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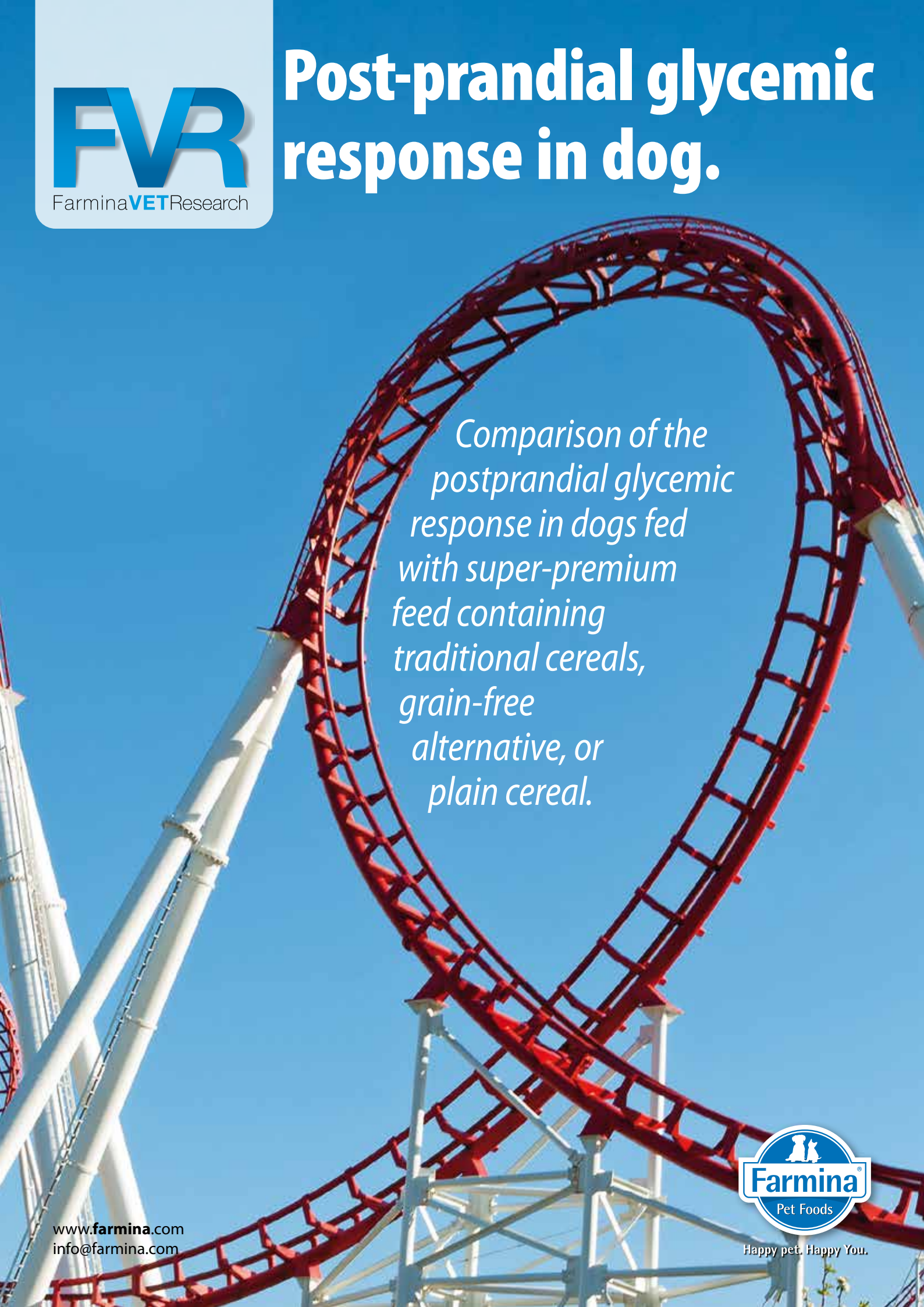
Post-prandial glycemic response in dog.



Comparison of the postprandial glycemic response in dogs fed with super-premium feed containing traditional cereals, grain-free alternative, or plain cereal.

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Post-prandial glycemic response in dogs: effects and affecting factors.

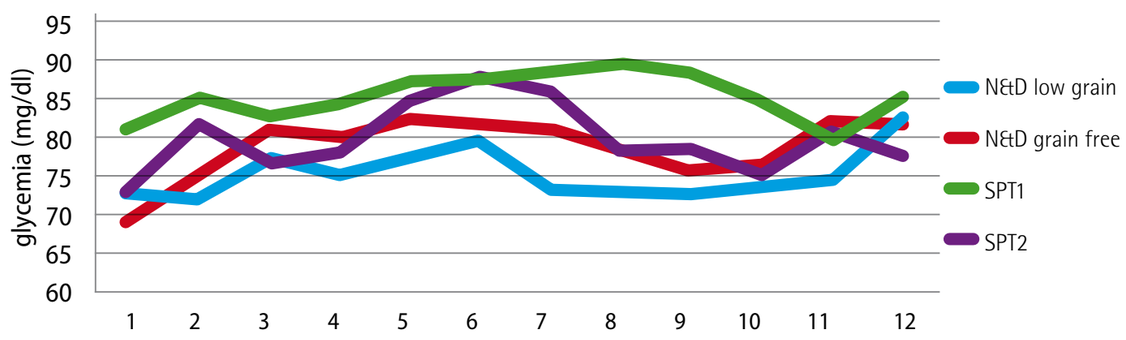
Monica Isabella Cutrignelli – DVM, PHD, Naples.

The glycemic post-prandial response changes greatly depending on animal condition and dietary characteristics. Depending on the intensity and rate of the rise in post-prandrial blood glucose levels, as well as the insulin response there are considerable changes in daily energy levels, because the excess of glucose is stored in muscles as a short term energy reserve (glycogen) or accumulated as reserves to be used in the long term (triglycerides). It is obvious that controls of blood glucose levels can be considered one of the cornerstones in the prevention of obesity which, because of changed lifestyles, it is becoming more and more common in dogs. There are physiological (age, pregnancy), para-physiological (stress) and pathological (inflammatory, neoplastic processes, endocrinopathies) conditions that could alter the glycemic control, therefore, even in these cases it is advisable to use diets that can minimize and prolong the post-prandial glycemic response. To do this, particular attention must be paid to the type of carbohydrates and to the carbohydrate/protein ratio supplied the diet.

MATERIAL AND METHODS

For the test six neutered adult dogs (weight 20±5.8; BCS 5.5±0.35; 2.8±0.11 years old) of both sexes were used. During the entire test dogs continued to live with the families of adoption, without changing the daily habits with the exception of the diet. A diet of the N&D grain free line (free from cereal and a minimum intake of carbohydrate from potato) and one of the N&D low grain line (characterized by the presence of unconventional starch sources such as spelt and oats) were compared with two super feed premium which contain sources of carbohydrates, that is conventional cereals such as rice and maize (SPT1) or maize and wheat (SPT2). All diets were fed at a rate of 130 kcal EM/kg^{0,75}/d for a period of 30 days (10 to adapt and 20 trial period). On the 30th day the dogs were weighed before eating and blood was collected in order to evaluate metabolic profile, then the dogs were admitted in order to check glucose levels. During the 24 hours of observation 12 blood glucose tests were performed at regular intervals and animals had access to the food at a rate of 75 kcal EM/kg^{0,75}/ meal for 30 minutes immediately after the first and sixth blood test. All results were subjected to analysis in order to assess the effect of the diet on blood parameters and glucose response, using Proc GLM of SAS (2000).

Glycemic response trends with the 4 diets.



During the test there were no significant differences in the weight of the subjects (20.0; 19.87; 20.03; 20.02; respectively with diets SPT1; N&D grain free; N&D low grain and SPT2) or voluntary food intake. Although in all cases the registered blood parameters were considered physiological for dog species, it is evident that the type of diet has a significant impact on all indicators of glucose metabolism. There are, in fact statistically significant differences between the diets for the following parameters:

- average glucose levels (85.4; 78.3; 75.5; 79.9 mg/dl with diets SPT1, N&D grain free, N&D low grain and SPT2, respectively P <0.01);
- maximum glucose levels (97.3; 89.7; 87.3; 92.5mg/dl with diets SPT1, N&D grain free; N&D low grain SPT2, respectively, P <0.05);
- minimum glucose levels (76.1; 67.4; 66.2; 76.5 mg/dl with diets SPT1, N&D grain free, N&D low grain and SPT2, respectively P <0.01);
- serum levels of glycated proteins (262; 215; 221; 261µmol/l with diets SPT1, N&D grain free, N&D low grain and SPT2, respectively P <0.05).

RESULTS AND DISCUSSIONS

It is possible to conclude that the use of high protein diets or diets containing oats and spelt as starch sources, allows to modulate the post-prandial glycemic response therefore affecting the glycidic metabolism even in the long term, as shown by the significant differences recorded for the levels of glycated proteins. Despite having similar effects, the N&D grain free and the N&D low grain diets recognize different mechanisms of action, in fact, the low levels of blood glucose recorded with the N&D grain free diet are due to the protein/carbohydrates ratio that in this diet is particularly high this means greater use of glucogenesis from protein, which in turn is responsible for a slower delivery to the bloodstream of the glucose. The hepatic glucogenensis, moreover, requires for the production of each molecule of glucose, a water molecule and an ATP molecule, for this reason, the high-protein diets are particularly indicated for the prevention of weight gain both in the human and veterinary field. The mechanism of action of N&D low grain diets is instead connected to the type of starch, richer in amylose (more slowly digestible) and to the higher concentration in dietary fiber of oats (36-37%), with a fair amount of soluble dietary fiber (5-6%), which creates a gelatinous mass which slows down intestinal transit rate and consequently the absorption of nutrients.

In conclusion from these results it is possible to highlight how the use of diet free of cereals or containing cereal different to rice and corn allow to control the dog's postprandial glycemic response, as already demonstrated for the cat, therefore limiting the possibility of a positive energy balance condition. At the same time the reduction of post-prandial glucose peaks allows less stress secretory of the secretory pancreatic beta cells and limits the risk of diabetes Type 1 most common in dogs.

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