Piglet serum IgG, a non disruptive method to measure colostrum distribution

Jan Jourquin

Introduction

- Sufficient and early colostrum intake is decisive for:
  - piglet survival
  - Piglet development
- Colostrum provides:
  - Energy
    - Thermo regulation
    - homeostasis during the first 24 hours
    - Growth and movement
  - Protection against infections until full activation of the immune system
  - Colostrum is the only source of IgG in neonatal piglets

Introduction

- Sows often show abnormal behavior at farrowing
  - Aggressive (mainly first litter sows)
  - Restless (sitting and standing)
  - Belly position

- Abnormal behavior impairs the fast transfer of colostrum from sow to piglet

Facts and Figures

- Colostrum production is independent of litter size[1]
- Total colostrum volume ranges between 1.91 and 5.31 kg[2]
- Avg. colostrum intake per piglet ranges from 210-370 g/kg BW[2]
- Minimum colostrum need for piglet survival = 160-170 g/kg BW[1]

(1) N. Devillers, 2007 ,(2) N. Devillers, 2004

Colostrum distribution

Number piglets born alive	Average weight at birth (kg)	Minimum ([1]) colostrum need (kg)	Colostrum ([2]) needed at avg. consumption
12	1.50	3.06	5.22
14	1.45	3.45	5.89
16	1.40	3.81	6.50
18	1.35	4.13	7.05

([1]) minimum need = 170 g/kg BW, ([2]) avg. consumption = 290 g/kg BW

Colostrum **distribution** becomes critical especially in hyper prolific breeds

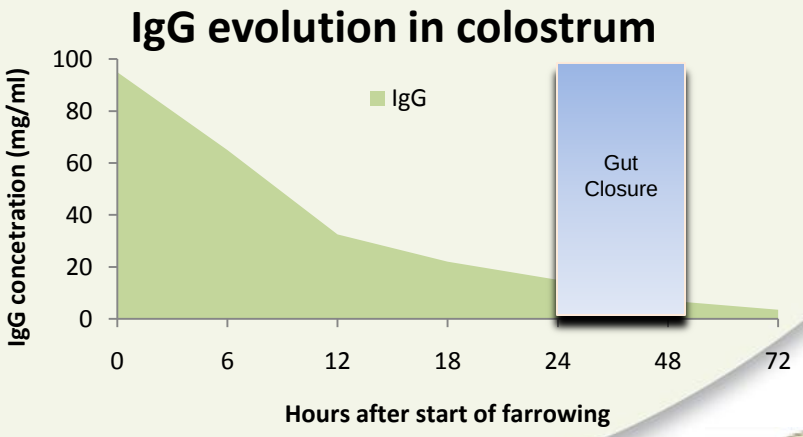
Measuring colostrum distribution

- Classical measuring methods
  - Involves piglet and/or sow manipulation
  - Manipulation impacts behavior of sow and piglet ➔
- Need for a non disruptive method:
  - The IgG titre, measured after the phase of IgG passage trough the gut can be used a measure for colostrum intake (1)
  - Piglet serum IgG concentration at 3 days of age (at tail docking) depends on:

✓ **Volume** of colostrum intake

✓ **Concentration** of IgG in colostrum

✓ **Moment** of colostrum intake (gut closure after 24-48 hours)



Klobasa, 1987

Objective

To investigate

- the use of IgG serum concentration in 3 day old piglets
- as a measure within litter colostrum distribution
- without manipulation of sow or piglets during the colostrum phase

Materials and Methods

- Commercial sow farm, 1600 sows
- 114 litters included (parity 1 and 2)
- Tail docking procedure standard at 3 days of age
- Blood drop from tail end sufficient for testing

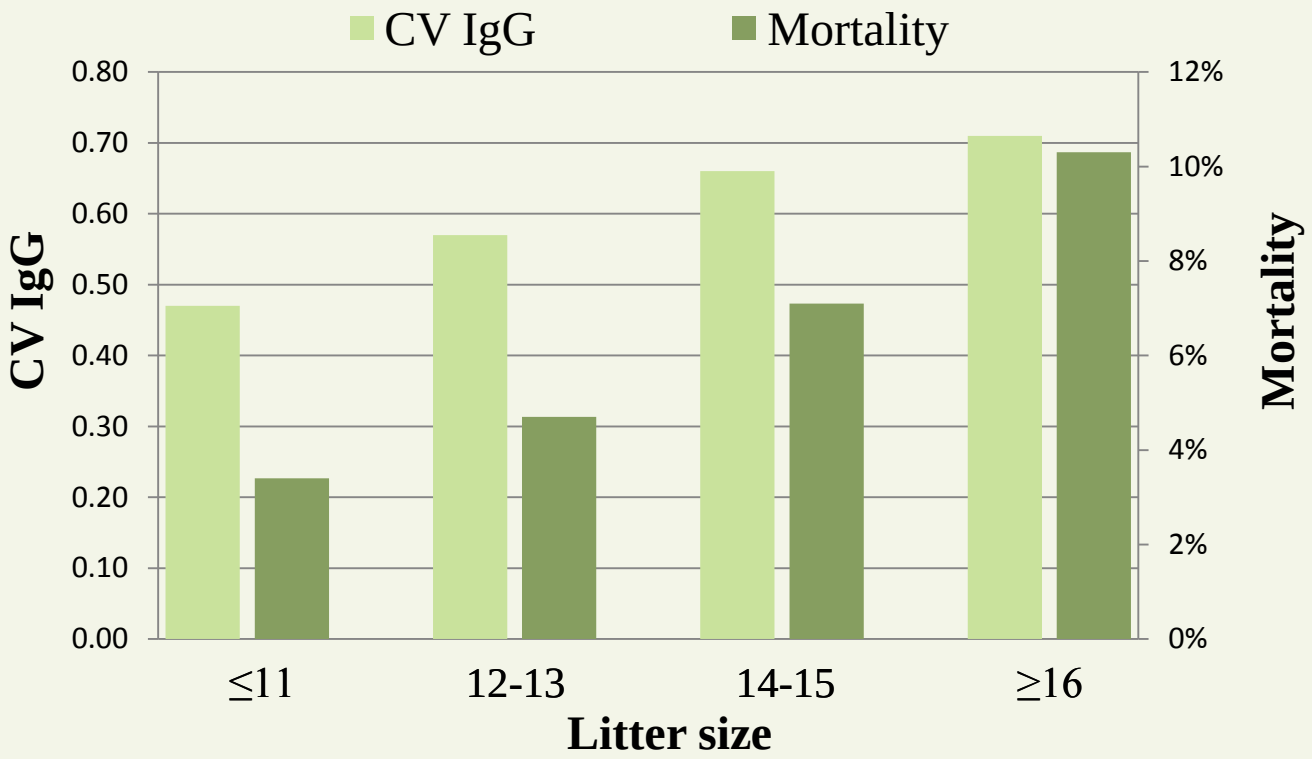
- 6 piglets per litter were sampled (no fostered piglets)

Materials and Methods

- DAS-ELISA (Colostrum Quality Counter™)
- Absolute IgG serum concentration in mg/ml
- Standard deviation/litter average = Coefficient of Variance (CV IgG) as a measure for colostrum distribution
- Relevant reproductive data retrieved from the farm data recording system

Results

Impact of litter size on IgG distribution and piglet mortality



Results

- Mortality rate increases with litter size ($p < 0.0001$)
  - Up to 13 piglets, mortality rate is low
  - ≥ 16 piglets, mortality rate doubles

- Variation in IgG levels increases with litter size
  - Up to 11 piglets: CV IgG below 0.50
  - ≥ 14 piglets: CV IgG increases to over 0.70

Discussion

- Increased mortality in big litters caused by
  - Lower birth weight
  - Limited colostrum volume
- Colostrum distribution depends on
  - Litter size
  - Behavior of sow and vitality of the piglets
  - Colostrum management

Conclusion

- IgG serum concentration in 3 day old piglets can be used to estimate the colostrum distribution within the litter
- Increased litter size results in higher piglet loss and has a negative impact on colostrum distribution
- In hyper prolific sow herds, good colostrum management is crucial to allow all piglets to get their share of the available colostrum
- Further trials focus on methods to improve the colostrum distribution in bigger litters


300 ml
300 ml
300 ml
300 ml
300 ml
300 ml