

# Investigating the protective effects of bromelain against inflammatory marker alterations induced by cadmium pulmonary intoxication in rat

Sirous Rafiei-Asl<sup>1</sup>; Gholamhosein Khadjeh<sup>2</sup>; Seyedeh Missagh Jalali<sup>3\*</sup>; Javad Jamshidian<sup>4</sup> and Annahita Rezaie<sup>5</sup>

<sup>1</sup> Dvsc Graduated, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran

<sup>2</sup> Professor, Department of Clinical Sciences, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran

<sup>3</sup> Associate Professor, Department of Clinical Sciences, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran

<sup>4</sup> Assistant Professor, Department of Basic Sciences, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran

<sup>5</sup> Associate Professor, Department of Pathobiology, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran

Received: 07.07.2019

Accepted: 30.09.2019

## Abstract

A total of 66 albino Wistar rats were subjected to the following treatments in 11 groups: Group 1 (negative control); Group 2 and 3: received Cadmium Chloride (CdCl<sub>2</sub>) 400 µg/rat intratracheally (IT) and sampled after 5 and 10 days, respectively; Group 4 and 5: received bromelain 20 mg/kg orally (PO) from 14 days before until 5 and 10 days after CdCl<sub>2</sub> instillation, respectively; Group 6 and 7: received bromelain 40 mg/kg from 14 days before until 5 and 10 days after CdCl<sub>2</sub> instillation, respectively; Group 8: received bromelain 40 mg/kg for 24 days; Group 9 and 10: received Celecoxib 25 mg/kg PO from one day before until 5 and 10 days after CdCl<sub>2</sub> instillation, respectively; Group 11: received Celecoxib for 11 days. Serum protein analysis revealed that intratracheal Cadmium administration resulted in an insignificant rise in all globulin fractions on day 5 and 10 post-injection. Low dose bromelain treatment for 24 days in CdCl<sub>2</sub> exposed rats showed a significant decrease in serum total protein and all globulin fractions. However, CdCl<sub>2</sub> plus high dose bromelain treatment for 24 days, significantly increased all the mentioned analytes. Bronchoalveolar lavage fluid γ-globulin concentration was decreased in all cadmium and/or bromelain treated groups. However, these changes were not significant compared to the control group. Serum LDH activity was significantly increased 5 days after cadmium intoxication while bromelain or celecoxib coadministration resulted in an insignificant decrease in enzyme activity level. In the histopathologic examination, severe interstitial pneumonia and fibrinous bronchopneumonia were observed in cadmium exposed rats and low dose bromelain administration for 24 days resulted in the reduction of these complications in lung tissue. In brief, bromelain administration can be considered as a supportive or alternative treatment to alleviate CdCl<sub>2</sub> induced systemic and bronchoalveolar inflammatory changes, especially when administered in the lower dose.

**Keywords:** Cadmium, Bromelain, Pulmonary intoxication, Bronchoalveolar lavage fluid, Protein electrophoresis

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\* **Corresponding Author:** Seyedeh Missagh Jalali, Associate Professor, Department of Clinical Sciences, Faculty of Veterinary Medicine, Shahid Chamran University of Ahvaz, Ahvaz, Iran, E-mail: mi.jalali@scu.ac.ir



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