DIETARY PUTRESCINE SUPPLEMENTATION REDUCES FAECAL ABUNDANCE OF *CLOSTRIDIUM PERFRINGENS* AND MARKERS OF INFLAMMATION IN CAPTIVE AZURE-WINGED MAGPIES (*CYANOPICA CYANUS*)

Daniel Harrold, MSc[1,2,3]*, Richard Saunders, DZooMed, MRCVS[1], and Jennifer Bailey, PhD[2]

[1]Bristol Zoological Society, College Rd, Clifton, Bristol, BS8 3HA, England.
[2]Bristol Veterinary School, University of Bristol, Langford House, Langford, BS40 5DU, England.
[3]North of England Zoological Society, Chester Zoo, Chester, Cheshire, CH2 1EU, England.

Abstract

Dietary supplementation allows aviculturists to correct for nutritional imbalances helping maintain peak health and welfare of captive populations. Supplementation with the polyamine putrescine (PUT) has been used widely in poultry production and is shown to promote and regulate multiple biological processes essential for growth, digestion, and immunity. This novel investigation quantified the effect of PUT supplementation on gut health in a new model passerine: the azure-winged magpie (*Cyanopica cyanus*).

Faecal samples from 15 birds were processed over 10 weeks prior to, during, and following a four week PUT supplementation period. Markers of relative gastrointestinal health were quantified using intestinal microbiota abundance from cultures, immunoassay of pro-inflammatory cytokine interleukin-6, and excreted polyamine concentrations from samples.

PUT significantly reduced faecal interleukin-6 concentration ($P<0.0001$) and *Clostridium perfringens* abundance ($P<0.0001$). Lactic acid bacteria ($P=0.0011$) and enterobacteria ($P=0.0017$) abundance increased with PUT, with a subsequent decrease in colony count after supplementation ceased.

PUT supplementation here is shown to be beneficial to *C. cyanus* by reducing gut inflammation and colonization of *C. perfringens*, subsequently allowing the proliferation of commensal bacterial populations into available niches and improved assimilation of nutrients across the epithelium, reducing nutritional stress. Such reductions in *C. perfringens* abundance may also indicate the relevance of using polyamines in combinatory treatments for chronic clostridiosis.

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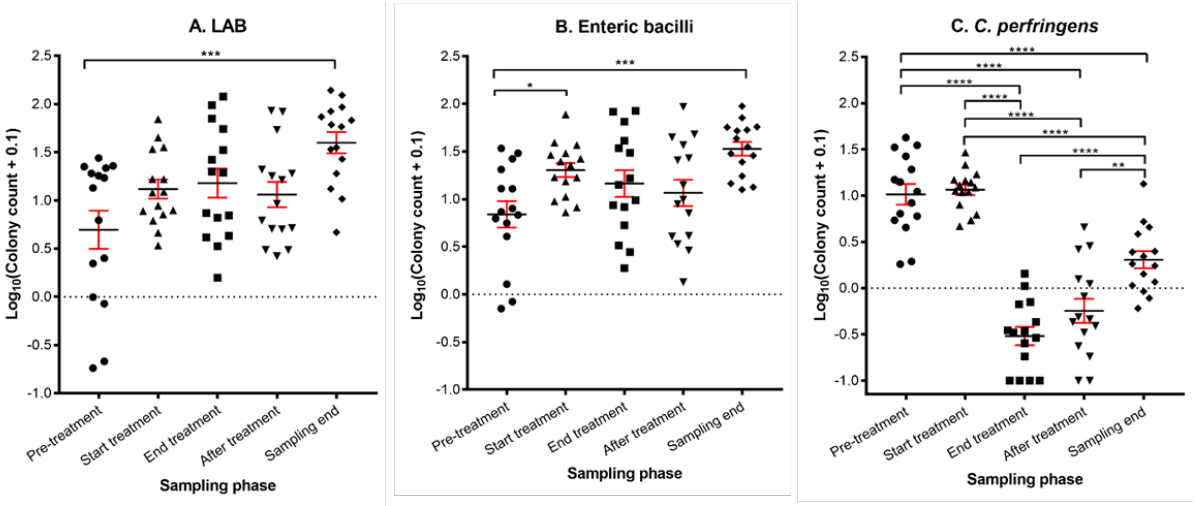

Figure 1. Change in mean bacterial colony count between sampling phases of different culture media. Effect of supplementation on microbial abundance between sampling phases. Each point represents one sample and line represents mean. LAB = Lactic Acid Bacteria; A = LAB Abundance; B = Enteric bacilli Abundance; C = *C. perfringens* abundance. * = $P<0.05$; ** = $P<0.01$; *** = $P<0.001$; **** = $P<0.0001$.

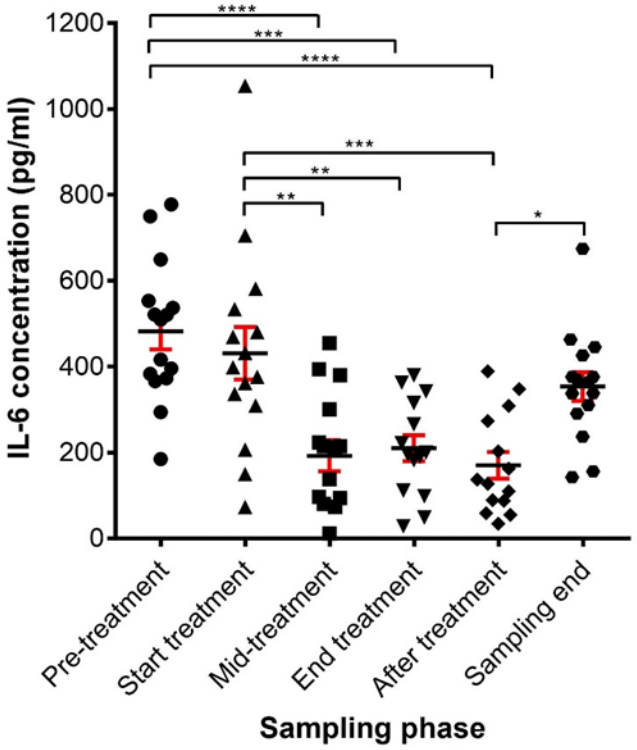

Figure 2. Change in IL-6 concentration between sampling phases. Effect of PUT supplementation on IL-6 concentration (pg/mL) within faecal samples between sampling phases. Each point represents one sample and bars represent mean. * = $P<0.05$; ** = $P<0.01$; *** = $P<0.001$; **** = $P<0.0001$.

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