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# Effect of Ashwagandha in Management of Summer Stress Induced Cardiac Abnormalities in Pet Rabbits

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## Abstract

Ashwagandha (*Withania somnifera*) is widely used as one of the ingredients in many formulations which are used to increase energy, health and longevity. Summer stress leads to cardiac arrhythmias and hypotension. The objective of the study was to analyze the efficacy of Ashwagandha root powder in prevention of summer stress induced electrocardiographic abnormalities in New Zealand white pet rabbits. Rabbits under treatment group were administered 50 mg of Ashwagandha root powder orally for two months before onset of summer. Electrocardiographic parameters were recorded before onset of summer and after the completion of the supplementation. Significant reduction in the R wave amplitude, increased P wave duration and QT interval was noticed in the control group of rabbits without any supplementation than compare with the treatment group. All the electrocardiographic parameters in treatment group were within the normal range.

***Keywords:*** *Ashwagandha; Cardiac Abnormalities; Management; Pet Rabbits Summer Stress*

## Introduction

Summer stress is one of the major influencing factors for the reduced production as well as it effects the health of animals. During the summer stress, endocrine system activated and which may leads to cardiac arrhythmias and hypotension. Heat stresses have direct impact on control mechanisms of stroke volume, such as preload, after load, diastolic function and systolic function. In ethno veterinary practice, different herbal and medicinal plants have been used in animal practice. Ashwagandha (*Withania somnifera*) has long been used in traditional medicine in India [1]. It is useful as immunomodulatory, hepatoprotective, antibacterial and antioxidant [2]. Present study was carried out to record the effect of *Ashwagandha* root powder in management of electrocardiographic changes during the summer stress in New Zealand white pet rabbits.

## Materials and Methods

The present study was carried out from January 2015 to June 2015 at YSR Kadapa District of Andhra Pradesh, India. Twenty apparently healthy New Zealand white pet rabbits were selected in a house of pet breeder for the study and they were divided equally into two groups. It was reported that during the summer season mortality of the rabbits were reported by the owner every year. Rabbits in group I was not supplemented any anti stressor components and serve as control group. While rabbits under groups II were supplemented with *Ashwagandha* as 50 mg orally BID for two months before onset of summer and considered as the treatment group. Before starting of the study and after two months of the supplementation electrocardiographic recordings were carried out in both groups of rabbits. Electrocardiography was carried out according to the standard procedure and lead II recordings were considered for the study [3].

### Statistical analysis

Data were presented as the mean ± standard error (SE) and were subjected to statistical analysis using paired t – test by using SPSS version 16.0(IBM, USA). NS: Statistically Not Significant (P > 0.05); *: Statistically Significant (P ≤ 0.05); **: Statistically Highly Significant (P ≤ 0.01).

## Results and Discussion

Recorded electrocardiographic parameters before the onset of summer and after the supplementation and mentioned in table 1. Recorded abnormal electrocardiography in the rabbits with summer stress was in association with the previous studies. The results (Table 2) showed that there was significant reduction in the R wave amplitude, increased P wave duration and QT interval was noticed in the control group of rabbits without any supplementation than compare with the treatment group (Table 2). All these parameters were within the normal range in the treatment group of rabbits (Table 1).

| S No | Parameters | Before summer | During summer | P-Value |
|---|---|---|---|---|
| 1. | P wave amplitude (mV) | 0.073 ± 0.004 | 0.063 ± 0.005 | 0.13 $^{NS}$ |
| 2. | R wave amplitude (mV) | 0.211 ± 0.008 | 0.215 ± 0.009 | 0.74 $^{NS}$ |
| 3. | T wave amplitude (mV) | 0.152 ± 0.006 | 0.142 ± 0.007 | 0.27 $^{NS}$ |
| 4. | P wave duration (s) | 0.041 ± 0.003 | 0.036 ± 0.003 | 0.17 $^{NS}$ |
| 5. | QRS wave duration (s) | 0.049 ± 0.004 | 0.048 ± 0.003 | 0.84 $^{NS}$ |
| 6. | T wave duration (s) | 0.077 ± 0.007 | 0.079 ± 0.007 | 0.83 $^{NS}$ |
| 7. | PR interval (s) | 0.060 ± 0.004 | 0.052 ± 0.003 | 0.14 $^{NS}$ |
| 8. | QT interval (s) | 0.122 ± 0.007 | 0.135 ± 0.008 | 0.22 $^{NS}$ |

***Table 1:*** *Electrocardiographic findings in rabbits in treatment group (Lead-II) (Mean ± S.E.).*

*$^{NS}$: Statistically Not Significant.*

| S No | Parameters | Before summer | During summer | P-Value |
|---|---|---|---|---|
| 1. | P wave amplitude (mV) | 0.073 ± 0.004 | 0.080 ± 0.008 | 0.471 $^{NS}$ |
| 2. | R wave amplitude (mV) | 0.211 ± 0.008 | 0.166 ± 0.012 | 0.005** |
| 3. | T wave amplitude (mV) | 0.152 ± 0.006 | 0.138 ± 0.007 | 0.128 $^{NS}$ |
| 4. | P wave duration (s) | 0.041 ± 0.003 | 0.049 ± 0.003 | 0.029* |
| 5. | QRS wave duration (s) | 0.049 ± 0.004 | 0.050 ± 0.003 | 0.843 $^{NS}$ |
| 6. | T wave duration (s) | 0.077 ± 0.007 | 0.061 ± 0.006 | 0.086 $^{NS}$ |
| 7. | PR interval (s) | 0.060 ± 0.004 | 0.065 ± 0.005 | 0.444 $^{NS}$ |
| 8. | QT interval (s) | 0.122 ± 0.007 | 0.156 ± 0.009 | 0.005** |

***Table 2:*** *Electrocardiographic findings in rabbits in control group (Lead-II) (Mean ± S.E.).*

*$^{NS}$: Statistically Not Significant, *: Statistically Significant (P ≤ 0.05), **: Statistically Highly Significant (P ≤ 0.01).*

Heat stress is a global problem in animal welfare and it causes a reduction in feed intake and decreased productivity. Most of the pharmacological activity of *Ashwagandha* is attributed to the presence of these steroidal lactones. It provides alkaloids, fatty acids, beta-sitesterol, polyphenols and phytosterols. *Ashwagandha* is known to have anti-inflammatory, antitumor, antidiabetic, antioxidant, cardioprotective, and anti-stress effect [4]. Stress, as a major cardiovascular risk factor leads the activation of sympathoadrenal and hypothalamic pituitary adrenal (HPA) axis and causes oxidative stress. Withania possesses a potent antistressor effect and alleviates stress induced changes and provides cardioprotection [5]. The cardio-inhibitory action in dogs appeared to be due to ganglion blocking and direct cardio-depressant actions. The pharmacological actions of the total extract of *Ashwagandha* roots on the cardiovascular and respiratory systems appeared to be due to its alkaloid content [6,7].

## Conclusion

In conclusion, Ashwagandha root powder proved as a cardiac protectant during the summer stress in rabbits.

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