

METABOLIC AND REPRODUCTIVE DISEASES AS HEALTH PROBLEMS

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INTRODUCTION: The fertility is decreasing in dairy cows with increasing milk yield. This is both genotypically as well as phenotypically related. The phenotypic part can be specifically influenced positively. This applies especially the optimal animal husbandry, feeding and protection against infection diseases.

ETIOLOGY OF INFERTILITY: The main metabolic causes of infertility are:

- increased lipolysis and energy supply peripartal and in early lactation in association with obesity or poor quality food;
- increased concentrations of urea (protein over supply / energy under supply);
- metabolic alkalization, faulty mineral supply;
- inadequate trace element, vitamin respectively antioxidants supply. These disorders are potentiated by poor cow comfort (climate, barnstable deficiencies). The disturbances in energy metabolism induce the hypothalamic-pituitary insufficient LH-secretion with dysregulation of the sexual cycle including cyst formation.

METABOLIC BACK GROUND OF FERTILITY PROBLEMS: Reproductively cows have :

- 1) a generally lower back fat thickness (18 - 25 mm),
- 2) less birth stress with lower haptoglobin, lactate, pulse, respiratory rate,
- 3) higher insulin concentrations before parturition and lower insulin resistance (RQUCKI),
- 4) tend to have lower estradiol concentrations,
- 5) increased leukocytes and lower alkaline phosphatase.

LABORATORY DIAGNOSIS: The best informations provide subclinical following time-dependent parameters:

- 1) 2 - 1 week before parturition (w a.p.): free fatty acids (FFA), glucose, insulin, IGF-1, Creatine kinase (CK) and cholesterol;
- 2) 2 - 5 days after parturition (w p.p.): FFA, BHB (ketone bodies), bilirubin, calcium, CK, K, cholesterol and leukocytes;
- 3) in early lactation 3 - 8 w p.p.: in blood BHB, FFA and urea, in urine Na, K, inorganic phosphate and net acid base excretion (NABE);
- 4) 1 - 4 times per year: β -carotene in the blood and trace elements (Se, Cu, Mn) in the blood or hair. Later studies, e.g. currently repeated unsuccessful inseminations are not productive.

RESULTS OF METABOLIC CONTROLS IN 20 YEARS: Following metabolic abnormalities were found during metabolic controls in the last 20 years: BHB (> 0.62 mmol/l) 50 - 66% in 1, 2 - 8. and >8 w p.p., FFA 40-66% (>150 μ mol/l) a.p. and (> 620 μ mol/l) 1 w pp, bilirubin (>5.3 μ mol/l) 40 - 66% w 1 p.p., Cholesterol (<2 mmol/l) 20 - 50% a.p. and 1 w p.p., CK (>150 U/l) 20-60% 1, 2 - 8 and > 8 w p.p., AST (>80 U/L) 20 - 60% 1, 2 - 8. and > 8 w p.p., Urea (>5 mmol/l) 20 - 50% 1 and 2-8 w p.p., 50 - 75% > 8 w p.p., β -Carotin (<4 g/l)

33.6%, Se (<40 mg/l) 34.6%, Cu (<8 $\mu\text{mol/l}$) 24.8%. These findings emphasizes the need for increased energy supply peripartal, to optimal protein supply, but also the β -carotene, Se and Cu-supply as needed to better fertility and longer productive life.

PROPHYLAXIS: By the time of parturition optimum conditioning, reduction of all birth stressors and reduce postpartum lipolysis through optimal energy intake is achieved improved fertility. Other important factors are the correct transit feeding, the controlled calving in calving boxes, reliable estrus controls and optimal insemination management. In cow comfort are no compromises allowed.