International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

The Effect of Red Grape Seed Extract (RGSE) on the Body Weights of D-Galactose used in Male Albino Rats (Wistar stain) with connection to Alzheimer's Disease

[1]V. Uday Kiran, [2]K.Yellamma

[1,2]Department of Zoology, Sri Venkateswara University. Tirupati, Andhra Pradesh, India.

ABSTRACT

Objective: To study the effect of RGSE on Body weights of D-Galactose used in albino male rats (Wister stain) with connection to Alzheimer's Disease.

Methodology: The discussion of body weights eventually results in a conclusive diagnosis of Alzheimer's disease (AD) in affected individuals. The main goal of this study was to determine whether Red Grape Seed Extract (RGSE) had any ameliorative effects on the brains of male albino rats after D-galactose administration caused gradual weight loss. Male rats were divided into three groups (control, AD-I, and PG (AD-I+ RGSE treated)) and given ethonolic and aqueous extracts of the Red Grape Seed Extract of Vitis vinifera orally for 30 days. Rats were given normal saline as controls, D-gal was administered intraperitoneally to treat AD in rats, and RGSE (100 mg/kg) was administered orally to treat rats for 30 days.

Results: My practical experience of this test showed that administration of Red Grape Seed Extract to Albino male rats improves body weights when compare to AD treated rats.

Conclusion: Based on the results D-Gal using albino male rats, we found that RGSE had a remarkable enhancing effect of body weights.

Keywords: RGSE, Memory, D-Galactose, Protective group and Albino Rats.

Introduction:

In the presence of galactose-1-phosphate uridyltransferase and galactokinase, D-galactose (D-gal), a natural sugar in mammals, is converted into glucose. However, when levels are high, galactose oxidase produces reactive oxygen species. According to recent research, cognitive function gradually deteriorates in rodents given D-gal injections for 6–10 weeks. Additionally, the brains of these animals show deficiencies in brain mitochondrial function, calcium homeostasis, and antioxidant capacity. Astrocytes in the hippocampus become dysfunctional and neurogenesis is also impaired by chronic D-gal injection. The results discussed above suggest that rodents given D-gal injections may be a useful model for oxidative stress-related brain ageing. D-galactose toxicity can disrupt brain chemistry, which can result in depression, agitation, and weakened immunity. A definitive diagnosis of Alzheimer's disease (AD) is made in patients as learning and memory function steadily deteriorate, and body weights decrease as a result of using D-Gal. The main goal of this study was to determine how well Red Grape Seed Extract (RGSE) treated the brain of male albino rats exposed to D-galactose toxicity. The waste products of the wine and grape juice industries are grape seeds. A potent antioxidant, grape seed extract is known to shield the body from decay, disease, and early ageing. Proanthocyanidin is one of the main phenols found in grape seed (oligomeric proanthocyanidin). The ability of grape seed polyphones to scavenge free radicals is what gives them their positive effects, but grape seed polyphones also have superior antioxidant activity to other well-known antioxidants like vitamin C, vitamin E, and beta-carotene. Monomeric phenolic compounds like catechin, epicatechin, and dimeric and tetrameric proanthocyanidin are abundant in grape seeds. In the current study, age-matched rats were divided into three groups of six rats each and treated as follows: Control (CN) rats were given 0.9 percent saline (1ml/kg body weight) in Group I. Group-II. D-Gal (120 mg/kg body weight) was administered intraperitoneally (IP) to rats until the experiment ended. Group-III rats were injected intraperitoneally with D-Galactose (120 mg/kg body weight) for six weeks, followed by 30 days of simultaneous oral administration of Red Grape Seed ethanol extract (100mg/kg body weight).

Materials & Methods

Preparation of Extraction

Red Grapes (*Vitis vinifera (Linn)* were bought from a local super market. Seeds were removed from the grapes, air dried in shade for one week, milled to fine powder to a particle size of < 0.4 mm and powder was macerated in 75% ethanol for 72 h at room temperature. The ethanol extract was evaporated to remove ethanol and Red Grape Seed Extract was obtained as a lyophilized powder (**Alireza*et al.*, 2007**).

Grouping of Animals:

Group-I (Control)	Control Rats received normal saline
Group-II (AD-I)	Rat, intraperitonealy (IP) administered with D-Gal (120 mg/kg body weight) up to end of the experiment (1st day to 60th day). (Zhang *et al.*, 2006; Hua *et al.*, 2007)
Group-III PG (AD-I+RGSE)	AD-Induced Rat, administered with Red Grape Seed ethanol Extract (100 mg/kg body weight) **(*Alireza Sarkakiet. al.*, 2007)** for 30 days.

Animals:

Albino male rats weighing 160±20 gm of either sex were used for the study. The animals were procured and housed in the animal house in college of life science / Sri Venkateswara University, maintained under standard hygienic conditions, at 20 ± 2o C, humidity (60 ± 10%) with 12 hour day and night cycle, with food and water *ad libitum*.

RESULTS

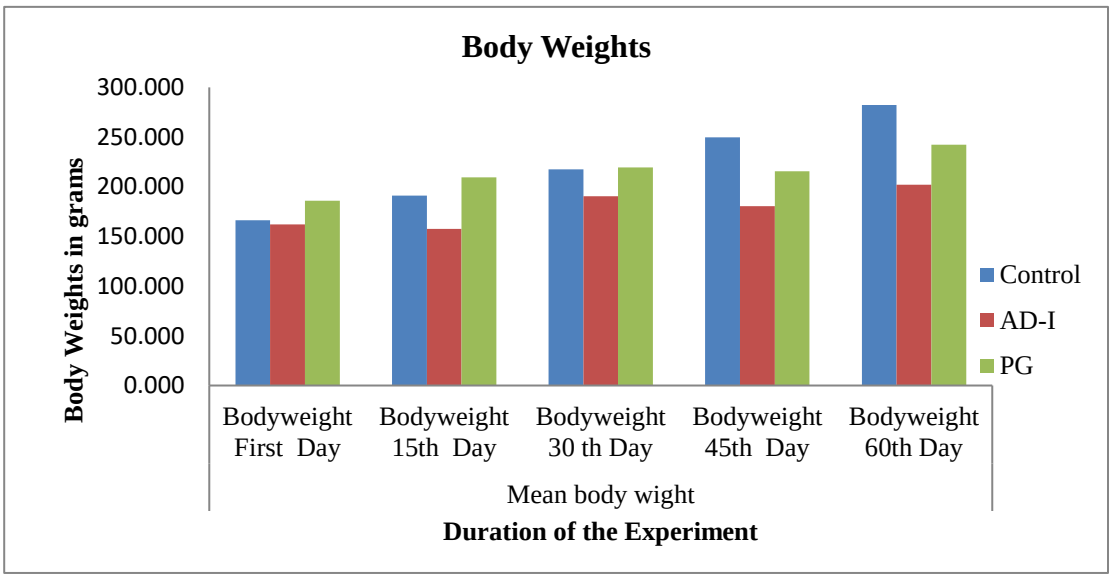

Fig:1- Graph **Showing** differences in Total **Body Weights** of Control and Experimental groups of rats on selected Days of Experimentation.

In the present study, in general there was a continuous increase in the body weights of the control as well as in AD-induced and the protective group where the AD-I rats, were simultaneously treated with RGSE from the First day-1 of treatment up to 60th Day. In detail, it was described as follows: In control rats the body weight on Day 1 was 166.38 **grams**, on Day 15th191.10 **grams**, on Day 45th249.58 **grams** and on Day 60th 282.26 **grams**. That is there was 41.05% of increase in body weight in control rats within duration of 60 days. However, AD-induction caused a drastic drop in the body weights on all days i.e. from 162.250 **grams** to 202.083 **grams** thus incurring about -28.40% reduction from Day 1 to Day 60th, indicating that the overall growth and development process was severely hampered by the administration of D-Gal. Interestingly, chronic oral administration of RGSE to AD-Induced rats for 60 days resulted in gradual gain in body weights. For example, the % of gain was: on 15th Day: 9.62%; 30th Day: 5.56%; 45th Day 13.62%: and on the day of termination of treatment i.e. 60th Day: 14.20%. In total there was 14.20% of recovery in the body weight of AD-induced rats with RGSE treatment.

Conclusion:

From the above results, it was obvious that in control rats, there was a continuous gain in body weights from initial day of commencement of experiment up 60th day which is a natural phenomina in the process of growth. Contrary to this, AD-I induced rats recorded significantly less body weights over the control rats. However, AD-I induced rats treated with RGSE (AD-I +RGSE) showed significant elevation in body weight on 30th day and 60th day against the AD-I indicating that RGSE can reverse AD- induced changes.

DISCUSSION:

Morphometrics **(Olalekan Agbolade *et al.*, 2020)** is the study of form variation and its co-variation with other physical charecterstic features. The application of multivariate statistical analysis to sets of quantitative variables such as length, width, and height was traditionally known as morphometrics. However significant improvement was noticed in the protective group of rats. Quantitative data on one or more measurable features were included in morphological studies, which were summarized as mean values and compared between groups. Because geometric morphometrics is used to address an increasingly diverse range of problems about the evolution and development of organisms (**Klingenberg, 2010**), the visualization of shape changes remains as an important tool for understanding morphological diversity. Ontogenetic changes connected with growth and development, where there is a clear directionality from younger to older organisms or historical changes from earlier to later time are examples of shape changes, according to **O'Higgins *et al.*, 2011**.

In geometric morphometrics, the most common strategy is to represent each specimen using the relative positions of morphological landmarks that can be precisely located and build a one-to-one connection between all specimens in the analysis. The geometric information about a configuration of landmarks, save for its size, position and orientation, is therefore characterised as shape.

Acknowledgements

The authors thankful to the Department of Zoology Sri Venkateswara University. Tirupathi (A.P) for providing necessary facilities to carry out this work. The authors also humble thanks to their Research supervisor, Prof.K.Yellamma (Retd) Department of Zoology S.V.University, Tirupati.

Reference:

1. Alireza Sarkaki1, Yaghoub Farbood2 ,Mohammad Badavi3, The effect of grape seed extract (GSE) on spatial memory in aged male rats, 2007 Vol. 23 No. 4.
2. ASHUTOSH AGARWAL*, S. MALINI, K.L. BAIRY, MUDDANNA S. RAO**EFFECT OF *TINOSPORA CORDIFOLIA* ON LEARNING AND MEMORY INNORMAL AND MEMORY DEFICIT RATS, 20.4.2002.
3. Balu M, Sangeetha P, Haripriya D, Panneerselvam CH. Rejuvenation of antioxidant system in central nervous system of aged rats by grape seed extract. Neuroscience Letters 2005;(383):295-300.
4. Balu M, Sangeetha P, Murali G, Panneerselvam CH. Age-related oxidative protein damages in central nervous system of rats: modulatory role of grape seed extract. Int. J Devl Neuroscience 2005;23:501-7.
5. Bickford PC, Gould T, Briederick L, Chadman K, Pollock A, young D, et al. Antioxidant-rich diets improve celebellar physiology and motor learning in aged rats. Brain Res 2000;866:211-17.
6. Chen Chen, Yake Zheng, Tianwen Wu, Chuanjie Wu and Xuan Cheng, Oral administration of grape seed polyphenol extract restores memory deficits in chronic cerebral hypoperfusion rats. 8 November 2016.
7. Dukas R. Evolutionary ecology of learning. In: Cognitive Ecology: The Evolutionary Ecology of information processing and Decision Making. University of Chicago Press, Shicago 1998;129-74.
8. Joseph JA, Shukitt-Hale B, Denisova NA, Bielinski D, Martin A, MCEwen JJ, et al. Reversals of age-related declines in neuronal signal transduction, cognitive and motor behavioral deficits with blueberry, spinach or strawberry dietary supplementation. J Neurosci 1999;19:8114-21.
9. JUNLI ZHEN, ZHENZHEN QU, HAIBO FANG, LAN FU, YUPENG WU,HONGCHAO WANG, HONGMIN ZANG and WEIPING WANG, Effects of grape seed proanthocyanidin extract on pentylenetetrazole-induced kindling and associated cognitive impairment in rats, Accepted May 13, 2014.
10. JUNLI ZHEN, ZHENZHEN QU, HAIBO FANG, LAN FU, YUPENG WU,HONGCHAO WANG, HONGMIN ZANG and WEIPING WANG, Effects of grape seed proanthocyanidin extract on pentylenetetrazole-induced kindling and associated cognitive impairment in rats. Accepted May 13, 2014
11. LU Shi Jun3, ZHANG Wan Qi1,#, and JIANG Yu Gang3,# Cyanidin-3-O-galactoside and Blueberry Extracts Supplementation Improves Spatial Memory and Regulates Hippocampus ERK Expression in Senescence-accelerated Mice*Biomed Environ Sci, 2014; 27(3): 186-196
12. Mery F. Aging and its differential effects on consolidated memory forms in Dorsophila. Experimental Gerontology 2007;(42):99-101.
13. Naimesh Solanki, Isam Alkadhi, Fatin Atrooz, Gaurav Patki, and Samina Salim*Grape powder prevents cognitive, behavioral and biochemical impairments in a rat model of posttraumatic stress disorder, 2015 January; 35(1): 65–75.
14. Rice-Evans CA, Miller NJ, Praganga G. Structure-antioxidant activity relationship of flavonoids and phenolic acids. Free Radic Biol Med 1996;226:G247-G54
15. Schoniech C. Reactive oxygen species and biological aging: A mechanistic approach. Exp Gerontol 1999;34:19-34.

16. Shi J, Yu J, Pohorly JE, Kakuda Y. Phenolic in grape seeds-Biochemistry and functionality. J Med Food 2003;6(4):291-99.

17. Sreemantula S, Nammi S, Kolanukonda R, Koppula S, Boinil KM. Adaptogenic and nootropic activities of aqueous extract of vitis vinifera (grape seed): An experimental study in rat model. BMC Complementary and Alternative Medicine 2005;5(1):1-8.

18. T. ZHONG, F. REN, C. S. HUANG, W. Y. ZOU, Y. YANG, Y. D. PAN, B. SUN, E. WANG AND Q. L. GUO* Swimming exercise ameliorates neurocognitive impairement induced by neonatal exposure to isoflurane and enhances hippocampal histone acetylation in mice, 2015.12.049,0306-4522/_ 2015

19. TAN Long1,3,^, YANG Hong Peng2,3,^, PANG Wei3, LU Hao3, 4, HU Yan Dan3, LI Jing3,

20. Yamakoshi J, Satio M, Kataoka S, Kikuchi M. Safety evaluation of proanthocyanidin-rich extract from grape seeds. Food and Chem Toxicology 2002;40:599-607.

21. Yanai Sh, Okaichi Y, Okaichi H. Long-term dietary restriction causes negative effects on cognitive functions in rats. Neurobiology of Aging. 2004;25:325-32.