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LIST OF ABBREVIATIONS

Abbreviation	Descriptions
A.O.A.C	**Association of Official Analytical Chemists**
AGP	**Antimicrobial growth promoting**
ALT	**Alanine aminotransferase**
AST	**Aspartate aminotransferase**
BW	**Body wight**
BWG	**Body wight gain**
Ca	**Calcium**
CE	**Competitive exclusion**
CF	**Crude fiber**
CP	**Crude protein**
CT	**Caecal tonsil**
d	**Day**
DCP	**Digestible crude protein**
DM	**Dry matter**
DMI	**Dry matter intake**
E.coli	**Echerichia coli**
EE	**Ether extract**
FCR	**Feed conversion ratio**
FI	**Feed intake**
FOS	**Fructo-oligosaccharides**
g	**Gram**
g/d	**Gram/day**
GLM	**General Linear Model**
GOS	**Galacto-oligosaccharides**
GR	**Growth Rate**
Hgb	**Hemoglobin**
HMB	**β-hydroxy-β-methylbuterate**
I	**Iodine**
IgA	**Immunoglobulin type-A**
IgG	**Immunoglobulin type-G**
IgM	**Immunoglobulin type-M**
Inu	**Inulin**
iP	**Inorganic phosphorus**
Kg	**Kilogram**
L	**Liter**
LBW	**Live body weight**
mg	**mlgram**
mmol	**mlmole**
MOS	**Mannan Oligo Saccharides**
MOS(-)	**Mannan Oligo Saccharides intermittently**
MOS(+)	**Mannan Oligo Saccharides continuously**
NAOH	**National Office of Animal Health**
NDF	**Neutral detergent fiber**
NFE	**Nitrogen free excetract**
NRC	**National Research Council**

NS	**Not Significant**
OM	**Organic matter**
PA	**Phagocytic activity**
PCV	**Packed cell volume**
PI	**Phagocytic index**
PUFA	**Polyunsaturated fatty acids**
RBC'S	**Red Blood Cells Count**
T.A.C	**Total anti oxidant capacity**
TBC	**Total bacterial count**
TDN	**Total digestible nutraients**
VFA	**Volatile fatty acids**
WBC'S	**White Blood Cells Count**
Zn	**Zinc**
ZnB	**Zinc bacitracin**
ZnB(-)	**Zinc bacitracin intermittently**
ZnB(+)	**Zinc bacitracin continuously**

6. SUMMARY

The present study was carried out at the El-Sabahiea Poultry Research Station belongs to the Animal Production Research Institute, Agriculture Research and Development Center, Ministry of Agriculture and Land Reclamation.

Three experiments were done at three different weaning ages of growing V-line rabbits weaned at 35, 28, and 25 days of age in trial 1, 2 and 3, respectively. This was done to investigate the efficient of using a prebiotics such as inulin and MOS as an alternative to AGP ZnB for improving growth performance of the V-line growing-rabbits weaned at different ages.

Trial I: Forty eight V-line mixed sex (24 of each), 35 day-old weighed (619.6 $\pm$ 90.4 g) were randomly distributed among 4 experimental groups of 12 rabbits each of 6 males and 6 females of a similar initial live body weight. Supplementations were given orally for 15 days after weaning at 35 days. The treatments included control group, inulin administrated group at 0.25 g inulin/rabbit/day, and MOS supplemented- group at 0.083 g / MOS/rabbit/day and ZnB supplemented-group at 0.083 g/rabbit/day. The experiment listed for seven weeks from 35-84 days of age. Rabbits were housed in individual cages and provided pelleted feeds and water *ad labtium*. Rabbits and feed intake were weighed at 35, 69 and 84 days of age and FCR was calculated. Mortality was recorded daily and mortality rate was calculated. Blood samples were collected at 3, 5 and 7 weeks after starting of the experiment and plasma total protein, albumin, globulin, total lipid, cholesterol, liver enzymes (AST-ALT), RBC's, WBC's, PCV, Hgb, and TAC were determined. A digestibility trial was carried out at 65 days of age, to determine the digestibility coefficients of nutrients and nutritive values using five rabbits per treatment.

Trial 2: Sixty V-line mixed sex, 28 day-old weighed (478.2 $\pm$ 95.0 g) were randomly distributed among 4 experimental groups of 15 rabbits each of 7 males and 8 females of a similar initial live body weight. Supplementations were given orally along the growing period (28-77 days of age) intermittently as 2 days per week for 15 days after weaning at 28 days. The treatments included control group, inulin supplementation at 0.5 g /rabbit/day, MOS supplementation at 0.083 g/rabbit/day and ZnB supplementation at 0.083 g /rabbit/day. The experiment listed for seven weeks from 28-77 days of age. Rabbits were housed in individual cages and provided pelleted feeds and water ad libtum. Rabbits and feed intake were weighed at 28, 48, 62 and 77 and FCR was calculated. Mortality was recorded daily and mortality rate was calculated. Blood samples were collected at 3, 5 and 7 weeks after starting of the experiment and plasma total protein, albumin, globulin, total lipid, cholesterol, liver enzymes (AST-ALT), RBC's, WBC's, PCV, Hgb, and TAC were determined. A digestibility trial was carried out at 65 days of age, to determine the digestibility coefficients of nutrients and nutritive values using five rabbits per treatment.

Trial 3: One hundred and twenty five V-line mixed sex, 25 day-old weighed (445.6$\pm$98.4) were randomly distributed among 5 experimental groups of 25 rabbits each of 12 males and 13

females of a similar initial live body weight. The supplementations were MOS and ZnB and were given either continuously for 15 days after weaning at 25 days or intermittently for the same period along the growing period as two days per week. The dose of MOS and ZnB was the same as those used in trial 1 and 2. The inulin treatment was eliminated from this experiment due to lack of significant response compared to MOS and ZnB. The proposal of this experiment was to compare the efficient of different supplementations given continuously for 15 days or intermittently for the same period along the growing period. The experiment listed for eight weeks from 25-81 days of age. Rabbits were housed in individual cages and provided pelleted feeds and water ad libtum. Rabbits and feed intake were weighed at 25, 53 and 81 days of age and FCR were calculated. Mortality was recorded daily and mortality rate was calculated. Blood samples were collected at 3, 5 and 7 weeks after starting of the experiment and plasma total protein, albumin, globulin, total lipid, cholesterol, liver enzymes (AST-ALT), TAC, RBC's, WBC's, PCV, Hgb, and TAC were determined. Five male rabbits per treatment were slaughtered at the end of the experiment and dressing and organs were weighed and expressed as a percentage of live body weight. Carcass quality including chemical and physical characteristics of meat was done.

The Results Could Be Summarized as Following:

1- In trial 1, ZnB supplemented-group had significantly higher GR than the control and inulin-supplemented- group during 56 to 69 days of age while there were no significant differences from the MOS supplemented-group and ZnB. In trial 2, MOS supplemented-group showed significantly higher GR during 49-62 days of age than only inulin one. During 63-77 days of age, MOS and ZnB supplemented- groups exhibited numerally higher GR than the control. However, GR for the whole experimental periods of each trial was not significantly affected, MOS and ZnB increased GR by 0.82 to 2.15% in trial 1, and this was confirmed (8.7%) in trial 2 with only MOS supplement when it was administrated intermittently from 28 days of age. In trial, both MOS and ZnB either given continuously or intermittently also increased GR by ~7.8 and ~ 7.6% compared to the control.

2- Feed intake was significantly decreased during only 56-69 days of age by inulin supplementation in trial 1, while the same trend was observed in trial 3, when ZnB was given continuously compared to MOS given by the same way during 25-53 days of age. Feed intake for the whole period of each trial was not significantly affected by these supplementations.

3- In trial 1, ZnB supplemented-group had significantly better FCR than the control and inulin-supplemented- group during 56 to 69 days of age while there were no significant differences from MOS supplemented-group and ZnB one. In trial 2, inulin significantly impaired FCR during 49-62 days of age compared to the other treatments. In trial 3, ZnB given continuously improved FCR during 25-53 days of age compared to the control group only but without significant differences from the other supplements. Although FCR for the whole experimental period of each trial was not significantly affected, MOS and ZnB improved FCR by 3.4 to 5.4% in trial 1, and this was confirmed (7.9%) in trial 2 with only MOS supplementations when it was administrated intermittently. In trial 3, both MOS and ZnB either given continuously or intermittently also improved FCR by ~6.4 and ~8.8% compared to the control.

4- Digestibility of DM, OM, CP, CF and NFE was significantly increased due to MOS supplementation and thus DCP and TDN was also significantly improved in trial 1. In trial 2, MOS given intermittently for 15 days along the growing period induced similar trend in only CP and DCP, confirming the results of trial 1.
5- Mortality rate was decreased considerably in the 3 trials when MOS was given either continuously or intermittently after weaning at 35, 28 and 25 days of age compared to the control and ZnB groups. The values for these groups were 0, 0 and 0-4% vs. 8.3, 26.7 and 16% and 0, 20 and 0-12% for trial 1, 2 and 3, respectively.
6- There were no significant differences between groups in RBC's, PCV, Hgb and glucose due to different supplements in trial 1. In trial 2, MOS significantly decreased RBC's while increasing PCV, Hgb and glucose compared to the control. In Trial 3, ZnB given either continuously or intermittently significantly decreased RBC's compared to MOS given continuously, meanwhile there was no significant differences in Hgb, PCV and glucose.
7- WBC's count of the MOS and ZnB supplemented-groups were significantly decreased compared with groups administrated with inulin or the control in the trial 1 which confirmed in trial 2 when MOS was compared to inulin or when ZnB was compared with inulin or control. In trial 3, WBC's, lymphocyte, monocyte, esnophil and index and activity of phagocyte were no significantly affected by supplementation of MOS and ZnB. However, basophil significantly decreased while neutrophilis significantly increased when MOS was supplemented intermittently compared to the other treatments.
8- Total protein and albumin in plasma significantly increased while plasma globulin significantly decreased with ZnB supplementation compared with other groups in trial 1. In trial 2, the same trend was observed when inulin was compared with other treatments. In the trial 2, the ratio between globulin and albumin was increased when ZnB was compared with the control group which is contrary to the results of trial 1. In trial 3, these characteristics were not significantly affected showing that MOS had no negative effects on plasma protein and its fractions.
9- Plasma total lipid and cholesterol significantly decreased of MOS and inulin and ZnB-supplemented- groups compared with control group with ZnB was more effective for decreasing plasma total lipid while increasing plasma cholesterol compared to other supplements trial 1. In trial 2, ZnB significantly increased plasma total lipid and cholesterol compared to control. In trial 3, these effects were diminished.
10- MOS significantly decreased liver enzymes (AST-ALT) compared with other groups in trial 1, in trial 2, this effect was confirmed for MOS and a similar effect was shown for inulin. In trial 3, ZnB given orally by either way significantly decreased AST compared with MOS administrated continuously and control.
11- Plasma TAC significantly increased of MOS supplemented-group compared with other groups in trial 1, 2 and 3.
12- Dressing percentage significantly increased when MOS and ZnB administrated intermittently compared to control. Liver weight significantly increased of most of supplemented groups except group supplemented with ZnB intermittently and control. On the other hand, MOS significantly decreased relative weight of pancreas compared to other treatments.

13- Testis weight significantly increased when ZnB administrated intermittently compared to other groups. The contrary trend was shown in heart percentage when MOS was supplemented countinously.
14- Relative weight of lungs significantly decreased when ZnB given continuously compared to MOS given by the same way and ZnB administrated by the other way.
15- No significant differences were observed among groups in percentage blood, head, spleen, kidney due to different treatments.
16- Meat protein significantly increased when ZnB was given intermittently or continuously compared to control group, meanwhile meat lipid significantly decreased of group supplemented with MOS continuously and these changes correlated with significant increase in meat tenderness and WHC compared with control.
17- Macroscopic examination of testis (increasing spermatogenesis) and intestinal (increasing villi height) showed an improvement in these organs when MOS was administered by either way.
18- Mortaility rate of the three experiments, showed that MOS, inulin and ZnB supplementation significantly decreased mortaility with MOS was the most potent. On the other hand, Mortality significantly decreased with increasing age of weaning.
19- Economic efficiency significantly improved with supplementation of MOS and ZnB compared to the control group.

Conclusion

In conclusion ZnB and MOS showed similar potential for improving growth performance، economic efficiency and decreasing mortality rate of growing rabbits weaned at different ages showing that MOS can replace ZnB in growing rabbit framing and this effect was concurred with increasing digestibility of CP and DCP and plasma AOC.