Nutritional and immunological composition of canine colostrum

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Introduction and aims. Dogs are born poikilothermic and hypogammaglobulinemic (1). Colostrum ingested during the first day of life provides them with both high amount of energy and immunoglobulins. In case of ingestion of low quality colostrum, a risk of failure of passive immune transfer occurs, as well as of hypothermia and inadequate growth. The few works that studied dog's colostrum evaluated either its immune quality or its nutritional composition. This study was designed to investigate the relationship between both parameters.

Materials and methods. Within the first 24h after parturition onset, colostrum was collected from 21 bitches from a multi-breed kennel. Immunoglobulin G (IgG) concentration was assayed on colostral whey with commercial ELISA test (Dog IgG-Quantitation Kit, Bethyl Lab, Montgomery, USA). All samples were analyzed for dry matter (DM), fat, total sugar and crude protein. Standard methods of milk analysis were utilized (2). Gross energy (GE) was calculated using the formula: GE = 9.11 x %fat + 5.86 x %protein + 3.95 x %sugar (3). Depending on energy content, samples were classified into low (quartile 1), medium (quartile 2+3) and high (quartile 3) quality colostrum. Relationship between colostrum energetic content and DM, and IgG concentration was evaluated with ANOVA test and regression models. Values are expressed (mean ± SD) on a wet weight basis as g/100 g (%) for DM, fat, protein, sugar, in kcal/g for energy and mg/ml for IgG.

Results. Average composition of dog colostrum is presented in Table 1. Low energy colostrum was defined at ≤1.15 kcal/g (n=6), medium 1.15-1.4 kcal/g (n=9) and high ≥1.4 kcal/g, with a significant difference between defined groups (Table 1). GE was positively correlated with DM ($r=0.89$, $p<0.001$; Table 1). No correlation between IgG concentration and GE was evidenced ($r=0.28$, $p=0.28$; Table 1).

Colostrum energetic quality	GE (kcal/g)	DM (%)	Fat (%)	Protein (%)	Sugar (%)	IgG (mg/ml)
Mean	1.31 ± 0.21	22.3 ± 2.7	5.8 ± 2.7	11.8 ± 2.4	2.3 ± 0.3	29.5 ± 15.4
Low	1.1 ± 0.1	20.0 ± 1.2	3.3 ± 1.2	12.1 ± 2.1	2.2 ± 0.3	36.2 ± 18.5
Medium	1.3 ± 0.1	21.7 ± 1.1	5.6 ± 1.4	11.8 ± 2.0	2.2 ± 0.3	29.2 ± 14.5
High	1.6 ± 0.1	25.1 ± 2.2	8.6 ± 2.9	11.6 ± 3.5	2.4 ± 0.5	23.4 ± 13.0
p-value	<0.001	<0.001	<0.001	0.933	0.593	0.371

Table 1. Composition of dog colostrum depending on its energetic quality (n=21). Results presented as mean ± SD.

Conclusions. This study pointed out a variation in colostral energy content between bitchescorrelated with dry matter.. Immune quality of the colostrum was found strongly variable and not correlated with energy content. Further studies should determine which factor is determinant for puppies survival.

References

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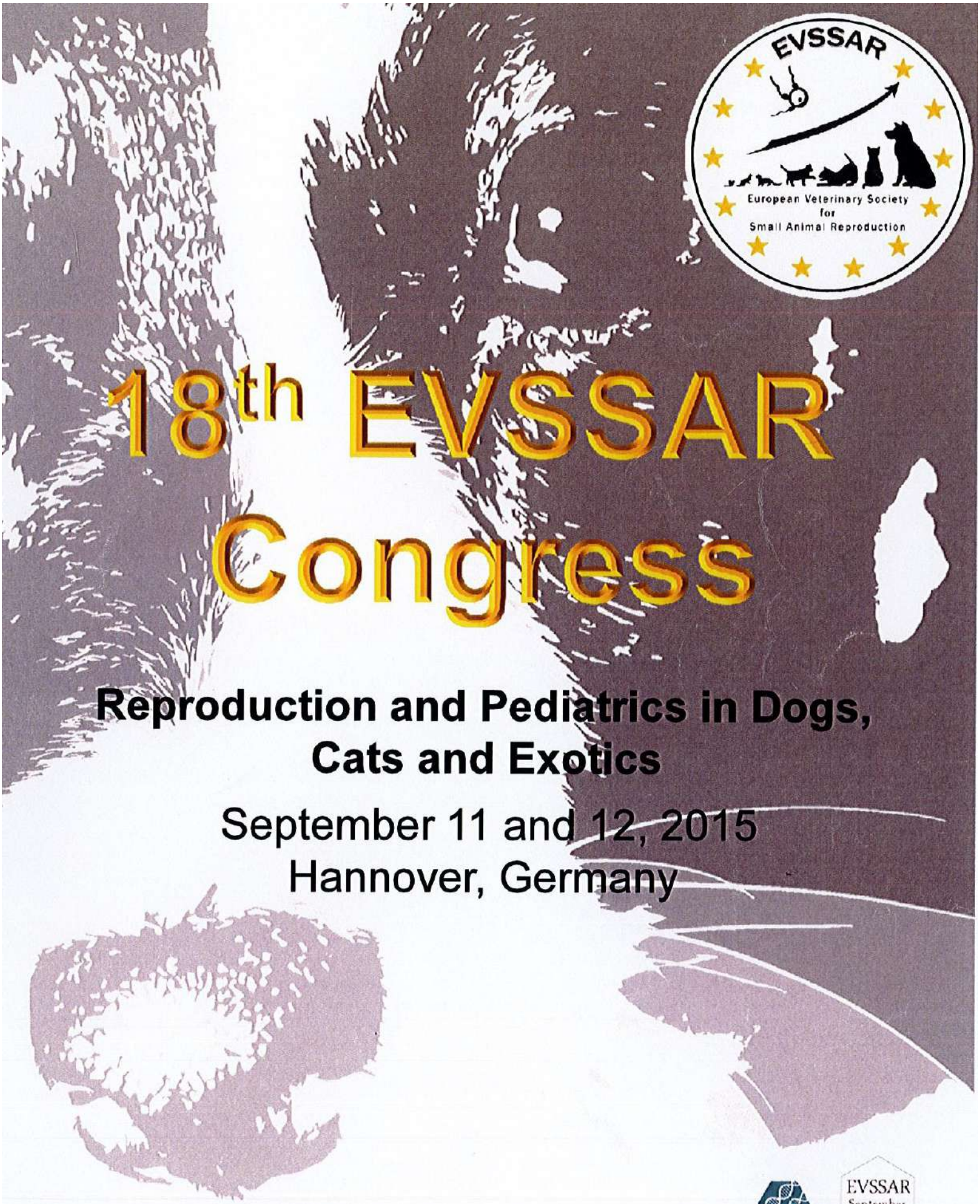

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