of IgG and IgA in newborn suckling piglets depend on both the immunoglobulin and the trypsin inhibitor levels in the colostrum of their mothers. Accordingly, the sow colostrum trypsin inhibitor (SCTI) is essential in order to ensure optimal systemic antibody protection to the newborn and young piglets. The secretory IgA in colostrum and milk, which gives local passive immunity to the gastro-intestinal tract of the piglets (*Bourne* 1973), is assumed in itself to be relatively resistant against proteolytic degradation (*Tomasi & Bienenstock* 1968).

The purpose of the present investigation was to study the variations in the amount of inhibitor and immunoglobulins in sow colostrum. Colostrum samples consisting of secretion pools from at least three teats of each of 58 Danish Landrace gilts were collected during or immediately after parturition and again 24 hrs. later to get an impression of the amounts presented to the newborn piglets. The colostrum samples were stored at minus 20°C and successively withdrawn at random for analysis as described previously (*Jensen & Pedersen*). The amounts of immunoglobulins (IgG, IgM and IgA) and SCTI were determined by the single radial immunodiffusion technique (SRI) with pools of porcine serum and colostrum as standards (*Jensen* 1977, *Jensen & Pedersen*).

For all characters the arithmetic means and the 95 % confidence intervals were calculated after log-transformation of the measured values. Also the correlation coefficients were determined on log-transformed variates.

The results are given in Table 1. The mean inhibitor concentration in colostrum whey of 2 g/l — corresponding to the activi-

ty of about 5.7 g trypsin being inhibited (*Jensen*) — is higher than the value reported by *Laskowski et al.*, perhaps because of differences in time of collecting colostrum, different numbers of animals, breed differences, etc. As seen from the table, one day after farrowing the SCTI and IgG concentrations were only one tenth of the 'farrowing' values; as far as the SCTI is concerned this is consistent with the results of *Laskowski et al.* A low but significant correlation was found between the inhibitor concentration at farrowing and one day later ($r = 0.35$, $P < 0.05$). The correlation between SCTI and IgG (Day 0: $r = 0.48$, $P < 0.01$; Day 1: $r = 0.79$, $P < 0.01$), between SCTI and IgM (Day 0: $r = 0.04$, not significant; Day 1: $r = 0.55$, $P < 0.01$), and between SCTI and IgA (Day 0: $r = 0.37$, $P < 0.01$; Day 1: $r = 0.68$, $P < 0.01$) were all low at parturition but higher after one day of lactation, and the values were highest for the correlation SCTI-IgG.

Table 1. Mean concentrations of immunoglobulins and trypsin inhibitor in colostrum whey from 58 gilts. The interval of mean ± 2 s in brackets. (Calculations made on log-transformed values).

	IgG g/l	IgM g/l	IgA g/l	SCTI g/l
Day 0 (at parturition)	93.54 (46.02—190.10)	5.21 (2.17—12.50)	25.70 (12.24—53.95)	2.070 (0.816—5.248)
Day 1 (24 hrs. after parturition)	8.61 (0.91— 81.10)	1.72 (0.71— 4.18)	6.38 (2.22—18.32)	0.208 (0.021—2.109)

The correlation between litter size and the SCTI concentration in colostrum one day after parturition was low and unsignificant ($r = -0.23$) thus disagreeing with the results of *Baintner* who, in experiments with two litters, found the inhibitor activity to decrease at a rate depending on litter size.

The variation in the concentrations of both immunoglobulins and SCTI in colostrum, together with quantitative differences in absorption among the individual pigs in a litter (*Curtis & Bourne* 1971) may explain the great differences in the passive, systemic, humoral immunity acquired by the young pigs. The rapid fall, and the variations, in both the colostrum inhibitor concentration and the IgG concentration might to some extent explain the dif-

ficulties in fostering newborn piglets with a sow that has farrowed one or two days before. The low SCTI concentration in the colostrum/milk of the latter may be insufficient to protect antibodies from proteolytic degradation in the gut.

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