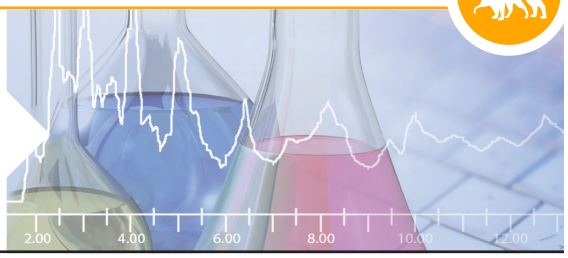
FOCUS ON RESEARCH



Comparison of effects of postbiotic supplementation in adult dogs

The objective of this study was to evaluate microbiological and immunological responses of supplementing two *Saccharomyces cerevisiae* fermentation-based postbiotics (SCFP) in dogs. This study was conducted at the University of Illinois (Hernot et al.,2008[1]).

Overview

- 3 x 3 Latin square design
- Nine adult females, hound mix canines, ~ 25 kg BW
- Dogs received 400 g of a complete and balanced dog food daily and *ad libitum* water. Treatments (supplemented in gel capsules):
  - Control (CON; Placebo-empty capsule)
  - SCFP 1 (SCFP; 1 g/d; equivalent to 40 mg/kg BW)
  - SCFP 2 (EpiCor® Pets; 0.143 g/d; equivalent to 5.7 mg/kg BW)
- Measurements included:
  - Concentration of lymphocytes positive for CD3, CD4, CD8α and CD21 surface markers. Each of these cell types play an important role in the maturation and activation of T and B-cells to fight infectious agents and pathogens.
  - Serum immunoglobulins
  - Cytokine gene expression of:
    - » Tumor Necrosis Factor-alpha (TNF-α): An inflammatory cytokine produced by macrophages and monocytes during acute inflammation and responsible for signaling a diverse range of intracellular events leading to necrosis or apoptosis.
    - » Interleukin-6 (IL-6): a cytokine with both proinflammatory and anti-inflammatory roles
    - » Interferon-gamma (INF-ɣ): a key cytokine involved in innate and adaptive immunity responses. It activates macrophages and stimulates expression of MHC-II receptors expression. IFN- ɣ is produced predominantly by natural killer cell, CD4 Th1 and CD8 cytotoxic T-lymphocytes.
    - » Transforming growth factor beta (TGF-β): Involved in many cellular processes including cell growth, cell differentiation, apoptosis and cellular homeostasis.
  - Quantification of faecal *Lactobacilli, Bifidobacteria, Escherichia coli* and *Clostridium perfringens* DNA using parallel denaturing gradient gel electrophoresis (DGGE).

Results

- An increased faecal score (wetter) was observed for dogs fed EpiCor Pets versus control (Table 1).
- Total tract nutrient digestibility not affected by treatment (Table 2).
- Both total white blood cells and lymphocytes were lower in dogs fed EpiCor Pets vs control (Figure 1).
- No differences in immune system function (cell surface markers, gene expression of cytokines or serum immunoglobulins) were observed in dogs fed either fermentate treatment versus control; however, dogs fed the EpiCor Pets fermentate exhibited fewer lymphocytes versus control ($P < 0.05$).
- Both postbiotic ingredients decreased *Clostridium perfringens* ($P < 0.05$) with SCFP1 exerting a greater effect in reducing C. *perfringens* than EpiCor Pets (Figure 2). *Bifidobacteria*, a beneficial taxa were lower ($P < 0.05$), for SCFP vs control but no decrease was observed between control and dogs supplemented with EpiCor Pets.

EPICOR® pets

Results — Continued

Table 1: Faecal scores

	Control	SCFP	EpiCor® Pets	SEM
Scores (1–5)	2.5[a]	2.5[a]	2.7[b]	0.1

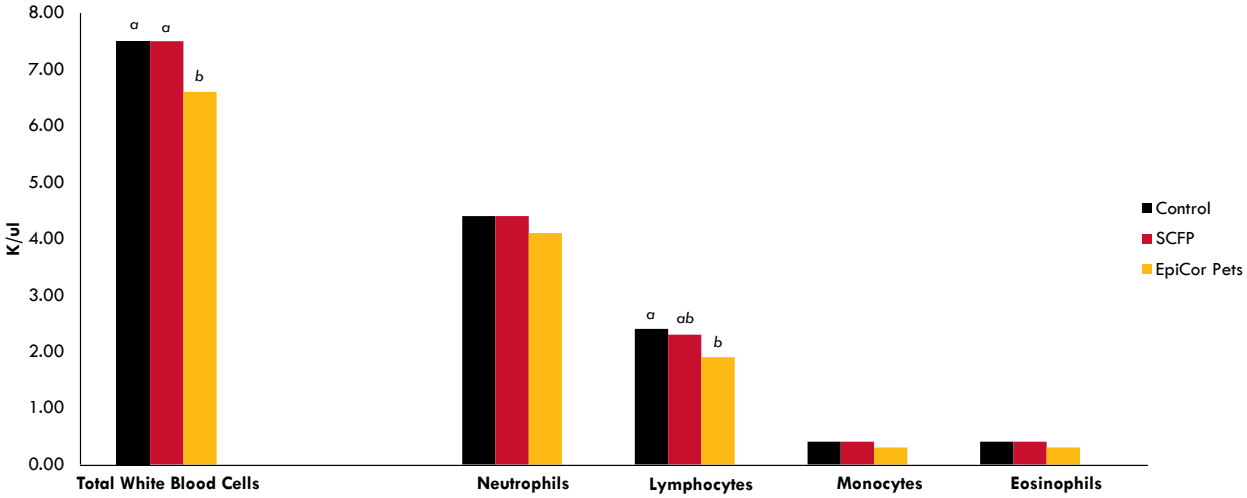
Faecal Scoring: 1 = hard, dry pellets; 2 = hard, formed, dry stool; 3 = soft, formed, moist stool;
4 = soft, unformed stool that assumes shape of container; and
5 = watery liquid that can be poured

[a,b] Different superscript denote significance ($P < 0.05$).

Table 2: Nutrient digestibility

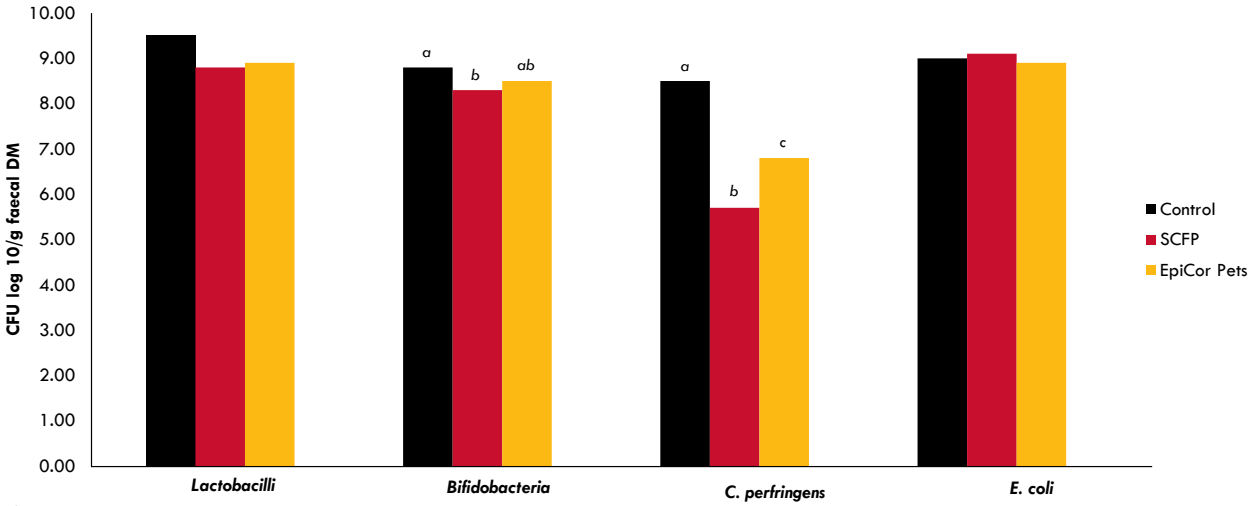
Digestibility, %	Control	SCFP	EpiCor Pets	SEM
Dry matter	86.2	86.4	85.4	0.8
Organic matter	87.2	88.6	86.7	1.0
Crude protein	83.4	85.3	82.4	1.5
Gross energy	88.1	89.3	87.6	0.9
Total Dietary Fibre	30.9	41.8	30.5	4.9

Figure 1: Total white blood cell and lymphocyte counts



[a,b] Different superscript denote significance ($P < 0.05$).

Figure 2: Faecal bacterial population analysis



[a,b,c] Different superscript denote significance ($P < 0.05$).

Summary

- Several indicators of immune and digestive health changes were observed in dogs supplemented with yeast fermentate versus control with the responses varying between fermentate source.
- Although a higher faecal score was observed for dogs fed EpiCor® Pets, faecal consistency was in the optimal range.
- Lower total white blood cells observed for dogs supplemented with EpiCor Pets is consistent with other studies that hypothesised that increased mucosal immunity may reduce the need for more immune cells and/or immune capacity is enhanced thereby requiring less immunological cellular architecture.
- Yeast components have been studied for their ability to interfere with intestinal binding and colonization of harmful microbial species. Under the conditions of this study, both SCFP and EpiCor Pets reduced the population of C. *perfringens* suggesting a potential beneficial effect on gut health. The differential response in the reduction in C. *perfringens* between fermentates may be due to difference in levels incorporated in test diets. In this study, the EpiCor Pets inclusion rate was ~20% lower than the optimal target of 7 mg/kg BW.

[1] Hernot, D.C., et al. 2008. Microbiological and immunological effects of two yeast-based complex fermentation ingredients on adult dogs. J. Anim. Sci. Vol. 86, E-Suppl. 2. Poster Presentation, Abstract #W64.

This information has been reviewed for products sold in the European Union & United Kingdom. For products marketed in other countries, please contact a local representative.

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If you would like more information, please contact your local EpiCor Pets representative.

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