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Research Article

## Oxygen therapy: A rejuvenator of body defense as per its antioxidant nature

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### ABSTRACT

The oxidation stress is known to be a reason for various tissue degenerations and plays a role in premature aging. In a wake of this, there is a need to explore antioxidants, which can help the body to maintain a balance between inbuilt oxidation stress and detoxifying reactions. The antioxidant power of the blood serum was determined by FRAP (ferric reducing the ability of plasma) method after being supplied with oxygen. Furthermore, the other biochemical tests of the volunteer showed no variation in his biochemistry.

**Keywords:** Oxygen therapy; Antioxidants; Blood Serum; Biochemical Tests

### INTRODUCTION

Air only contains 21% oxygen, and increasing the fraction of oxygen in the breathing gas increases the amount of oxygen in the blood in normal condition. Ozone is a tri-atomic oxygen molecule, O<sub>3</sub>, with a different molecular structure than oxygen. Ozone in the atmosphere is produced by action of UV rays and thunderstorm on the atmosphere oxygen, but medical ozone is produced from pure medical grade oxygen with the help of high voltage electrical discharge. Medical ozone is a mixture of oxygen and ozone of different concentrations medical ozone is always freshly prepared on-site for immediate administration.

Oxygen therapy is the administration of oxygen as a medical intervention, which can be for a variety of purposes in both chronic and acute patient care. Oxygen is essential for cell metabolism, and in turn, tissue oxygenation is essential for all normal physiological functions (Clinical Guidelines Update — Oxygen 2009). It is often only required to raise the fraction of oxygen delivered to 30–35% and this is done by use of a nasal cannula. When 100% oxygen is needed, it may be delivered via a tight-fitting face mask, or by supplying 100% oxygen to an incubator in the case of infants. Oxygen can be administered in other ways, including specific treatments at a raised air pressure, such as hyperbaric oxygen therapy.

High blood and tissue levels of oxygen can be helpful or damaging; depending on circumstances and oxygen

therapy should be used to benefit the patient by increasing the supply of oxygen to the lungs and thereby increasing the availability of oxygen to the body tissues, especially when the patient is suffering from hypoxia and/or hypoxaemia. High flow oxygen is definitively indicated for use in resuscitation, major trauma, anaphylaxis, major haemorrhage, shock, active convulsions and hypothermia (Howard LS; Davison AG, 2008).

Uptake of O<sub>2</sub> from the air is the essential purpose of respiration, so oxygen supplementation is used in medicine. Treatment not only increases oxygen levels in the patient's blood, but has the secondary effect of decreasing resistance to blood flow in many types of diseased lungs, easing work load on the heart. Oxygen therapy is used to treat emphysema, pneumonia, some heart disorders (congestive heart failure), some disorders that cause increased pulmonary artery pressure and any disease that impairs the body's ability to take up and use gases oxygen. Increased O<sub>2</sub> concentration in the lungs helps to displace carbon-monoxide from the heme group of hemoglobin. Oxygen gas is poisonous to the anaerobic bacteria that cause gas gangrene, so increasing its partial pressure helps kill them. In 1892, The Lancet published an article describing the administration of ozone for treatment of tuberculosis (Stoker G, 1892). In 1902, another article was published claiming success in treating chronic middle ear deafness with ozone (Stoker. G, 1902). Ozone was used during the First World War to disinfect wounds (Stoker, George, 1916). Ozone has been analgesic as well as anti-inflammatory effects (Iliakis E, Valadakis V, 2001) as it inhibits synthesis of proinflammatory prostaglandins, release of bradykinins and algogenic compounds. Ozone also increases the release of antagonists to proinflammatory cytokines (Bocci V, Luzzi F et Al, 1993). The prevalence rate of low back pain in a number of studies ranged from 22% to 65% in one year, and the lifetime prevalence ranged from 11% to 84%

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(Smith LW, 1964). In 1934, Mixer and Barr drew worldwide attention by stating that herniated disc or nucleus pulposus is one of the important causes of low back pain (Viebahn R, 1994). In 1998, Muto and Avella suggested intra-tractal injection of ozone for disc herniation under CT guidance (Muto M, Andreula C, Leonardi M, 2004). After that successful outcome has been reported by many European centers (Bonetti M, Fontana A, 2003, Andreula CF, Simonetti L, 2003)

## MATERIALS AND METHODS

### Chemical and Equipment

All the chemicals used in the investigation were of Analytical Reagent (AR) grade and were purchased from Sigma, Merck, etc. De-ionized water was used for complete study. All the glass ware equipment used for extraction were sterilized prior to use. Sterilization process was performed by autoclaving at 121°C for 15 minutes.

### Experimental work

The Clinically and medicinally pure five liters oxygen was taken by a volunteer of 25 years everyday as a part of double-blind study for a period of three months as per doctor's recommendation. After every month, a blood sample of the volunteer was examined for its antioxidant power determination. Furthermore, the frequent monitoring of the subject applying, ECG, Hematology (kidney, liver functioning).

### Antioxidant activity determination

The antioxidant activity was measured by FRAP method (Ferric reducing the ability of plasma or plant) Benzie and Strain, (1996-1990).

**FRAP - Working solution.** 25 ml acetate buffer, 2.5 ml TPTZ solution (2, 4, 6-Tripyridyl-S-triazine) and 2.5 ml FeCl<sub>3</sub>.6H<sub>2</sub>O solution was freshly prepared. Aqueous solution of known FeCl<sub>4</sub>.7H<sub>2</sub>O was used for calibration.

## RESULTS AND DISCUSSION

The human life has been seeded by nature on earth after millions of years since the formations of earth laced with anaerobic conditions. (CO<sub>2</sub> saturated earthly environment). For human life which is dependent upon oxygen, the anaerobic condition was translated to aerobic condition to suit the evolution and development of human life upon earth. For understanding the oxygen dependence and rejuvenation of human life or system, this oxygen therapy was tested upon a volunteer of 26 years applying double blind experiment.

As per the results of ECG, there were no any changes of the volunteer as per the reports. The other biochemical parameters like hematology, renal functioning and liver functioning were also shown to be increased after oxygen therapy as shown in the table below. So, it is not hazardous as per these medical reports.

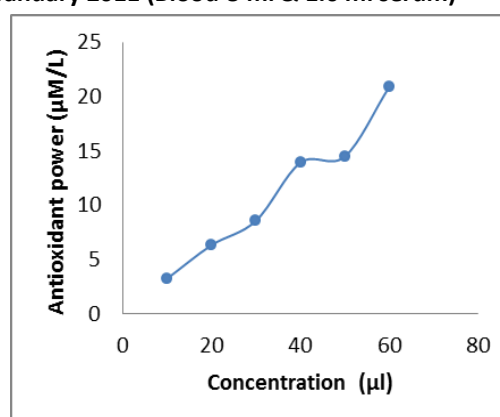
One of the most important parameter which was

**Table 1: Data sheet for various bio-chemicals before and after oxygen therapy**

Bio-chemicals	Before oxygen therapy	After oxygen therapy	Normal Range
Hb	15.3 gm / dl	15.6	13-18
TLC	9400	10600	4000-11000
Neutrophil	81%	76%	40-75
Lymphocyt	16%	22%	20-40
Eosinophil	01%	02%	0-06
Monocyte	02%	00	0-10
E.S.R.	03%	08 mm after 1 hrs.	0.00-10
R.B.C.	5.36 millions/cm	--	4.2-5.4
Protein	6.3%	7.5 gm/dl	6.6 - 8.3
Albumin	4.1%	4.2 gm/dl	3.5-5.0
Globulin	2.2%	3.3 gm/dl	1.5-3.0
Alkaline Phosphates	169	188 IU/L	108-306

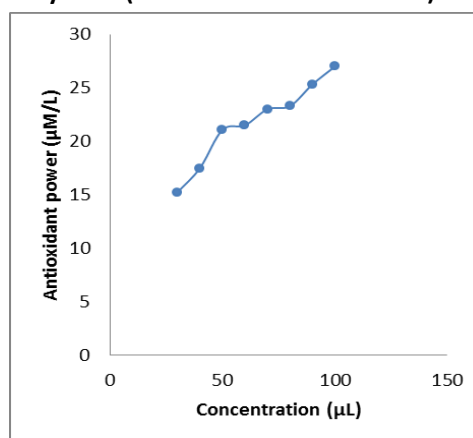
**Table 2: Antioxidant property carried out on 5th January 2011 (Blood-5 ml & 1.0 ml serum)**

Conc. (µl)	Absorbance	Antioxidant power (µM/L)
10	0.039	03.25
20	0.076	06.33
30	0.103	08.58
40	0.167	13.92
50	0.174	14.50
60	0.251	20.92



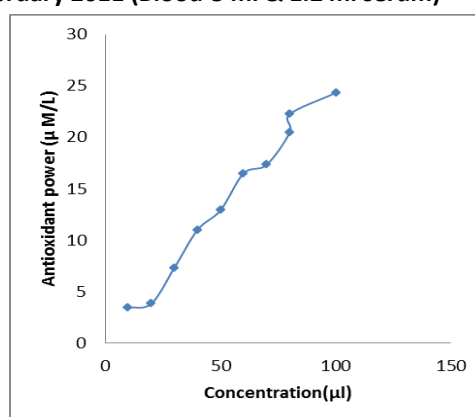
**Table 3: Antioxidant Property Carried out on 20th January 2011 (Blood-5 ml & 1.0 ml serum)**

Conc. (μl)	Absorbance	Antioxidant power (μM/L)
10	0.055	04.58
20	0.101	08.42
30	0.183	15.25
40	0.210	17.50
50	0.253	21.08
60	0.258	21.50
70	0.276	23.00
80	0.280	23.30
90	0.304	25.33
100	0.324	27.00



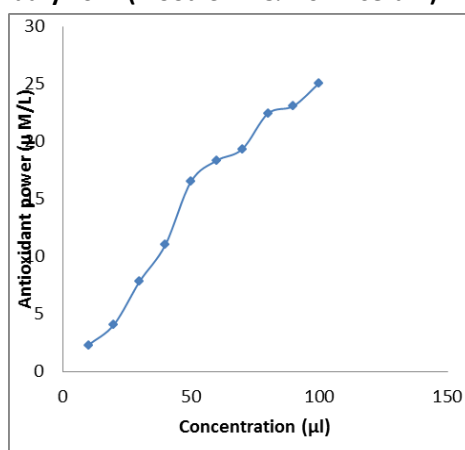
**Table 4: Antioxidant Property carried out on 5th February 2011 (Blood-5 ml & 1.2 ml serum)**

Concentration (μl)	Absorbance	Antioxidant power (μ M/L)
10	0.041	03.42 μ M/L
20	0.046	03.83 μ M/L
30	0.088	07.33 μ M/L
40	0.132	11.00 μ M/L
50	0.155	12.92 μ M/L
60	0.198	16.50 μ M/L
70	0.208	17.33 μ M/L
80	0.246	20.50 μ M/L
90	0.267	22.25 μ M/L
100	0.292	24.33 μ M/L



**Table 5: Antioxidant Property carried out on 20th February 2011 (Blood-3 ml & 1.0 ml serum)**

Concentration (μl)	Absorbance	Antioxidant power (μ M/L)
10	0.028	02.30 μ M/L
20	0.049	04.08 μ M/L
30	0.094	07.83 μ M/L
40	0.132	11.00 μ M/L
50	0.210	17.50 μ M/L
60	0.232	18.33 μ M/L
70	0.220	19.33 μ M/L
80	0.269	22.42 μ M/L
90	0.277	23.08 μ M/L
100	0.301	25.08 μ M/L



determined in this particular therapy was antioxidant power determination before and after the oxygen therapy. The result showed first the increase in the antioxidant potential, then following a straight path and finally remains constant, meaning there by that, up to a certain limit the therapy is useful in overcoming the health problem which are of free radical origin. The results in this study are as same as the results of other studies of antioxidants in terms of the graphs shown in this study.

Continuous use of antioxidant is in turn is health hazardous, because much intake of antioxidant within the

body leads to the decline in the immune response of the immune system, same is the case of ozone therapy. So this ozone therapy is very useful helpful in furnishing the antioxidants to the body that too without side effects.

**CONCLUSION**

The antioxidant activity of the medicinal oxygen was determined using the FRAP method. The final results indicated that the medicinal oxygen has antioxidant activity in blood serum. The study showed that the human body. Also it does not harm the biochemistry of a person as per the results are taken into considera-

tion. So medicinal oxygen should be taken up to certain limit in order to overcome free radical borne diseases.

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