Research Article

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THE NON-SURGICAL THERAPEUTIC APPROACH FOR THE TREATMENT OF PERIODONTITIS BY USING AYURVEDIC FORMULATIONS

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Received on: 19/03/18 Accepted on: 16/04/18

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DOI: 10.7897/2277-4343.09370

ABSTRACT

Introduction: Periodontal diseases are universal and have been known to affect mankind since the beginning of the recorded history. Conventional periodontal therapy consists of mechanical debridement to disrupt the subgingival microbiota. The effective use of herbal products has been successfully used in effective treatment of periodontal disease. **Aim:** To evaluate and compare the clinical effects of topical application of H – Gum Powder and H - Gum gel as an adjunct to scaling and root planing (SRP) in patients suffering from chronic periodontitis. **Methodology:** 30 patients aged 18 - 50 years reporting with bleeding gums, were randomly assigned to 3 groups of 10 patients in each group. Plaque index, gingival bleeding index scores and probing pocket depth were evaluated at baseline, 2nd week and 4th week. For every patient SRP was done. The powder was dispensed to subjects of Group B and C in Group C H- Gum gel was placed locally in pocket. Subjects were instructed to apply a pea-sized amount of powder to the gums, twice daily, and to massage the gums gently by finger. **Results:** Patients in group B and C showed statistically significant greater reduction in plaque index and gingival index compared to baseline to 2 weeks and 4 weeks. There is a reduction in pocket probing depths also more in group B and C but that is not statistically significant. **Conclusion:** The adjunctive use of H-Gum Powder and H- Gum gel, in comparison to SRP alone, is associated with greater reduction in PI, GI and PPD in patients with chronic periodontitis.

Keywords: Scaling and root planing, Chronic Periodontitis, Gum massage, Periodontal Pocket, Ayurvedic Products.

INTRODUCTION

Periodontal diseases are chronic infectious diseases characterized by a bacterial challenge that can provoke a destructive host response, leading to clinical attachment loss (CAL) and ultimately possible tooth loss. Supragingival plaque is the cause of gingivitis and plays a primary role in the initiation of periodontitis. Whereas the removal of microbial plaque leads to resolution of gingival inflammation, if someone ceases plaque control, it will lead to recurrence of inflammation.¹ Scaling and root planing forms the first and indispensable phase of periodontal therapy. But inaccessibility of plaque retentive areas, can compromise clinical and microbiologic outcomes.²

Therefore, to overcome the limitations of mechanical plaque control, chemical plaque control measures have also been advocated which can be used as adjuncts to mechanical measures, which together can reduce plaque and plaque associated gingival problems. Although a number of chemical plaque control agents like Chlorhexidine, have been suggested, there is still a need for an anti plaque agent that can be used on a daily basis due to the side effects of the chemical agents.³

Since ancient times, Ayurvedic drugs have been used to treat periodontal diseases. Ayurvedic medicines are also used as oral rinses to reduce gingival inflammation and bleeding. According to the 20th slokha of Sushruta Samhita (an ancient Sanskrit text on medicine and surgery), *triphala* (TRP) can be used as a gargling agent in dental diseases.⁴ Some of the other herbs having

beneficial effects for oral health are *Shuddha Sphatika* which is an astringent, caustic, haemostatic, antispasmodic & antiseptic, *Cinnamomum zeylanicum* has antibacterial actions. Clove (*Syzygium aromaticum*) is antifungal, antibacterial and antiviral qualities make it an excellent anti-infection essential oil for all types of infection. *Embelia ribes* has antibacterial activity. *Azadirachta indica* has antibacterial activity and it is an anti inflammatory, antiseptics, & analgesic ingredient. *Mimusops elengi* is an astringent. Commercially available herbal product H-gum powder and Gel are an excellent mixture of these active ingredients. To date, and to the author's best knowledge, no study has evaluated clinical efficacy of H-gum Powder and Gel as an adjunct to scaling and root planing for treatment of mild to moderate chronic periodontitis.

The aim of the clinical study was to evaluate the clinical effects of a commercially available powder & gel (H –Gum), containing various herbal medicaments, in the reduction of plaque, probing pocket depth and gingival inflammation in subjects with chronic periodontitis.

MATERIALS AND METHODS

Thirty patients (27 males and 3 females, aged 20-60 years, mean age 38 years) with mild to moderate chronic periodontitis were recruited for this randomized, controlled clinical trial from the Department of Periodontics and Oral Implantology at A.M.E's Dental College and Hospital, Raichur, Karnataka. The research

protocol was approved by the Institutional Ethical Committee and Review Board, as per Declaration of Helsinki guidelines. Written informed consent was obtained from all participants recruited into the study.

Inclusion and Exclusion Criteria

After taking a detailed medical history and initial clinical examination, systemically healthy individuals with at least three pockets depth in the range of 4-6mm in a quadrant, having inflamed and spongy gums and with no history of periodontal therapy were selected. Exclusion criteria were patients with severe periodontitis, patients with only gingivitis, patients who were not willing to participate in the study.

Study design

The total 30 subjects who were diagnosed as mild to moderate chronic periodontitis were divided into 3 groups, 10 in each group. In Group A – Only conventional procedure scaling and root planing was done. In Group B – Scaling and root planing was done, and H-gum powder was prescribed to apply a pea-sized amount of powder to the gums, twice daily, and to massage the gums gently with finger. In Group C – Scaling and root planing was done, H- Gum gel was locally delivered in pocket and H-Gum powder was prescribed to apply a pea-sized amount of powder to the gums, twice daily to massage the gums gently by finger. Plaque index, Gingival index scores and probing pocket

depth were evaluated at baseline, 2nd week and 4th week (Fig 1-9).

Statistical Analysis

Data were analyzed using software. Mean changes in the parameters were calculated from baseline to 2nd and 4th week. Statistical analysis was carried out using ANOVA test at baseline, 2 week and 4 weeks. Turkey's test was used as post hoc test for intergroup comparison.

RESULT

All 30 patients completed study, no patient showed any adverse reaction and discomfort. The clinical parameters for both the groups at each visit are shown in Table (1-3) and Graphs (1-4) statistically significant intergroup difference in baseline values for any parameter was observed.

Intergroup comparison shows that there was a statistically significant greater mean reduction in GI from baseline to 4th week in group B and group C. Group B and Group C shows statistically significant mean reduction in GI and PI from baseline to 2nd week compared to group A.

There is a reduction in pocket probing depths also more in group B and C but that is not statistically significant.

Fig 1 Group A at Baseline

Fig 2 Group A after 2nd week

Fig 3 Group A follow up after 1 month

Fig 4 Group B at Baseline

Fig 5 Group B Follow up after 2nd week

Fig 6 Group B Follow up after 1 month

Fig 7 Group C at Baseline

Fig 8 Group C Follow up after 2nd week

Fig 9 Group C follow up after 1 month

Graph 1: Mean value of Group A, B and C recorded at baseline, 2nd week and 4th week.

(Intergroup)
(Gingival Index)

Graph 2: Comparison of the mean difference {Baseline – 4 weeks} among all the 3 groups in terms of {Mean (SD)} using ANOVA test (Baseline – 4 weeks)

(Pocket probing depth)

Graph 3: Comparison of the mean difference {Baseline – 4 weeks} among all the 3 groups in terms of {Mean (SD)} using ANOVA test (Baseline – 4 weeks)

(Plaque Index)

Graph 4: Comparison of the mean difference {Baseline – 4 weeks} among all the 3 groups in terms of {Mean (SD)} using ANOVA test (Baseline – 4 weeks)

Results
(Intergroup)
(Gingival Index)

Table 1: Comparison of the mean difference {Baseline – 2 weeks & Baseline – 4 weeks} among all the 3 groups in terms of {Mean (SD)} using ANOVA test

(Baseline – 2 weeks)

Groups	N	Mean	Std. Deviation	F value	P value
Group A	10	0.96	0.42	5.718	0.009*
Group B	10	1.21	0.52		
Group C	10	1.64	0.41		
Total	30	1.27	0.52		

(p< 0.05 - Significant*, p< 0.001 - Highly significant**)

(Tukey's post hoc analysis)

	Group A	Group B	Group C
Group A	-	0.439	0.007*
Group B	0.439	-	0.108
Group C	0.007*	0.108	-

(Baseline – 4 weeks)

Groups	N	Mean	Std. Deviation	F value	P value
Group A	10	1.04	0.382	18.656	<0.001*
Group B	10	1.70	0.379		
Group C	10	2.06	0.370		
Total	30	1.60	0.562		

(p< 0.05 - Significant*, p< 0.001 - Highly significant**)

(Tukey's post hoc analysis)

	Group A	Group B	Group C
Group A	-	0.002*	<0.001**
Group B	0.002*	-	0.106
Group C	<0.001**	0.106	-

(Pocket probing depth)

Table 2: Comparison of the mean difference {Baseline – 2 weeks & Baseline – 4 weeks} among all the 3 groups in terms of {Mean (SD)} using ANOVA test

(Baseline – 2 weeks)

Groups	N	Mean	Std. Deviation	F value	P value
Group A	10	0.57	0.461	1.234	0.307
Group B	10	0.91	0.668		
Group C	10	0.87	0.440		
Total	30	0.78	0.537		

(Tukey's post hoc analysis)

	Group A	Group B	Group C
Group A	-	0.339	0.422
Group B	0.339	-	0.986
Group C	0.422	0.986	-

(Baseline – 4 weeks)

Groups	N	Mean	Std. Deviation	F value	P value
Group A	10	0.67	0.49	3.035	0.065
Group B	10	1.22	0.76		
Group C	10	1.25	0.48		
Total	30	1.05	0.63		

(Tukey's post hoc analysis)

	Group A	Group B	Group C
Group A	-	0.118	0.089
Group B	0.118	-	0.989
Group C	0.089	0.989	-

(Plaque Index)

Table 3: Comparison of the mean difference {Baseline – 2 weeks & Baseline – 4 weeks} among all the 3 groups in terms of {Mean (SD)} using ANOVA test

(Baseline – 2 weeks)

Groups	N	Mean	Std. Deviation	F value	P value
Group A	10	1.26	0.688	6.383	0.005*
Group B	10	1.91	0.561		
Group C	10	2.09	0.318		
Total	30	1.75	0.638		

(p < 0.05 - Significant*, p < 0.001 - Highly significant**)

(Tukey's post hoc analysis)

	Group A	Group B	Group C
Group A	-	0.034*	0.006*
Group B	0.034*	-	0.740
Group C	0.006*	0.740	-

(Baseline – 4 weeks)

Groups	N	Mean	Std. Deviation	F value	P value
Group A	10	1.80	0.78	3.772	0.036*
Group B	10	2.35	0.52		
Group C	10	2.50	0.45		
Total	30	2.21	0.65		

(p < 0.05 - Significant*, p < 0.001 - Highly significant**)

(Tukey's post hoc analysis)

	Group A	Group B	Group C
Group A	-	0.122	0.037*
Group B	0.122	-	0.835
Group C	0.037*	0.835	-

Results
Intragroup
(Group 1)

Table 1: Comparison of the Gingival index, Pocket probing depth & Plaque index values in terms of {Mean (SD)} at different time interval using ANOVA test

(Gingival index)

Time interval	N	Mean	Std. Deviation	F value	P value
Baseline	10	1.93	0.294	45.250	<0.001*
2 Weeks	10	0.97	0.282		
4 Weeks	10	0.89	0.238		
Total	30	1.26	0.549		

(p < 0.05 - Significant*, p < 0.001 - Highly significant**)

(Tukey's post hoc analysis)

	Baseline	2 Weeks	4 Weeks
Baseline	-	<0.001**	<0.001**
2 Weeks	<0.001**	-	0.782
4 Weeks	<0.001**	0.782	-

(Pocket probing depth)

Time interval	N	Mean	Std. Deviation	F value	P value
Baseline	10	4.57	0.59	4.402	0.022*
2 Weeks	10	4.00	0.52		
4 Weeks	10	3.90	0.51		
Total	30	4.15	0.60		

(p < 0.05 - Significant*, p < 0.001 - Highly significant**)

(Tukey's post hoc analysis)

	Baseline	2 Weeks	4 Weeks
Baseline	-	0.067	0.027*
2 Weeks	0.067	-	0.912
4 Weeks	0.027*	0.912	-

(Plaque index)

Time interval	N	Mean	Std. Deviation	F value	P value
Baseline	10	2.78	0.695	30.500	<0.001*
2 Weeks	10	1.51	0.469		
4 Weeks	10	0.98	0.369		
Total	30	1.76	0.921		

(p < 0.05 - Significant*, p < 0.001 - Highly significant**)

(Tukey's post hoc analysis)

	Baseline	2 Weeks	4 Weeks
Baseline	-	<0.001**	<0.001**
2 Weeks	<0.001**	-	0.078
4 Weeks	<0.001**	0.078	-

(Group 2)

Table 2: Comparison of the Gingival index, Pocket probing depth & Plaque index values in terms of {Mean (SD)} at different time interval using ANOVA test

(Gingival index)

Time interval	N	Mean	Std. Deviation	F value	P value
Baseline	10	1.94	0.316	48.674	<0.001**
2 Weeks	10	0.72	0.484		
4 Weeks	10	0.24	0.37		
Total	30	0.97	0.823		

(p < 0.05 - Significant*, p < 0.001 - Highly significant**)

(Tukey's post hoc analysis)

	Baseline	2 Weeks	4 Weeks
Baseline	-	<0.001**	<0.001**
2 Weeks	<0.001**	-	0.028*
4 Weeks	<0.001**	0.028*	-

(Pocket probing depth)

Time interval	N	Mean	Std. Deviation	F value	P value
Baseline	10	4.47	0.282	12.112	<0.001*
2 Weeks	10	3.56	0.645		
4 Weeks	10	3.25	0.708		
Total	30	3.76	0.766		

(p < 0.05 - Significant*, p < 0.001 - Highly significant**)

(Tukey's post hoc analysis)

	Baseline	2 Weeks	4 Weeks
Baseline	-	0.004*	<0.001**
2 Weeks	0.004*	-	0.467
4 Weeks	<0.001**	0.467	-

(Plaque index)

Time interval	N	Mean	Std. Deviation	F value	P value
Baseline	10	2.69	0.4	116.376	<0.001*
2 Weeks	10	0.78	0.1		
4 Weeks	10	0.34	0.3		
Total	30	1.27	1.0		

(p < 0.05 - Significant*, p < 0.001 - Highly significant**)

(Tukey's post hoc analysis)

	Baseline	2 Weeks	4 Weeks
Baseline	-	<0.001**	<0.001**
2 Weeks	<0.001**	-	0.031*
4 Weeks	<0.001**	0.031*	-

DISCUSSION

Plaque and gingivitis are important diseases of oral cavity and comprises a major part of patients visiting dentists. Various herbs are mentioned in Ayurvedic classics, which can be used for plaque control and treatment of gingivitis.

Aluminum has demonstrated activity against oral bacteria. Early studies indicated that several aluminum salts, including potassium aluminum sulfate (alum), inhibit the growth of salivary bacteria. Aluminum has shown antimicrobial activity, against cariogenic streptococci as well as normal oral flora and periodontal pathogens, by significantly reducing the ability of streptococci to colonize on enamel surfaces and decreasing the

(Group 3)

Table 3: Comparison of the Gingival index, Pocket probing depth & Plaque index values in terms of {Mean (SD)} at different time interval using ANOVA test

(Gingival index)

Time interval	N	Mean	Std. Deviation	F value	P value
Baseline	10	2.31	0.4	71.606	<0.001*
2 Weeks	10	0.66	0.4		
4 Weeks	10	0.24	0.3		
Total	30	1.07	0.9		

(p < 0.05 - Significant*, p < 0.001 - Highly significant**)

(Tukey's post hoc analysis)

	Baseline	2 Weeks	4 Weeks
Baseline	-	<0.001**	<0.001**
2 Weeks	<0.001**	-	0.076
4 Weeks	<0.001**	0.076	-

(Pocket probing depth)

Time interval	N	Mean	Std. Deviation	F value	P value
Baseline	10	4.54	0.30	32.587	<0.001**
2 Weeks	10	3.67	0.37		
4 Weeks	10	3.29	0.38		
Total	30	3.83	0.63		

(p < 0.05 - Significant*, p < 0.001 - Highly significant**)

(Tukey's post hoc analysis)

	Baseline	2 Weeks	4 Weeks
Baseline	-	0.004*	<0.001**
2 Weeks	0.004*	-	0.059
4 Weeks	<0.001**	0.059	-

(Plaque index)

Time interval	N	Mean	Std. Deviation	F value	P value
Baseline	10	2.78	0.40	163.648	<0.001**
2 Weeks	10	0.69	0.31		
4 Weeks	10	0.27	0.25		
Total	30	1.24	1.16		

(p < 0.05 - Significant*, p < 0.001 - Highly significant**)

(Tukey's post hoc analysis)

	Baseline	2 Weeks	4 Weeks
Baseline	-	<0.001**	<0.001**
2 Weeks	<0.001**	-	0.025*
4 Weeks	<0.001**	0.025*	-

colloidal stability of oral bacteria. More recently, use of alum mouth rinse has also shown significant reductions in salivary levels of *Streptococcus mutans* in children. Skjorland et al (1978),⁵ Putt et al (1996)⁶ and Bihani and Damle (1997)⁷ evaluated the effect of 0.02 M alum mouth rinse on plaque inhibition and observed significant reductions in the amount of plaque after 2 to 4 weeks of supervised use.

Wren (1975) notes the use of an extract from heartwood leaves and young shoots to check haemorrhages, and as a local application in relaxed sore throat and sponginess of gums. Stuart (1979), on the other hand, refers to the use of the boiled and strained aqueous extract of the heartwood as an astringent for inflamed conditions of the throat, gums, and mouth and also

externally for boils and chronic ulcers. These uses noted by Wren (1975) and Stuart (1979) were described in greater detail by Pereira (1942) and by Felter & Lloyd (1998). In Chinese traditional medicine, the dried extract from the peeled branches and stems of *A. catechu* provides *Er Cha*, which has haemostatic activity (Stuart 1911, Huang 1993).

Triphala has been extensively used in Ayurveda because of its various properties and therapeutic uses. An herb originating in India, Triphala, is originally a mixer of three fruits. It has been found to act as a complete body cleanser. Beside detoxifying and cleaning colon, it also purifies the blood and removes toxins from the liver. It also reduces the level of serum cholesterol and controls blood pressure.⁸ Abdominal pain, decreased appetite, stomach acidity, and constipation can also be controlled with regular use of triphala. This is not only effective in treating common respiratory ailments such as cold and cough but also has also been shown to be very beneficial for the reproductive system. It has strong antioxidant activity apart from its immunomodulatory, anti-inflammatory, analgesic, astringent, antispasmodic, anti-mutagenic, anticancer, and antimetastatic properties due to the presence of tannins, phenols, and glycosides. Triphala is also effective remedy for geriatric degenerative diseases. Several authors have used triphala as a mouth rinse in healthy gingivitis and periodontitis patients. Triphala was used in studies as antiplaque agent like Chlorhexidine and was more effective in inhibiting plaque formation with lesser or no side effects.⁹ According to *Sushruta Samhita*, triphala has hemostatic, anti-inflammatory, analgesic, and wound-healing properties. Haritaki is the most efficacious for the treatment of bleeding gums and gingival ulcers as well as carious teeth. On the other hand, as amalaki contains a large amount of vitamin C, it is effective in

preventing bleeding from gums. The agar gel diffusion method was used to prove the antimicrobial activity of triphala churna on a standard *Streptococcus Mucous* strain and a clinical isolate. Jagadish et al. conducted a study to determine the effect of triphala on dental bio-films. They concluded that triphala had potent antioxidant and antimicrobial activity and inhibited the growth of *Streptococcus mutans* and gram-positive cocci involved in plaque formation when it was adsorbed on the tooth surface. Tandon *et al.* suggested the use of triphala mouthwash for preventing the development of incipient lesion. Another beneficial point triphala mouthwash is that it is cheaper than the commercially available CHX mouthwash. Being an Ayurvedic product, it has no known side effects and hence is safer for long-term use.¹⁰

The volatile oils of black pepper assessed for antibacterial activity against 25 different genera of bacteria. These included animal and plant pathogens, food poisoning and spoilage bacteria. The volatile oils exhibited considerable inhibitory effects against all the organisms under test while their major components demonstrated various degrees of growth inhibition. Its antifungal, antibacterial and antiviral qualities make it an excellent Anti-infection essential oil for all types of infection. Its use can stop infections from taking hold in the body. Clove is also famous for its ability to kill parasites. It is powerful addition to an antiparasite program. When used topically, it helps to numb the skin and relieve many aches and pains. One of its main components, eugenol, is still used by dentists to numb the gums for dental procedures. Clove is a carminative that increases the ability of the stomach to digest foods. The use of clove oil when used on the back of the tongue can help stave off tobacco cravings. Clove oil helps to dissolve warts and other abnormal growths.

H – Gum is a Gum Massage Powder for healthy gums & strong long lasting teeth. H – Gum, has a well known classical ingredients like

<i>Shuddha Sphatika</i>	(Pottash Alum)	3.2g
<i>Bakula</i>	(<i>Mimusops elengi</i>)	4g
<i>Khadira</i>	(<i>Acacia catechu</i>)	4g
<i>Triphala</i>		3.2g
<i>Nimba</i>	(<i>Azadirachta indica</i>)	0.8g
<i>Maricha</i>	(<i>Piper longum</i>)	0.8g
<i>Karpura</i>	(<i>Cinnamomum camphora</i>)	0.8g
<i>Saindhava lavana</i>	(Potassium Chloride)	2.4g
<i>Lavanga</i>	(<i>Syzygium aromaticum</i>)	0.8g
<i>Vidanga</i>	(<i>Embelia ribes</i>)	1.6g
<i>Twak</i>	(<i>Cinnamomum zeylanicum</i>)	1.6g

So having all the active ingredients, H-gum powder and Gel caused decrease in gingival index, plaque index and probing pocket depth. Whereas in the Group A after scaling and root planing only the mean gingival index score came down from 1.9 to 0.9, in Group B after scaling and root planing with regular 2 times H-gum powder application the mean gingival index came down from 1.9 to 0.2 in 4 weeks and in Group C where we used intrapocket H-gum gel along with regular H-gum powder application after scaling and root planing the mean gingival index came down from 2.3 to 0.2. So the mean reduction of gingival index in case of Group A was 1.04, in Group B it was 1.7 and highest reduction in Group C, 2.06.

Group A after scaling and root planing only the mean probing pocket depth score came down from 4.5 to 3.9, in Group B after scaling and root planing with regular 2 times H-gum powder application the mean gingival index came down from 4.4 to 3.2 in 4 weeks and in Group C where we used intrapocket H-gum gel

along with regular H-gum powder application after scaling and root planing the mean gingival index came down from 4.4 to 3.2.

In case of mean Probing Pocket Depth, the reduction was 0.67, 1.22 and 1.25 respectively for the groups A, Group B and Group C.

Group A after scaling and root planing only the mean gingival index score came down from 2.7 to 0.9, in Group B after scaling and root planing with regular 2 times H-gum powder application the mean gingival index came down from 2.6 to 0.3 in 4 weeks and in Group C where we used intrapocket H-gum gel along with regular H-gum powder application after scaling and root planing the mean gingival index came down from 2.7 to 0.2.

Due to daily massage with H-Gum powder in the 2 test Groups (Group B and Group C) we can see the reduction of Plaque index score also. The mean reduction in plaque index score was 1.8, 2.35, 2.5 respectively.

So, after this short term study with 10 patients in each group and 4 weeks follow-up we got beneficial result in favour of regular use of H-gum with adjunct to scaling and root planing in patients with mild to moderate periodontitis.

No patients gave any history of discomfort or side effects during this study period. Long term studies with large sample size should be done to definitely conclude about the beneficial effects of H-Gum Powder and Gel. Study with subjects having Systemic diseases like Diabetes, Cardiovascular diseases, pregnant and lactating mothers can also be used ayurvedic products because they do not have any definite contraindications.

CONCLUSION

According to our knowledge it was the first kind of study where H-gum gel was locally delivered once in the pocket and H-gum powder was given to the patients to use twice a day as an adjunct to scaling and root planing for 4 weeks. We got beneficial result in favour of the use of H-gum powder and Gel. Further long-term studies with larger sample size are required for confirmation the beneficial result of these products.

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Cite this article as:

Nagappa G. et al. The non-surgical therapeutic approach for the treatment of periodontitis by using Ayurvedic formulations. Int. J. Res. Ayurveda Pharm. 2018;9(3):99-106 <http://dx.doi.org/10.7897/2277-4343.09370>

Source of support: Nil, Conflict of interest: None Declared

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