368 Effects of mannan oligosaccharide and mannan rich fraction of *Saccharomyces cerevisiae* on production of cytokines by alveolar macrophages. M. T. Che*, R. W. Johnson, K. W. Kelley, and J. E. Pettigrew, *University of Illinois*, *Urbana*.

The study, consisting of 3 in vitro assays, was conducted to evaluate 1) inflammatory activity of alveolar macrophages (AMΦ) from pigs fed diets supplemented with mannan oligosaccharide (MOS); 2) cytokine production by AMΦ stimulated in vitro with MOS, mannan rich fraction (MRF) of Saccharomyces cerevisiae cell wall, Lipopolysaccharide (LPS), and Poly I:C (PLIC). In assay 1, pigs fed diets with 0%, 0.2%, and 0.4% MOS for 2 weeks post-weaning were slaughtered (1 pig/pen, 6 replicate pens) for collection of AMΦ which were stimulated in vitro with LPS or PLIC. In assays 2 & 3, replicates were donor pigs. In assay 2, AMΦ collected from 4 pigs were stimulated with 7 treatment doses of MOS, MRF, LPS, or PLIC. In assay 3a, AMΦ from 6 pigs were stimulated with MOS, LPS, PLIC, MOS plus LPS, and MOS plus PLIC. Assay 3b was identical to 3a but used MRF instead of MOS. AMΦ were cultured for 24 h, washed 3 times, and then stimulated for 24 h prior to collection of supernatants for measurement of pro-inflammatory (TNF-α) and anti-inflammatory (IL-10) cytokines by ELISA. In vitro LPS-stimulated AMΦ from pigs fed 0.2% or 0.4% MOS diets produced less TNF-α ($P<0.01$) and more IL-10 ($P=0.051$) than 0% MOS diet. However, no treatment effects on both cytokines were seen when AMΦ were stimulated with PLIC. TNF-α level peaked at stimulating concentrations of 500 μg/mL MOS, 2500 μg/mL MRF, 1 μg/mL LPS, and 50 μg/mL PLIC. Both MOS and MRF suppressed TNF-α response of LPS-stimulated AMΦ ($P<0.01$), whereas TNF-α production by PLIC-stimulated AMΦ was decreased only by the presence of MRF ($P<0.01$). IL-10 production by AMΦ stimulated with MOS or MRF was not affected by the presence of LPS or PLIC. In general, feeding MOS to weaned pigs for 2 weeks or in vitro stimulation of MOS reduced TNF-α production of LPS-stimulated AMΦ.

Key Words: MOS, Weaned Pigs, Cytokine Production

369 Effects of dietary yeast culture supplementation to gestation and lactation diets on performance of sows and litters. S. W. Kim*[1], M. Brandherm[2], B. Newton[3], D. Cook[3], and I. K. Yoon[4], [1]*North Carolina State University*, *Raleigh*, [2]*Hitch Pork Producers*, *Guymon, OK*, [3]*Akey*, *Lewisburg, OH*, [4]*Diamond V Mills*, *Cedar Rapids, IA*.

Four hundred ninety one sows at a commercial operation (Hitch Pork Producers, Guymon, OK) were used to determine dietary effects of yeast culture supplementation (XPC, Diamond V XPC™ Yeast Culture, Diamond V Mills, Cedar Rapids, IA) on litter performance. Sows were grouped by parity (primiparous vs. multiparous). Sows within a group were then allotted to 3 treatments consisting of: CON (no added yeast culture), YC5 (5 and 15 g/d XPC during gestation and lactation, respectively), and YC12 (12 and 15 g/d XPC during gestation and lactation, respectively). Sows were housed individually and fed their assigned gestation and lactation diets from d 35 of gestation to d 21 of lactation. Sows were fed 2.0-kg/d during gestation and *ad libitum* during lactation. Voluntary feed intake was measured daily during lactation. At farrowing, total numbers of pigs born and those born alive were measured. Litter weights were measured at birth and weaning on d 21 of lactation. Litter weight gain of multiparous sows in YC5 (47.4 kg) was 7.5% greater ($P < 0.05$) than CON (44.1 kg) but did not differ from sows in YC12 (45.0 kg). Litter weight gain of primiparous sows did not differ among treatment groups. Number of days from weaning to successful breeding of YC5 (5.75 d) and YC12 (6.80 d) was smaller ($P < 0.05$) than CON (8.74 d) for all sows. Voluntary feed intake of primiparous sows did not differ between CON (6.8 kg) and YC5 (6.6 kg); however, sows in YC12 (6.3 kg) had a smaller ($P < 0.05$) voluntary feed intake than CON. Production efficiency (litter weight gain per lactation feed intake of sow) of YC12 (3.19) was greater ($P < 0.05$) than CON (2.98) considering all sows and that of YC5 (3.09) was greater ($P < 0.05$) than CON (2.84) considering multiparous sows only. This study indicates that dietary yeast culture supplementation benefits productivity of multiparous sows by improving litter weight gain and reducing days from weaning to successful breeding. Improvement in litter weight gain may possibly be due to increasing milk nutrient output, which remains to be investigated.

Key Words: Litter Weight Gain, Sow, Yeast Culture

370 In vitro efficacy of yeast cell walls to bind pathogenic bacteria and to influence performance of broiler chickens. A. Ganner*, S. Nitsch, and G. Schatzmayr, *Biomin Research Center*, *Tulln, Lower Austria, Austria*.

Yeast cell wall products have been proposed to improve livestock health leading to increased performance. Amongst others this effect can be associated with the ability to bind enteropathogenic bacteria.
Aim of this study was to investigate different yeast cell wall products for their ability to bind *Salmonella*, *E.coli*-, *Campylobacter* and *Clostridium* strains. The products were examined with a quantitative microplate-based assay by measuring the optical density as growth parameter of adhering bacteria. 8 out of 10 *S. typhimurium* and *S. enteritidis* strains adhered to cell wall product MOS1 with an amount of up to 105 CFU/ml. 5 different *E. coli* strains (F4; O108 K; O139 K82; 0149 K91; O141 K85ac) were tested for their ability to bind to MOS1. 4 of these strains showed an average binding capability (around 102 CFU/ml) whereas 105 *E .coli* F4 cells bound per ml. *C. jejuni* and *C. perfringens* did not bind to MOS1.
A feeding trial with broiler was conducted to evaluate the efficacy of MOS1 in comparison with commercially available MOS products (MOS2 and MOS3) on performance and health status in a 35 days study. 800 one day old mixed sexed broiler were distributed to 4 experimental groups with 8 replicates: control group A, group B (MOS1, 2kg/T), group C (MOS2, 2kg/T) and group D (MOS3, 2kg/T). In the course of the trial a positive influence could be observed by the addition of MOS1 and MOS2. Live weight (1649g MOS1, 1634g MOS2) and daily weight gain (46.07 g MOS1, 45.64 g MOS2) were improved and showed statistical differences ($P<0.05$) compared to group A (1502g live weight, 41.84 g dwg) and MOS3 (1456 g live weight, 40.65 g dwg). Feed consumption was increased and feed conversion improved when compared to the control. Mortality rate was higher in group A (> 6%), compared to the groups B, C, D (3,4 and 4,5%). Our results are in agreement with the literature that MOS is able to bind enteropathogenic bacteria, such as *E. coli* and *Salmonella*. This might have been one reason for the increase in performance in the broiler feeding trial.

Key Words: Yeast, *E. coli*, Broiler Performance

371 Effect of enzymatically hydrolyzed yeast supplementation on performance and in protecting broilers against a mild coccidiosis challenge. S. Jalukar*[1], J. Oppy[1], and S. Davis[2], [1]*Varied Industries Corporation*, *Mason City, IA*, [2]*Colorado Quality Research Inc.*, *Wellington, CO*.

This study evaluated the effect of enzymatically hydrolyzed yeast and yeast culture manufactured as a combined supplement called Celmanax® on broilers with a mild coccidiosis challenge with *Eimeria*. Celmanax® contains complex sugars like galactosamine, mannose and mannan oligosaccharide (MOS). Zero days old Cobb 500 chicks were assigned in 8 replications to 12 treatments with 10 birds/pen. The treatments included 1) Control non treated (NT), challenged 2) Celmanax® 2 kg/MT (Cel 2), challenged 3) Celmanax® 4 kg/MT (Cel 4), challenged 4) Control, NT non challenged (NC) 5) Cel 2 6) Cel 4 7) Salinomycin (Sal) 50 g/MT 8) Sal 50 g/MT, challenged. Chicks were on the treatment diets from day 0-21. The birds were infected at 15 days of age with 31,000 *E. tenella* (ET) oocysts/bird or with ~37,500 *E. acervulina* (EA) oocysts and ~25,000 *E. maxima* (EM) oocysts/bird. Treatments were assigned to brooding cages using a complete randomized block design. Efficacy was evaluated by measuring body weight, feed intake and adjusted feed conversion (AFC), and intestinal lesion scores.

The non challenged treatments with Cel 2 and 4 performed well and had numerically improved weight gain (0.32 and 0.31 kg respectively) than the NT, NC control (0.3 kg). The 15-21 day data indicates that the Celmanax® treatments challenged with EA and EM did not prevent a significant impact on weight gain and AFC as the salinomycin. The lesion score data indicates that the EM and EA challenge was controlled significantly with Sal treatment (p=0.001) but not by Cel 2 and 4 treatments. The Sal, Cel 2 and Cel 4 treatments significantly decreased the ET lesion scores (0.93, 1.0 and 1.18 respectively p=0.001) compared to the un-treated *Eimeria* control (1.73). Both Cel 2 and Sal improved weight gain (0.306 and 0.31 kg respectively) but only Cel 2 improved AFC (1.389) in chicks challenged with ET compared to NT NC chicks (0.3 kg and 1.393). Overall, Celmanax® appeared to have performance improving properties when fed to non-challenged broilers, and showed significant efficacy against *E. tenella* but not against *E. maxima* and *E. acervulina* challenge.

Key Words: Coccidiosis, Poultry