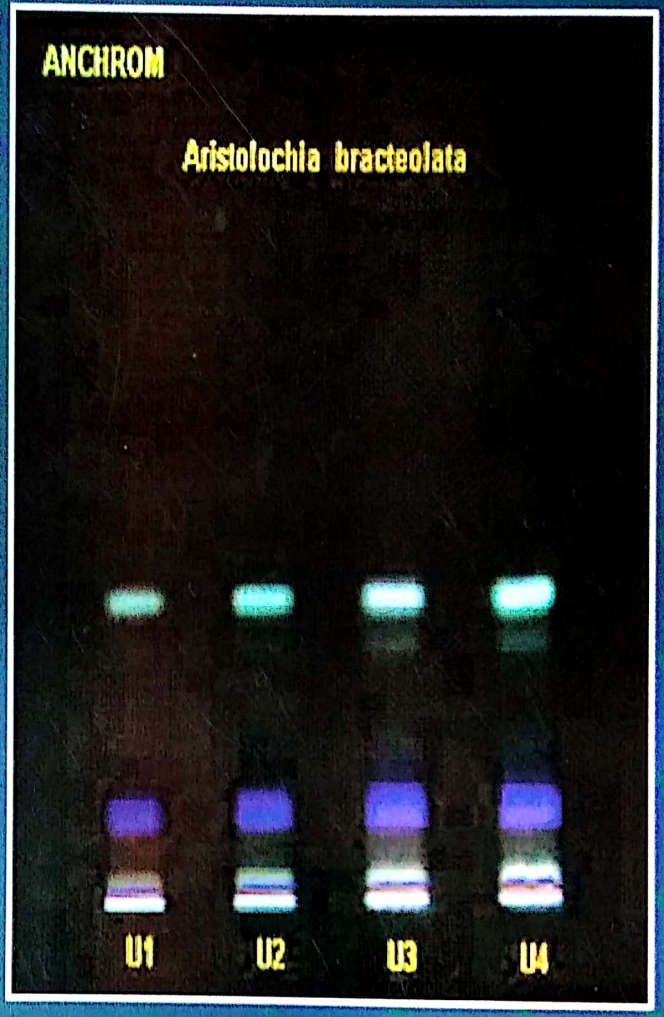
Print ISSN: 0973-1431
Online ISSN: 0976-4755

BIOINFOLET



A Quarterly Journal of Life Sciences

UGC-CARE APPROVED JOURNAL, INDEXED IN WEB OF SCIENCE CITATION INDEX, EXPANDED.

Vol. 18 2021 No. 2

BIOINFOLET 18 (2) : 215 - 217, 2021

EFFECT OF NANOCURCUMIN ON LIPOFUSCINOGENESIS IN THE PANCREAS OF ALLOXAN INDUCED DIABETIC MICE

N. D. Potphode, J. A. Daunde*, S. S. Desai* and M.V. Walvekar

Department of Zoology, Miraj mahavidhyalay, Miraj.
*Department of Zoology, Shivaji University, Kolhapur

ABSTRACT

Lipid peroxidation and fluorescent products are considered as characteristics of diabetic complications. On the other hand various studies have shown that curcumin is a promising bioactive compound showing antidiabetic activity. During present investigation the effect of curcumin nanoparticles on lipid peroxidation in terms of malondialdehyde, and lipofuscin granules in term of fluorescence product was studied. It was observed that after nanocurcumin administration, both of the parameters significantly reduced, and suggested that it was better than curcumin.

Key words : Nanocurcumin, Diabetes, Lipid peroxidation, lipofuscin granules

Introduction

Diabetes mellitus [DM] is one of the major chronic non-infectious diseases. Diabetes is associated with oxidative stress, which is induced by the generation of free radicals (Garg, *et al*., 1996), which interact with lipoproteins under the process of lipid peroxidation (LPO). On the other hand, lipofuscin is considered as an indicator of aging.

Curcumin, is a poly-phenolic compound, extracted from the rhizome of *Curcuma longa*. It's properties include anti-inflammation, anti-oxidation, decreasing blood glucose, immune regulation and anti-proliferation (Sureshbabu, *et al*., 1997). Nano-formulation of Curcuminis often used as a target drug (Bansal, *et al*., 2011, Pandey, *et al*., 2011).In view of this property, nanoparticles of curcumin were synthesized to find out its anti-diabetic activity

Material and Methods

Healthy male mice of 3 month age, weighing from 28 -30 g were kept for 18 hours under fasting condition. Those were divided into four groups, of 5 each. Of these the rats from diabetic group were subcutaneously injected with alloxan monohydrate, and alloxan induced diabetic mice were used for experimental purpose and one group was kept as diabetic control.

There were 4 treatments, given to three months old male mice : (1) : Control - subcutaneous injection of 0.15M acetate buffer pH 5.4 for 15 days. (2): Diabetic- single subcutaneous injection of alloxan 150 mg/kg body weight. (3) Recovery I- subcutaneous injection of curcumin @ 200 mg /kg body weight daily for 15 days. and Recovery II- subcutaneous injection of curcumin nanoparticles @ 150 mg /kg body weight daily for 15 days. Estimation of total lipid peroxidation was carried out following Wills (1966). Measurement of fluorescence product was carried out with the method explained by Dillard and Tappel (1971).

Results and Discussion :

Table 1 gives information on the effect of curcumin nanoparticles on lipid peroxidation on alloxan induced diabetic mice. Total lipid peroxidation in pancreatic tissue of control

mice was 28.6624 ± 4.0534 and it significantly (P < 0.01) raised to 53.5923 ± 6.5360 in alloxan induced diabetic mice. The total lipid peroxidation in recovery group I was 40.7808 ± 4.3088 which was significantly reduced as compared to alloxan induced diabetic mice group (P<0.01). The total lipid peroxidation level in pancreas of recovery group II significantly (P< 0.01) decreased to 33.2483 ± 4.7961 as compared to alloxan induced diabetic group.

Table 1 : Effect of curcumin nanoparticles on lipid peroxidation (n mole MDA/mg wet tissue) of alloxan induced diabetic mice.

Sr. no.	Groups (n=5)	n mole MDA/mg wet tissue	Statistical significance
1	Control	28.6624 ± 4.0534	1:2 p<0.01 2:3 p<0.01 2:4 p<0.01 3:4 p<0.05
2	Diabetic	53.5923 ± 6.5360	
3	Recovery I	40.7808 ± 4.3088	
4	Recovery II	33.2483 ± 4.7961	
P<0.01= Significant, P<0.05= Non significant			

Table 2 gives information on the effect of curcumin nanoparticles on fluorescence product (µg/mg wet tissue) in pancreas of alloxan induced diabetic mice. The fluorescence product in pancreas of control group was 0.0051 ± 0.0022 which significantly raised to 0.0145 ± 0.0010 in pancreas of alloxan induced diabetic group. The fluorescence product in recovery group I was significantly (P< 0.01). decreased to 0.0090 ± 0.0022. In recovery group II it was 0.0062 ± 0.0016, which was significantly less than that in alloxan induced diabetic group (P< 0.01).

Table 2 : Effect of curcumin nanoparticles on fluorescence product (µg/mg wet tissue) in pancreas of alloxan induced diabetic mice.

Sr. no.	Groups (n=5)	Fluorescence	Statistical significance
1	Control	0.0051 ± 0.0022	1:2 P<0.01 2:3 P<0.01 2:4 P<0.01 3:4 P<0.01
2	Diabetic	0.0145 ± 0.0010	
3	Recovery I	0.0090 ± 0.0022	
4	Recovery II	0.0062 ± 0.0016	
P<0.01= Significant, P<0.05= Non significant			

During present investigation, lipid peroxidation and fluorescence was significantly increased in alloxan induced diabetic mice, which was significantly decreased in curcumin treated mice, followed by further decrease in nanoparticles treated mice.

Decrease in lipofuscin pigment after curcumin treatment in recovery group-I could be explained as a result of cell proliferation. Curcumin reduced the lipofuscin granules in the pancreatic glands and resulted in considerable decrease of fluorescence. While in recovery group II, wherein mice were given curcumin nanoparticles, decreased lipofuscin pigments were observed. The results are in agreement with those reported by Walvekar, *et al,* (2013). Thus curcumin nanoparticles were more effective than normal amorphous curcumin.

Acknowledgements

The authors are thankful to the Department of Science and Technology - Promotion Of University Research And Scientific Excellence (DST-PURSE PHASE II), for providing financial assistance and to the Head, Department of Zoology, Shiva University, Kolhapur for providin infrastructural facilities.

References

Bansal, S. S., Goel, M., Aqil, F., Vadhanam, M. V. and Gupta, R. C. (2011) Cancer Prev *Res,*. **4 :** 1158

Dillard, C. J. and Tappel, A. L. (1973): *Lipids.* **8:** 183

Garg, M. C., Ojha, S. and Bansal, D. D. (1996) *Indian J. of Experimental Biology,* **34 :**264.

Pandey, M. K., Kumar, S., Thimmulappa, R. K., Parmar, V. S., Biswal. S. and Watterson, A. C. (2011). *Eur J Pharm Sci,*. **43 :** 16.

Pol, S. B., Walvekar, M. V. and Deshmukh, V. M. (2016) *International Journal of Pharmaceutical and Clinical Research,*. **8(1):** 22.

Suresh Babu, P. and Srinivasan, K. (1997) . *Mol Cell Biochem,*. **166(1-2) :** 169.

Walvekar Madhuri, Shaikh Nilofer and Priti Sarvalkar (2013). Iran J Reprod Med, vol. ***11(9)*** *: 711*

Wills, E. D. (1966): *Biochem. J.* **99:** 667