

## Effect of Sea Buckthorn Oil (*Hippophae Rhamnoides L*) As an Adjunct in Management of Chronic Periodontitis Subjects

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### Abstract

### Original Research Article

**Background:** Medicinal and pharmacological properties of sea buckthorn have been investigated in a few in vitro and in vivo models but very limited in clinical studies. **Aim:** To test the efficacy of sea buckthorn oil as an adjunct in management of subjects having chronic periodontitis. **Methods:** In this study, seventy six adult patients visiting the dental hospital for seeking care for chronic periodontitis. Patients receiving sea buckthorn oil capsules with standard treatment were allotted to test group (group I) and others who subjected to standard treatment alone were allotted to control group (group II). Patients of both the groups were recalled after 3 weeks for assessment as Plaque Index (PI), Gingival Index (GI), Bleeding on Probing (BOP), Clinical attachment level (CAL) and Pocket probing depth (PPD). **Results:** At the end of 3 weeks, mean plaque index was found to be higher in Group I ( $1.21 \pm 0.22$ ) as compared to Group II ( $1.11 \pm 0.18$ ). Similarly mean bleeding on probing index was found to be more in Group I ( $31.36 \pm 10.03$ ) as compared to Group II ( $30.02 \pm 9.64$ ). Contrary to this, mean gingival index and Pocket probing depth were found to be higher in Group II as compared to group I ( $1.18 \pm 0.73$ ,  $2.75 \pm 1.85$  Vs  $1.14 \pm 0.69$ ,  $2.18 \pm 1.38$ ). **Conclusion:** Sea buckthorn oil carries potential as an adjunct in management of subjects having chronic periodontitis as statistically significant difference in mean pocket probing depth at 3 weeks was observed between the study and test groups.

**Keywords:** Bleeding on Probing, sea buckthorn oil, control.

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## INTRODUCTION

Sea buckthorn (*Hippophae rhamnoides L*) Elaeagnaceae, a wonder plant has recently gained due attention, for its medicinal and nutritional potential. Sea buckthorn is a thorny nitrogen-fixing deciduous shrub of cold arid region native to Europe and Asia [1, 2]. All parts of this plant are considered to be a good source of large number of bioactive substances like vitamins (A, C, E, K, riboflavin, folic acid), carotenoids (carotene, lycopene), phytosterols (ergosterol, stigmasterol, lanosterol, amyryns), organic acids (malic acid, oxalic acid), polyunsaturated fatty acids and some essential amino acids[3-5].

Sea buckthorn oil has an anti-oxidative, antimicrobial, immuno-modulatory, cytoprotective, liver fibrosis and tissue regenerative properties [6]. This plant has been used extensively in oriental traditional system of medicine for treatment of asthma, skin diseases, gastric ulcers and lung disorders [7, 8]. Chronic periodontitis or alveolar pyorrhoea is an

inflammatory condition of the gums involving alveolar bone and other supporting structures of the teeth that can lead to their progressive destruction and therefore can cause pocket formation, tooth mobility etc [9,10].

Management of chronic periodontitis is multipronged thus a difficult one. The literature on usage of Sea buckthorn oil on periodontitis is very scarce. There are hardly any study evaluating the effectiveness of sea buckthorn oil as an adjunct in management of chronic periodontitis subjects. Therefore, the present study was to evaluate the efficacy of sea buckthorn oil as an adjunct in management of subjects having chronic periodontitis.

## METHODS

This prospective study was conducted at the Department of Periodontology of a dental hospital of Jammu region. In this study seventy six adult patients from both sexes who visited the dental hospital for seeking care for chronic periodontitis. All the patients

were explained about the additional benefits of systemically delivered antioxidants in reducing periodontitis. Those patients who were convinced for the antioxidant therapy were given Sea buckthorn oil capsules with standard treatment were allotted to test group (group I) and others who subjected to standard treatment alone (scaling and root planing) were allotted to control group (group II).

Group I: Those subjected to standard treatment along with sea buckthorn oil capsules

Group II: Those subjected to standard treatment alone (scaling and root planing)

Inclusion criteria were, age ranging from 18 to 35 years of age; untreated periodontitis involving >30% of the sites; Clinical and Radiographic signs of moderate (clinical attachment loss of 3-4 mm) chronic periodontitis; Probing pocket depth of 3-5mm. Subjects with allergies or hypersensitive skin reactions; aggressive periodontitis; systemic diseases/genetic disorders; patients on systemic medication affecting the periodontium e.g. phenytoin, nifedipine and or steroid drugs; patients requiring antibiotic coverage for any other dental treatment; subjects who had undergone professional periodontal therapy during the past 6 months prior to baseline; pregnant or lactating females; current smokers and alcoholics were excluded from this investigation.

Study subjects willing to participate and agreed to be available at any time as required for participation, and therefore agreed themselves to abstain from using anti-microbial mouth rinse during the study except for those explicitly prescribed. Full mouth periodontal parameters were recorded at the baseline and during follow up appointments; which included Plaque Index (PI), Gingival Index (GI),

Bleeding on Probing (BOP), Clinical attachment level (CAL) and Pocket probing depth (PPD).

Study subjects were subjected to scaling and root planing by ultrasonic scalers, manual scalers and curettes. The patients who were allocated in group A were given sea buckthorn capsules 500mg capsules for 3 weeks and were given a reminder every day for the intake of these capsules whereas patients of group II were subjected to scaling and root planing only. Patients of both the groups were recalled after 3 weeks for assessment.

Written and informed consent was obtained from study subjects. Permission of ethical committee was obtained from the Institutional Ethics Committee. All the questionnaires were manually checked and edited for completeness and consistency and were then coded for computer entry. After compilation of collected data, analysis was done using Statistical Package for Social Sciences (SPSS), version 21 (IBM, Chicago, USA). The results were expressed using appropriate statistical variables.

## RESULTS

At the end of 3 weeks, mean plaque index was found to be higher in Group I ( $1.21 \pm 0.22$ ) as compared to Group II ( $1.11 \pm 0.18$ ). Similarly mean bleeding on probing index was found to be more in Group I ( $31.36 \pm 10.03$ ) as compared to Group II ( $30.02 \pm 9.64$ ). Contrary to this, mean gingival index and Pocket probing depth were found to be higher in Group II as compared to group I ( $1.18 \pm 0.73$ ,  $2.75 \pm 1.85$  Vs  $1.14 \pm 0.69$ ,  $2.18 \pm 1.38$ ). Mean clinical attachment level was found to be more in Group I ( $2.32 \pm 1.04$ ) as compared to Group II ( $2.28 \pm 1.01$ ). Statistically significant difference in mean pocket probing depth at 3 weeks was observed between the study and test groups (Table 1).

**Table-1: Comparison of periodontal parameters among test and control groups at 3 weeks**

Parameters	Group I		Group II		P value
	Mean	S.D.	Mean	S.D.	
Plaque index (PI)	1.21	0.22	1.11	0.18	>0.05
Bleeding on probing (BOP)	31.36	10.03	30.02	9.64	>0.05
Gingival index (GI)	1.14	0.69	1.18	0.73	>0.05
Pocket probing depth (PPD)	2.18	1.38	2.75	1.85	<0.05
Clinical attachment level (CAL)	2.32	1.04	2.28	1.01	>0.05

## DISCUSSION

A wide spectrum of pharmacological effects of Sea buckthorn oil have been recently reported, including antioxidant, immunomodulatory, anti-atherogenic, anti-stress, hepatoprotective, radioprotective and tissue repair[11]. For centuries, the people of central and southeastern Asia have used Sea buckthorn oil as an agent of traditional medicine to prevent various ailments. In Tibetan and Mongolian traditional medicines, Sea buckthorn berries were used in the treatment of sputum and cough, and to improve

the blood circulation and the function of the digestive system. In Russia and Indian Himalayan region, SBT was used for treatment of skin diseases, jaundice, and asthma, for gastro-intestinal treatment, as laxative and for treatment of rheumatism [12, 13]. In the Central Asia (Pamirs of Tajikistan and Afghanistan), local people used Sea buckthorn berries for treatment of hypertension, digestive system and skin diseases. The oil extracted from berries is used for treatment of gastritis, stomach ulcers, erosion of uterus and inflammation of genital organs. In addition, people used infusion of dried berries for skin diseases [14].

The Sea buckthorn leaf extract was found to have significant anti-inflammatory activity in adjuvant induced arthritis rat model and lipopolysaccharide induced inflammatory response in murine macrophages. In another study, isolated casuarinin from the Sea buckthorn leaves was studied for the effect on the TNF-alpha-induced ICAM-1 expression in a human keratinocytes cell line [15]. Pre-treatment with casuarinin inhibited TNF-alpha-induced protein and mRNA expression of ICAM-1 and subsequent monocyte adhesiveness in HaCaT cells. Casuarinin significantly inhibited TNF-alpha-induced activation of NF-B, ERK and p38 MAPK in a dose-dependent manner [16]. Pretreatment with casuarinin decreased TNF- alpha-induced pro-inflammatory mediators, such as IL-1, IL-6, IL-8, and MP-1. Further, in the murine macrophage cell line, SBT leaf alcoholic extract significantly inhibited the enhanced production of NO induced by LPS in a dose dependent manner and by its inhibitory effect on iNOS activation[17].

Recently, SBT leaf alcoholic extract have shown up-regulated antigen presentation ability of macrophages in aged mice, which exhibited its immune boosting and anti-aging effect [18]. Sea buckthorn berries also showed immunoprotective effect against T-2 toxin-induced immunodepression in 15-day-old chicks [19]. SBT has been extensively used in oriental traditional medicines for treatment of many inflammatory disorders. Hence from these observations, the anti-inflammatory and immunomodulatory activities have been scientifically proved.

Sea buckthorn berry is known to be effective in treating wounds, inflammation, mucous-membrane-related disorders. Scientists have carried out extensive research on sea buckthorn which has resulted in an improved understanding of the health effects and the chemical composition of the berry.

In this study we observed that at the end of 3 weeks, mean plaque index was found to be higher in Group I ( $1.21 \pm 0.22$ ) as compared to Group II ( $1.11 \pm 0.18$ ). Similarly mean bleeding on probing index was found to be more in Group I ( $31.36 \pm 10.03$ ) as compared to Group II ( $30.02 \pm 9.64$ ). Contrary to this, mean gingival index and Pocket probing depth were found to be higher in Group II as compared to group I ( $1.18 \pm 0.73$ ,  $2.75 \pm 1.85$  Vs  $1.14 \pm 0.69$ ,  $2.18 \pm 1.38$ ). Mean clinical attachment level was found to be more in Group I ( $2.32 \pm 1.04$ ) as compared to Group II ( $2.28 \pm 1.01$ ). Statistically significant difference in mean pocket probing depth at 3 weeks was observed between the study and test groups. Another study<sup>20</sup> observed that in both the groups, statistically significant improvement was seen in the periodontal parameters during the follow up (p-values of PI <0.001, BOP <0.001, GI <0.001, PPD <0.002, CAL <0.001). A significant difference was found in PPD (p-value = 0.0174).

## CONCLUSION

On the basis of findings of this investigation, it can be concluded that sea buckthorn oil carries potential as an adjunct in management of subjects having chronic periodontitis as statistically significant difference in mean pocket probing depth at 3 weeks was observed between the study and test groups. It points towards regenerating potential of sea buckthorn oil. Further larger controlled trials are needed to support our findings.

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