Effects in dogs with behavioural disorders of a commercial nutraceutical diet on stress and neuroendocrine parameters

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Context
Due to the absence of clinical studies of dogs with behavioural disorders that have been treated with medicinal plants, it is worth demonstrating the effectiveness of new commercially available diets, enriched with medicinal plants, as a reliable and safe alternative to conventional medicines. This study aimed to be the first to describe the safe use of a tailored nutraceutical diet enriched with medicinal plants with a high omega 3:6 ratio, and free of intensive farming-derived proteins, for treating dogs with anxiety and chronic stress.

Main conclusion
This study demonstrated that a specific diet, enriched with medicinal plants and functional substances, significantly and positively affected neuroendocrine parameters and derivatives of reactive oxygen metabolites (dROMs) associated with stress and anxiety. These results present opportunities for investigating the use of diet and nutraceuticals in the treatment of behavioural disorders.

Approach
Sixty-nine dogs (31 females and 38 males) were enrolled, with a mean age of three years. They were randomly assigned to receive either a control diet (CD group, n=34) or a nutraceutical diet (ND group, n=35) which was fed over a period of 45 days. Blood samples were collected from each dog before (T₀) and after 45 days (T₁) of the diet administration and serum samples were stored at −20°C before evaluation. dROMs and biological antioxidant potentials (BAPs) were measured as indicators of oxidative stress spectrophotometrically at 505 nm, while dopamine, noradrenaline, serotonin, cortisol and β-endorphin concentrations were assessed by means of an ELISA kit and read at 450 nm.

Results
In the ND group mean (se) serotonin, dopamine and β-endorphin concentrations significantly increased from 7.67 (1.01) ng/ml to 25.91 (7.64) ng/ml, 1.05 (0.49) to 2.35 (0.76) ng/ml and 70.20 (23.82) ng/ml to 317.0 (124.1) ng/ml, respectively, from T₀ to T₁. In the same group, noradrenaline and cortisol significantly decreased from 2.57 (0.52) ng/ml to 1.36 (0.15) ng/ml, and 10.44 (3.38) ng/ml to 5.86 (1.95) ng/ml at T₁ and T₀, respectively. No significant variations for any of the evaluated parameters were observed in the CD group.

dROMS values showed a significant decrease from T₀ to T₁ (110.7 [10.64] to 85.06 [7.6] ng/ml) in the ND group (P<0.05), while no significant variation was observed in the CD group. A slight but not significant increase from 2391 (65.90) to 2504 (44.89) ng/ml was observed for BAP values over time in the ND group, while no significant variation was observed in the CD group (Fig 1).

Interpretation
Although the results successfully demonstrated that an equilibrated nutraceutical diet was well tolerated without any adverse effects, further evaluation of the trend in metabolic profile is needed to rule out any possible biological alteration in the longer term.

Significance of findings
This study demonstrated the positive effects of a nutraceutical diet on neuroendocrine parameters associated with stress, anxiety, aggression and numerous behavioural disorders. If a better understanding of dog behaviour and psychological and clinical signs associated with suffering is warranted, this study demonstrated that the use of an adapted and appropriate diet, devoid of contaminants and including specific nutraceuticals, may help to ensure a better quality of life of animals and improve behavioural disorders. Potentially, an easy and medication-free approach to behavioural issue treatment can be proposed.

FIG 1: Serum oxidative stress parameters in dogs fed a control diet or a nutraceutical diet before (T₀) and after 45 days (T₁) of diet supplementation. (a) Derivatives of reactive oxygen metabolites; (b) Biological antioxidant potentials