World Academy of Science, Engineering and Technology
International Journal of Animal and Veterinary Sciences
Vol:9, No:05, 2015

Effects of Boron Compounds in Rabbits Fed High Protein and Energy Diet: A Metabolomic and Transcriptomic Approach

Authors : Nuri Başpınar, Abdullah Başoğlu, Özgür Özdemir, Çağlayan Özel, FundaTerzi, Özgür Yaman

Abstract : Current research is targeting new molecular mechanisms that underlie non-alcoholic fatty liver disease (NAFLD) and associated metabolic disorders like nonalcoholic steatohepatitis (NASH). Forty New Zealand White rabbits have been used and fed a high protein (HP) and energy diet based on grains and containing 11.76 MJ/kg. Boron added to 3 experimental groups' drinking waters (30 mg boron/L) as boron compounds. Biochemical analysis including boron levels, and nuclear magnetic resonance (NMR) based metabolomics evaluation, and mRNA expression of peroxisome proliferator-activated receptor (PPAR) family were performed. LDL-cholesterol concentrations alone were decreased in all the experimental groups. Boron levels in serum and feces were increased. Content of acetate was in about 2x higher for anhydrous borax group, at least 3x higher for boric acid group. PPARα mRNA expression was significantly decreased in boric acid group. Anhydrous borax attenuated mRNA levels of PPARα, which was further suppressed by boric acid. Boron supplementation decreased the degenerative alterations in hepatocytes. Except borax group other boron groups did not have a pronounced change in tubular epithels of kidney. In conclusion, high protein and energy diet leads hepatocytes' degenerative changes which can be prevented by boron supplementation. Boric acid seems to precede in this effectiveness.

Keywords : high protein and energy diet, boron, metabolomics, transcriptomic
Conference Title : ICADS 2015 : International Conference on Animal and Dairy Sciences
Conference Location : Berlin, Germany
Conference Dates : May 21-22, 2015