Evaluation Of Some Antioxidant Activity in Induced Prostatitis Following Treatment with Moringa Oleifera

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Abstract

Prostatitis has been observed to be common among men and efforts on therapeutic approach using local plants for management have attained a significant insight in research. In this work, using animal mode, Benign Prostate Hyperplasia (BPH) was induced with testosterone and the progress was monitored by treating with extract of Moringa oleifera. The enzymatic activities of three antioxidants were monitored spectrophotometrically and evaluated. An increased antioxidant activity was observed for Malondialdehyde (MDA), Sodium Dismutase (SOD) and Glutathione (GSH) which is suggestive of ameliorative property of Moringa Oleifera. With a P-value set at 0.05, a significant difference was observed for mean GSH on day 10, 20 and 25 in concentration. Similar observation was seen in Malondialdehyde and SOD.

Keywords: *Antioxidant, Prostatitis, Treatment, Moringa Oleifera.*

Introduction

There is a quantum of knowledge currently for the fact that antioxidants inhibit cells from damage attributed to oxidative stress which has arisen due to pathological conditions. It is now known that conditions that exacerbate inflammation often results in neoplastic changes that affect the prostate. To a large extent, some scientific research has elucidated data that suggest the efficacy of antioxidants in inhibiting prostatitis which supports the need for enhanced chemopreventive investigation [1, 2].

The morbidity and mortality rate for prostate cancer among men is quite high but a clear definition of its etiology has not fully emerged. To a large extent, risk factors such as family history, age and ethnic group have been documented [3, 4]. There are other risk factors such as genetic predisposition, obesity and hormones that are being scrutinized. While a clear etiologic factor remains to be discovered a nexus seem to exist as an interplay of complex interaction among them having link with the development of prostate cancer [5].

Raised oxidative stress constitutes a risk factor in Prostate Cancer. Several free radicals arising from metabolic reactions of biochemical pathways due to unregulated dietary consumption of some macromolecules in food are known to contribute to the development of Prostate Cancer

[6, 7]. Induction of oxidative damage is enhanced by the production of Reactive Oxygen Species (ROS) and Reactive Nitrogen Species (RNS). An overload of these species can result in both lipid and protein oxidation can cause DNA damage or change.

Antioxidants are compounds which have the potential to inhibit the production of free radicals and the oxidation process [8, 9].

Classification of these substances is based on their source which can be endogenous or exogenous. The possible reaction mechanism of action of antioxidant is to a large extent complex [10, 11]. Oxidation generally, is a process in which electrons are lost in course of the reaction by the chemical species that are participating. In the reaction, Electrons are gained from different chemical species in a process known as reduction. Redox reaction which in a coupled reaction of reduction and oxidation is of relevance in cell physiology but when there is a disequilibrium they may become electrons and harmful to the system.

Oxygen is a key component of the terminal oxidant of the electron transport or the respiratory chain. It is important to note that while oxygen is very important for life process, it can also be harmful when reactive oxygen species (ROS) are produced. The production of superoxide anion (O_2^-), hydroxyl radicals (HO**.**) and hydrogen peroxide (H_2O_2) when elevated implies raised ROS or a decreased in the cellular antioxidant capacity which causes oxidative stress capable of ROS-meditated damage to the body lipids, nucleic acid and proteins [12, 13}. Research points in the direction of a reduced risk of cancer that is associated with intake of vegetable and fruits, thus supporting the need for further study of Moringa oleifera plant for phytochemicals and antioxidant capacity.

MATERIALS AND METHODS

The fresh leaves and stem of Moringa oleifera used for this study were sourced from Oyigbo in Oyigbo Local Government Area of Rivers State. They were identified by a taxonomist and issued voucher number. Both leaves and stem were air-dried for a period of three weeks. Extraction of the phytochemicals was done with ethanol and further subjected to qualitative and quantitative analysis. The yields obtained were Alkaloids, flavonoids, Saponin, Tannins, Cardiac glycosides Terpenoids, Pheonols, and Steroids. Procedures included the methods of (Siddiqui et al., 2009), (Harborne 1973), (Kokate 2005), (Abadoni and Achuko, 2001) and (Bothelho et al., 2019).

The level of Glutathione (GSH) was measured using Randox Glutathione Peroxides (Ransel) assay kit, a product of Randox Labs UK. Measurements were taken at a wavelength of 405nm using a spectrophotometer.

Evaluation of Superoxide Dismutase (SOD) activity was carried out utilizing the method of (Misra and Tridorich, 1989) and measured spectrophotometricallly at a wavelength of 420nm.

The Malondialdehyde (MDA), was analyzed by the method of (Gutteridge and Wilkins, 1982) using the Flouroscan Ascent a product of Thermo Electron Corporation, USA. The pink product of lipid peroxidation of reaction of MDA with 2-thiobarbituric acid was read spectrophotometrically at 532nm.

RESULTS

Results obtained for control, induced but not treated and other groups for the antioxidants SOD, GSH and MDA are shown on tables 1, 2 and 3. Generally there was evidence of increased activity of these antioxidants although it was concentration and time dependent.

TABLE 1: DESCRIPTIVE AND COMPARATIVE ANALYSIS OF MEAN VALUES OF SUPEROXIDE DISMUTASE ON DAY 5, 10, 15, 20 AND 25 ON A GROUP BASIS

DAYS	GP 1	GP 2	GP 3 20mg	GP 4 50mg	GP 5 100mg	GP 6 200mg	GP 7 300mg	GP 8	P-VALUE
DAYS 5	12.14±0.57	18.31±1.11	20.22±0.57	22.09±0.12	24.11±0.10	25.17±0.99	24.30±0.14	30.11±0.42	0.001
DAY 10	12.20±0.40	22.09±0.01	23.20±0.08	22.04±0.51	24.00±0.10	26.2±0.59	32.07±0.02	35.42±0.60	0.001
DAY 15	12.41±0.66	30.22±0.03	24.20±0.06	24.51±0.01	24.30±0.21	33.04±0.76	37.00±0.58	40.02±0.01	0.010
DAY 20	12.72±0.30	25.33±0.02	27.20±0.07	28.30±0.01	30.11±0.14	31.50±0.01	39.20±0.14	40.20±1.25	0.001
DAY 25	12.30±0.78	30.60±0.07	32.30±0.07	33.80±0.01	37.30±0.07	44.20±0.28	52.30±0.01	66.40±0.57	0.020

Values are Mean ± Stand Error of Mean (SEM) of Triplicate Determinations. P ≤ 0.05

TABLE 2: DESCRIPTIVE AND COMPARATIVE ANALYSIS OF MEAN VALUES OF GLUTATHIONE ON DAY 5, 10,15, 20 AND 25 ON A GROUP BASIS.

DAYS	GP 1	GP 2	GP 3 20mg	GP 4 50mg	GP 5 100mg	GP 6 200mg	GP 7 300mg	GP 8	P-VALUE
DAYS 5	2.34±0.46	3.11±0.63	3.42±0.02	3.44±0.08	3.72±0.03	4.21±0.01	5.20±0.06	6.12±0.13	0.246
DAY 10	3.21±0.04	4.11±0.05	3.62±0.02	4.72±0.14	5.20±0.15	5.58±0.06	6.21±0.06	8.33±0.02	0.001
DAY 15	2.31±0.45	4.01±0.05	4.51±0.08	5.11±0.02	5.47±0.10	6.21±0.01	7.42±0.33	9.12±0.13	0.211
DAY 20	2.14±0.47	6.33±0.01	5.22±0.13	5.44±0.01	5.10±0.01	5.00±0.71	8.60±0.07	10.01±0.14	0.030
DAY 25	2.34±0.54	10.70±1.23	6.23±0.07	7.44±1.06	7.44±0.03	8.33±0.06	922±0.04	13.50±1.27	0.003

Values are Mean ± Stand Error of Mean (SEM) of Triplicate Determinations. P ≤ 0.05.

Increase in GSH was more marked on days 10 and 20 and 25 with P ≤ 0.01, 0.3 and 0.003 respectively.

TABLE 3: DESCRIPTIVE AND COMPARATIVE ANALYSIS OF MEAN VALUES OF MALONDIALDYHYDE ON DAY 5, 10, 15, 20 AND 25 ON A GROUP BASIS.

DAYS	GP 1	GP 2	GP 3 20mg	GP 4 50mg	GP 5 100mg	GP 6 200mg	GP 7 300mg	GP 8	P-VALUE
DAYS 5	3.22±0.08	5.32±0.07	6.14±0.38	6.33±0.32	5.73±0.03	6.20±0.01	7.30±0.12	8.22±0.13	0.106
DAY 10	3.18±0.05	3.81±0.03	7.21±0.07	7.02±0.11	8.14±0.11	8.77±0.26	10.11±0.09	10.27±0.21	0.001
DAY 15	4.57±0.95	5.63±0.03	7.82±0.06	8.24±0.11	8.97±0.14	10.01±0.06	12.40±0.01	122.91±0.08	0.010
DAY 20	3.27±0.12	6.84±0.02	8.71±0.04	9.20±0.14	10.40±1.34	11.60±0.07	12.80±0.07	15.10±0.86	0.001
DAY 25	3.14±0.13	14.50±0.64	9.80±0.01	10.60±0.07	12.60±0.07	14.40±0.28	16.50±0.14	18.20±0.25	0.001

Values are Mean ± Standard Error of Mean (SEM) of Triplicate Determinations. P ≤ 0.05

Results show that the increase of MDA was both time and concentration dependent. P ≤ 0.01.

DISCUSSION

The use of plants and its identified phytochemicals in management of disease conditions has advanced the course of medical practice. In this research on Moringa oleifera, we have used qualitative and quantitative methods in attempt to identify the phytochemicals in the plant. We identified tannins, Flavonoids, Terpenoids, phenols, saponins glycosides and alkaloids at various concentration. Moreover, some mineral contents were discovered.

Over the years, plant derivatives had undergone scientific scrutiny and some have been identified chemotherapeautics for Prostate Cancer largely on account of their antioxidant and anti-inflammatory potentials coupled with their tolerability margin and low cost [14, 15, 16]. Experimental models in animals have been adopted in several studies that show their anticarcinogenic and chemopreventive actions. In this research, encouraging data was obtained to support increasing levels of antioxidants that could exert anti-cancer effects. We observed a rise in the level of GSH, SOD, and MDA all of which could be used to express antioxidant capacity. These findings support the work in [7].

Generally, Antioxidants are molecules which may be natural or artificial in origin. In the recent past, there has been a retinue of scientific literature that have reported on the physical and clinical parameters dealing with the utilization of antioxidants supplements [18, 19, 20]. It is known that molecular or genetic changes occurring in carcinogen as in Prostate cancer has the capacity to alter the protective effect of antioxidants [21, 22, 23]. A biological approach requiring the use of genomics, epigenetics and metabolomics may enhance the discovery of critical molecules and biochemical pathways in different set of patients which are regulated by the uptake of antioxidants.

As shown from the results obtained in this study, there was improvement in the level of antioxidants to ameloriate Benign Prostate hyperplasia in this animal model. This gives credence to the fact that Moringa oleifera have phytochemical components with potential to attenuate prostatitis.

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