OPEN ACCESS
Advances in Animal and Veterinary Sciences

Research Article

Improvements in Some Physiological and Histologic Aspects in the Rat Model When Lipoic Acid is Combined with Salbutamol

Huda K. Khassaf[1]*, Zainab A.H. Al-Mousawi[1], Sawsan A. Ali[2], Anwar Nather Seiwan[3]

[1]Department of Physiology, Pharmacology and Biochemistry, College of Veterinary Medicine, University of Basrah, Iraq; [2]Department of Anatomy and Histology, College of Veterinary Medicine, University of Basrah, Iraq; [3]Department of Biology, College of science, University, Basrah, Iraq.

Abstract | This rat model study investigated the effects of alpha-lipoic acid (ALA) and salbutamol (SAL) on many blood thyroid hormones and electrolytes. A total of forty rats, weighing between 200-250 g at the beginning, were divided into three experimental groups at random: the control group, the SAL group which was given (80 mg/kg) of SAL orally for two days, and SAL plus ALA groups which was given (80 mg/kg) of SAL orally for two days, followed by 20 mg/kg of oral ALA for 28 days. The levels of the hormones TSH, T4, free T3 and free T4 were estimated. Also, total bilirubin (TB), Na+, K+, CL- and Ca+2 were measured. A statistical analysis of the thyroid gland tissue's histological alterations was conducted. According to the findings, rats that got both SAL and ALA had higher levels of serum thyroxin T4, Free T3, and Free T4 than rats that did not g*et al*A ($p \leq 0.05$). As well as decreased total bilirubin, Na+, and Ca+2 levels and increased K+ and Cl- levels ($p \leq 0.05$). Furthermore, ALA is an effective therapeutic medication that improves the histological characteristics of the thyroid gland noticeably. The results of this study indicated that supplementing with ALA improved blood thyroid profiles more than SAL did, and that this may have the ability to prevent unwanted side effects.

Keywords | Alpha-lipoic acid, Salbutamol, Thyroid hormones, Histology, Rats

Received | December 21, 2023; **Accepted** | February 14, 2024; **Published** | March 01, 2024
***Correspondence** | Huda K. Khassaf, Department of Physiology, Pharmacology and Biochemistry, College of Veterinary Medicine, University of Basrah, Iraq;
Email: Huda.khassaf@uobasrah.edu.iq
Citation | Khassaf HK, Al-Mousawi ZA, Ali SA, Seiwan AN (2024). Improvements in some physiological and histologic aspects in the rat model when lipoic acid is combined with salbutamol. Adv. Anim. Vet. Sci., 12(5):844-848.
DOI | https://dx.doi.org/10.17582/journal.aavs/2024/12.5.844.848
ISSN (Online) | 2307-8316

INTRODUCTION

Salbutamol (SAL), a short-acting 2-adrenergic receptor agonist, has one chiral carbon atom (Figure 1). SAL is widely used to treat most bronchial asthma and bronchospasm disorders because of its excellent safety, low level of discomfort, and simplicity of administration (Brambilla *et al*., 2000). Regretfully, there could be harmful health consequences if β2-agonist residues from animal edible tissues accumulate in the human body through the food chain (Fraczek *et al*., 2016; Hifumi *et al*., 2014). Changes in thyroid hormones, such as a decreased T3 level, are important predictors of disease prognosis, according to clinical trials of patients with various non-thyroid conditions (e.g., respiratory and heart failure) (Ichiki, 2010; Mancini *et al*., 2016). The quantity of SAL that persists in the body is harmful to the animal's health, even though it is helpful commercially to enhance the animal's lean meat ratio. It is unknown if SAL has any negative effects on the bronchial morphology of the lung. Oxidative stress (OS) and inflammation are strongly connected processes, as demonstrated by obesity and cardiovascular disorders (Azab *et al*., 2014). Reciprocally, OS and hormonal dysregulation are linked. Thyroid hormones are among the