# Yeast extract reduces histological indices of inflammation in the small intestine of weaned piglets

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Feed additives are sometimes used in diets after weaning to modulate the structure and function of the gastrointestinal tract. Bio-Mos® (Alltech Biotechnology Pty Ltd), a mannan oligosaccharide derived from the cell wall of *Saccharomyces cerevisiae*, has been shown to influence positively the performance of weanling pigs (Miguel *et al.*, 2004). However, the precise mechanism(s) for these effects has not been fully elucidated. This study tested whether Bio-Mos® included in diets for sows in gestation and lactation and then in a post-weaning diet would alter indices of inflammation in the small intestine of young pigs. This was presumed on the basis that Bio-Mos® has been suggested to influence pathogen colonization and/or localized immunity (Davis *et al.*, 2004).

Samples of jejunum and ileum of piglets were collected into phosphate-buffered formalin at weaning or 14 days after weaning from either: 1) sows fed Bio-Mos® throughout pregnancy and lactation (1 g/kg) and then piglets fed Bio-Mos® (3 g/kg) after weaning or 2) sows not fed Bio-Mos® throughout pregnancy and lactation and piglets not fed Bio-Mos® after weaning. Tissue samples were subsequently fixed in haemotoxylin and eosin, and then processed using established histological procedures at Murdoch University for the subsequent enumeration of goblet cells, granulated mononuclear inflammatory cells (ICs) and non-granulated mononuclear ICs per 500 enterocytes. The statistical model included the main effects (±Bio-Mos®, time of euthanasia) and the interactions using JMP (SAS Inc v.6.1).

There were no differences (P>0.05) in goblet cell numbers (Table 1). Pigs from sows fed Bio-Mos® had fewer granulytic (P=0.009) and non-granulytic (P<0.001) ICs than pigs not exposed to Bio-Mos®. Newly weaned pigs had fewer granulytic (P<0.001) and non-granulytic (P<0.001) ICs than pigs killed 14 days after weaning. These data suggest that the small intestine of piglets derived from sows fed Bio-Mos® in gestation and lactation, and then fed a diet containing Bio-Mos® for 14 days after weaning, was less challenged. The reduction in the number of inflammatory cells suggests a direct effect of Bio-Mos® on the small intestine, however the mechanism(s) whereby this effect occurred could not be ascertained from this work.

**Table 1. Least-squares main effect means for the number of goblet cells, granulytic inflammatory cells (ICs) and non-granulated (NG) inflammatory cells (ICs) (all expressed per 500 enterocytes)**

| | Bio-Mos® (B) | | Time (T) | | RMSE[1] | Level of Significance | | |
|---|---|---|---|---|---|---|---|---|
| Cell type | + | - | Wean[3] | After[3] | | B | T | BxT |
| Goblet | 54.2 | 53.3 | 58.7 | 48.8 | 30.37 | NS | NS | NS |
| Granulated ICs | 26.5 | 36.0 | 19.9 | 42.5 | 12.84 | 0.009 | <0.001 | NS |
| NG ICs | 46.2 | 63.8 | 41.8 | 68.1 | 17.24 | <0.001 | <0.001 | NS |

[1]RMSE: root mean square error; [2]NS: P>0.1; [3]Wean: pigs killed at weaning; After: pigs euthanased 14 days after weaning.

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References

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