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Biochemical evaluation of some natural feed additives against experimental immunosuppression in rabbits

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VI. Summary

Feed additives are defined as materials or products added as food supplement to live stock which beneficially affects the host animal by improving its food conversion rate, liver function and strengthen the immune system. It is used excessively in last decades in human and different animal species as growth promoters and for treatments of different diseases. Feed additives have antioxidant, anti-microbial, immune modulatory properties and protection of immune system from adverse effect of some immune suppressive drugs.

The present study aimed to investigate the protective role of some feed additives (Egyptian Date palm flesh and / or probiotic saccharomyces cerevisiae) on liver functions, oxidative stress and immune suppression induced by long term administration of recommended doses of dexamethasone to rabbits.

The present work was carried out on 25 male white New Zealand rabbits. These rabbits were divided into five groups (each consists of 5 rabbits) as the following:

group 1 (control), group 2 (dexamethasone) (2 mg/kg bw/day dexamethasone I/M), group 3 (dexamethasone + date) (0.5 g/kg/day date palm flesh +2 mg/kg bw/day dexamethasone I/M), group 4 (dexamethasone + S. cerevisiae) (1g/kg ration S. cerevisiae probiotic + 2 mg/kg bw/day dexamethasone I/M), group 5 (dexamethasone + date + S. cerevisiae) (date palm flesh + S. cerevisiae probiotic + dexamethasone at the aforementioned doses).

At the end of the experiment (30 days), the fasting rabbits were weighed, fasting blood samples were collected for serum separation then used for biochemical assays including serum liver function tests (total proteins, albumin,

globulins, A/G ratio, ALT, ALP), serum renal function tests (urea and creatinine), serum glucose, serum lipid profile (TAG, total cholesterol, HDL-C, LDL-C, VLDL-C, CAD risk ratio), serum immunoglobulins (IgG and IgM). Then the rabbits were sacrificed and thymus, spleen and liver tissues were collected and weighed. Liver and spleen tissue homogenates were used for evaluation of the oxidative status in both liver and spleen (MDA, GSH, catalase activity). Another part of spleen tissue kept in RNase inhibitor for molecular assays of gene expression (Annexin-A1, COX-2, TNF-α, IL-6 and INF-γ) measuring.

Results were recorded in 8 tables and 30 figures. The obtained data were analyzed statistically and revealed the following:

- Long term (30 days) administration of dexamethasone to rabbits induced a significant decrease in body weight gain %, organ coefficient weights, serum total proteins, albumin, globulins levels, hepatic and splenic GSH, and splenic Annexin-A1, COX-2, TNF-α, IL-6 and INF-γ gene expressions. In contrast, it led to a significant increase in serum levels of ALT, ALP, urea, creatinine, fasting blood glucose, TAG, total cholesterol, VLDL-C, CAD risk ratio, hepatic and splenic catalase activity and MDA levels when compared with the control group.
- Administration of feed additives (date palm flesh and/or saccharomyces cerevisiae probiotics) during the challenge showed a significant improvement in the measured biochemical parameters and gene expression levels.
- The combination of both treatments possess immune-stimulant effects, hypolipidemic effects, good glycemic control, better liver, kidney and spleen functions in immunosuppressed rabbits.

Conclusion:

The present study revealed the potential ameliorative effect of both feed additives (date palm flesh and S. cerevisiae probiotics) against dexamethasone-induced metabolic alterations in rabbits. The main findings of this study were related to improving liver function, glycemic control, lipid profile and cardiovascular protection in rabbits subjected to dexamethasone administration. Furthermore, it suggested the potential hypolipidemic effect of S. cerevisiae probiotic over the date palm in rabbits. Therefore the combination of both date palm

flesh and S. cerevisiae probiotics could potentially be considered of great interest as feed additives.

The present results concluded that the supplementation of rabbits with date palm flesh and/ or S. cerevisiae probiotic has great benefits with higher body weight gain, spleen weight, antioxidant status, IgG, IgM, and the immune IF-γ production. The study showed for the first time that the treatment with a date palm flesh alone or in combination with S. cerevisiae probiotic could up-regulate the mRNA expression of splenic Annexin-A1 which is a potent promoter of T-cell activation and stimulation of adaptive immune response. Also, the present study suggested the potential immune-stimulant ability of date palm flesh over the S. cerevisiae in rabbits.

So the combination of these treatments possess immune-stimulant effects in splenic tissues of rabbits. Furthermore, these treatments add a new strategy aimed at potentiating Annexin-A1 signaling to become possible therapeutic approaches used for treatment of the immune-deficiency diseases.