



University of Zabol
Graduate School
Faculty of Veterinary
Department of Basic sciences

The Thesis Submitted for the Degree of DVM
(In the field of Veterinary)

Title:

The effect of long-term oral administration of *Ferula Gummosa* extract on behavioral improvement, serum profile and oxidative stress in an animal model of autism

Supervisors:

Dr. MR. Hajinezhad

Advisor

Dr. M. Jahantigh

By:

Mohammad Maghsoudlou

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Abstract:

Autism is a neurodevelopmental disorder with symptoms including decreased social relationships, limited interests and repetitive activities. Animal models in various sciences, including anatomy, neuroscience, pharmacology and physiology, have greatly contributed to the progress of science in the field of health. Today, plants are one of the main sources of treatment for humans and animals. According to a report released by the World Health Organization, more than half of the world's population still use herbs and herbal medicine to treat their illnesses. The aim of this study was to investigate the effects of low (100 mg/kg day) and high dose (200 mg/kg/day) of *Ferula gummosa* (Barijeh) on various aspects of the animal model of autism, including anatomical features, cognitive and behavioral changes, serum profiles and indices of oxidative stress in autistic rats. Barijeh was prepared and its hydro-alcoholic extract was obtained. Intraperitoneal injection of valproic acid was performed on pregnant rats on day 12.5 of pregnancy with the aim of developing autistic neonates. After weaning, the anatomical features, behavior, serum profile and some indicators of oxidative stress were compared between control groups, autism control, autistic receiving low and high dose of Barijeh extract (for 2 weeks). The results of the present study showed that autistic neonates had higher levels of enzymes indicating liver damage (aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase and lactate dehydrogenase) and kidney damage (blood urea nitrogen and creatinine) as well as high levels of oxidative stress (malondialdehyde, superoxide dismutase and catalase) compared to the control group. It was also found that negative behavioral changes including isolation, poor memory, stress and repetitive behaviors were significantly less in the control group than in the autistic group. Height and weight were lower in the valproic acid receiving group than in the control group. Barijeh plant extract reduced the serum levels of enzymes indicating liver damage (AST and ALT) in the high-dose treatment group compared to the autism control group. Improvement in height and weight was also observed in the Barijeh high-dose autistic group. Different cognitive behavioral changes were obtained as a result of treatment with Barijeh extract, which requires further studies. Oxidative stress indices in the autistic group treated with high dose of Barijeh extract showed a statistically significant improvement. The present study showed that Barijeh plant has antioxidant properties and can be effective on improvement of some aspects of the animal model of autism, including anatomical features,



serum profile and oxidative stress. It was also found that the effect of high dose of Barijeh is much more reliable than its low dose.

Key words: , Animal model, Rat, Valproic acid, Extract, *Ferula gummosa*