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Assessment of Nutritional Supplement (Haras) As an Air Pollution Detox by Measuring Breath Carbon Monoxide Levels in Healthy Non-Smokers: An Analytical Study

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Abstract

Nutritional supplement (Haras) is a curcumin juice used as an air pollution detox and has recently gained a recognition for its anti-inflammatory and anti-oxidant activities. Carbon monoxide (CO) concentrations in ambient air is one of the significant pollutants contributing to rotting of pure air. Aims and objective of this study was to assess Haras therapy in reducing CO levels in Non-smokers. The study included 25 subjects of healthy volunteers who were non-smokers. They were given 10 ml of Haras juice in divided doses per day for 30 days. CO levels were evaluated using breath analyzer prior to drug trial and then on 15th day, and after the conclusion of the drug trial. The results showed significant decline in CO levels in non-smokers. Haras, a nutritional supplement, can be used to detox from air pollution.

Keywords: Carbon monoxide, Non-smokers, Haras, Detox

Full-length article **Corresponding Author, e-mail: mitsmishra1810@rediffmail.com*

1. Introduction

The presence of contaminants in substantial amounts over protracted durations of time is referred to as air pollution. Particles, hydrocarbons, oxides of nitrogen and sulphur and extra scattered adulterants can be found in the air [1]. Millions of people throughout the world are continuously exposed to air that is extremely polluted and much farther than the safety standards set by the World Health Organization (WHO) [2].

Evaluation of the air quality is pivotal for the environment, a crucial step in identifying urban air pollution and also assist in its management3. When fossil fuels burn incompletely, carbon monoxide is formed. Headache, dizziness, exhaustion, fragility, airsickness, vomiting, and finally unconsciousness are signs of carbon monoxide poisoning [1]. Compared to oxygen, carbon monoxide has a far stronger affinity for haemoglobin. In a similar vein, those who are uncovered to steep levels of carbon monoxide for a very long duration of time may experience serious poisoning. Hypoxia, ischemia, and cardiovascular illness are seen as an aftereffect of the deficit of oxygen caused by the competitive binding of carbon monoxide [3-4].

Motor vehicles in metropolitan areas are the main source of CO emissions. Additionally, coal-producing industries release it. Smoke from cigarettes and charcoal burning, both raise the level of CO in the surrounding air [3]**.** Vent-free kerosene, gas space heaters, seeping smokestack, thermally insulated chambers, back drafting from fireplaces, pellet stoves, furnaces, gas stoves, generators, elements powered by lead petrol, exhaust fans in attached garage and tobacco smoke are all sources of carbon monoxide. High amounts of CO in indoor air may result from partial oxidation during burning in gas ranges and unvented gas or paraffin oil heaters [5]. CO is absorbed into the body by airborne breathing. Through the respiratory system, it enters the body and exits through exhale.

However, as CO levels rise, it becomes poisonous and may have negative effects on the circulatory and nervous system. For the five main air pollutants covered by the Clean Air Act; namely ground-level ozone, particle pollution, carbon monoxide, sulphur dioxide and nitrogen dioxide, the US-EPA developed the acronym "AQI" (Air Quality Index). Indoor and outdoor air pollution are among the top environmental health risk factors, with a wide range of literature recognising the link between unmasking to air pollutants and the associated ailments.

Various published literature also revealed that there are increased incidences of respiratory and cardiovascular comorbidities and congestive heart failure, asthma attacks, acute bronchitis and decreased lung function [6]. NIOSH, the national institution for occupational safety and health, has advised limiting the concentrations of CO display to 35 ppm. Younger children, those under the age of fourteen are more likely to become poisoned than older people.

Health risks to people generally result from exposures of 100 ppm or above [7]. The World Health Organisation (WHO) has approximated that air pollution causes 7 million untimely deaths worldwide6. In the published literature, curcumin is well known for its anti-inflammatory and anti-oxidant activities. This study was undertaken to check the effectiveness of nutritional supplement, Haras (turmeric juice) on CO levels in healthy volunteers who were non-smokers.

2. Methods

2.1. *Study sample*

The study included 25 subjects of non-smokers. The study participants were healthy adults who resided in Greater Noida for more than a year and were enrolled for the analysis. Participants had never smoked or had smoked fewer than 100 cigarettes in their lifetimes. The eligibility criteria for the study were as following: 1. Age 18-60 years 2.

Healthy volunteers who were non- smokers without any history of systemic diseases. 3. Healthy volunteers willing to return for follow ups. The exclusion criteria included 1. Smokers were excluded in the study 2. Patients who were unwilling to sign the informed consent.

2.2. Methodology

A single arm design was used for the study. Haras turmeric juice has been produced at Oncocur India Pvt Ltd, Mumbai, a holding company of the world's first turmeric extract juice as a daily air pollution detox for lung protection suitable for all age groups. The product supply has been sponsored by Nanoved Research Foundation, Mumbai. 30 days of daily divided doses of 10 ml of Haras juice were administered to the participants. Smokerlyzer, a breath analyzer, was used to measure the CO levels prior to, on the fifteenth day of the drug study and on the last day. The participants were instructed to inhale fully, exhale fully, hold their breath for 15 seconds and then quickly exhale into a single-use mouthpiece attached to the Smokerlyzer. Then, the CO concentrations in parts per million (ppm) were noted.

3. Results

3.1. Wilcoxon signed-rank test was used to compare CO levels on first, fifteenth and thirtieth day

The reduction in mean ppm CO was found to be statistically significant from 1st day to 30th day ($P<0.001$). The reduction in mean ppm CO was not statistically significant from 1st day to 15th day ($P\geq0.05$), Table 1, Graph 1.

4. Discussion

Curcumin (diferuloylmethane), an orange-yellow secondary metabolic product, is found in the rootstalk of turmeric (Curcuma *longa* L.) [8-13]. It accomplishes its therapeutic effects via altering signaling molecules such as cytokines, chemokines, transcription factors, adhesion molecules, microRNAs, tumor suppressor genes, etc[14-18]. Cardiopulmonary illnesses are more likely to occur when there is particle air pollution. In a study done on mice, Nemmar A et al. investigated the impact of curcumin on the pulmonary and cardiovascular consequences brought on by repeated unmasking to diesel exhaust particles. Curcumin (45 mg/kg) pretreatment administered orally 1 hour before exposure to diesel exhaust particles significantly reduced the infiltration of inflammatory cells, the rise in tumor necrosis factor and the elevated airway resistance brought on by diesel exhaust particles. The thrombosis was dramatically but only partially reduced. They deduced that repeated exposure to diesel exhaust particles caused systemic and pulmonary inflammation marked by the release of tumor necrosis factor, elevated systolic blood pressure and accelerated coagulation. Their results showed that curcumin is an effective counteractive inflammatory compound that inhibits the release of tumor necrosis factor and guards against the negative effects of diesel exhaust particles on the lungs and cardiovascular system [14-19]. Curcumin's effects on human nasal fibroblasts exposed to urban particulate matter were investigated by Kim et al. They inferred that curcumin had negating oxidative effects and may be helpful in treating nasal diseases brought on by urban particulate matter, such as allergic and chronic rhinitis, because it lowered Reactive Oxygen Species production in a dose-dependent manner in human nasal fibroblasts [20].

Shi J et al. studied in human microvascular endothelial cells HMEC 1, curcumin pretreatment prevents oxidative stress and inflammation brought on by PM2.5-induced oxidised low-density lipoprotein. Curcumin is said to be able to lessen oxidative stress and inflammation. The outcomes revealed curcumin decreased HMEC 1 cell death and intracellular caspase 3 activity generated by PM2.5 (300 g/ml). Curcumin therapy may therefore minimize oxidative stress and inflammation brought on by PM2.5 in HMEC 1 [21]. In both therapeutic and preventive approaches, curcumin lowered NF-κB activation, serum levels of inflammatory cytokines as well as protein and lipid oxidation according to Nery-Flores SD et al. They concluded that curcumin has demonstrated to be a phytodrug against the harm brought on by the exposure to ozone in the environment[2]. In a randomised controlled trial, E. Hee Jo et al. found that curcumin supplementation significantly decreased the levels of circulating pro-inflammatory cytokines, which are predictive biomarkers of clinical pneumonitis and improved anti-inflammatory cytokines in Chengdu, China's third most polluted city [22].

Table 1. Comparison of ppm CO at different time-intervals within Non-Smokers

Day	n	Mean	Std Dev	SE of Mean	Mean Difference	Z	P-Value
Day 1	25	1.72	0.68	0.14	0.160	-2.000	0.050
Day 15	25	1.56	0.58	0.12			
Day 1	25	1.72	0.68	0.14	0.680	-3.690	<0.001*
Day 30	25	1.04	0.20	0.04			

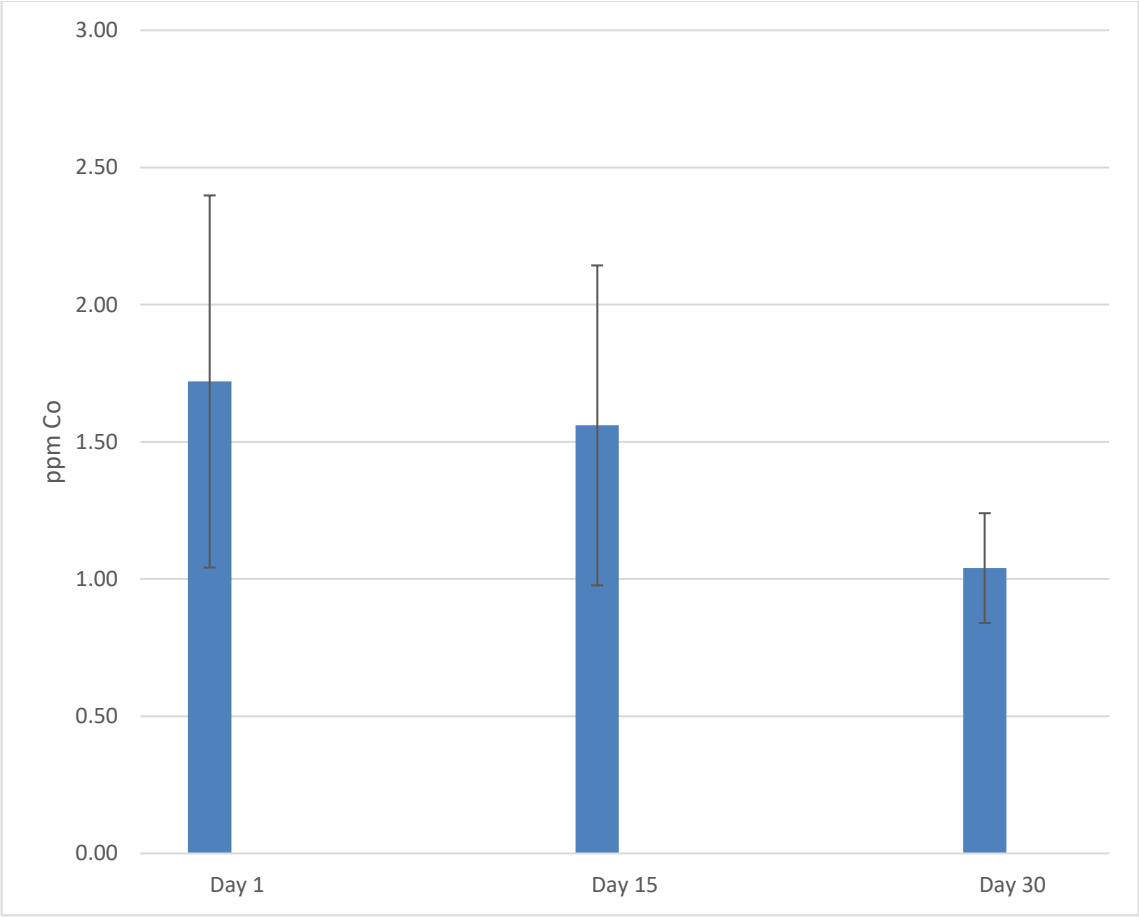

Figure 1. Showing CO levels on first day, fifteenth day and on the last day of drug trial.

According to a study on curcumin by Aminuddin M. et al., administering C. longa could lower malondialdehyde, tumor necrosis factor- α , and interleukin-6 levels. By lowering the cytokines IL-6 and tumor necrosis factor- α , curcuma longa, effectively controls inflammation. Curcuma longa can stop lipid peroxidation brought on by free radicals, which then lowers malondialdehyde concentrations [23]. In a mouse model of chronic asthma, Karaman M et al. investigated curcumin's anti-inflammatory properties. They showed that administering curcumin reduced the pathological alterations associated with chronic asthma. They concluded that in the future, curcumin may show promise as an asthma treatment [24]. Our research on haras therapy in non-smokers revealed a considerable drop in their CO levels, improving their lung function.

5. Conclusion

In conclusion Nutritional supplement (Haras) works well as a substitute for supportive therapy to lower CO levels in non-smokers and can be used as an air pollution detox.

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