



E-ISSN: 2278-4136  
P-ISSN: 2349-8234  
JPP 2017; 6(3): 533-536  
Received: 17-03-2017  
Accepted: 18-04-2017

**Neetu Gouda**

Department of Food Science and Nutrition, ASPEE College of Home Science and Nutrition, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, Gujarat, India.

**VH Kanbi**

Associate Professor  
Department of Food Science and Nutrition, ASPEE College of Home Science and Nutrition, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, Gujarat, India

**JJ Dhaduk**

Professor Department of Food Science and Nutrition, ASPEE College of Home Science and Nutrition, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, Gujarat, India.

**MK Choudhary**

Assistant Professor  
Department of Statistics, ASPEE College of Home Science and Nutrition, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, Gujarat, India.

**Correspondence****Neetu Gouda**

Department of Food Science and Nutrition, ASPEE College of Home Science and Nutrition, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, Gujarat, India.

## Effect of formulated herbal powder on arthritic patients

Neetu Gouda, VH Kanbi, JJ Dhaduk and MK Choudhary

**Abstract**

The clinical and nutritional efficacy of an ayurvedic indigenous powder containing *Cannabis sativa* L. (Hempseeds) 80g, *Moringa oleifera* L. (Drum stick leaves) 12g, *Withania somnifera* L. (Aswagandha) 6g and *Bacopa monnieri* L. (Brahmi) 2g, was prepared and evaluated in a randomized study on 48 subjects of rheumatoid arthritis. The subjects were divided into four groups: group I, II, III and IV. Group I was control (herbal powder was not given) whereas groups II, III and IV were given herbal powder in two equal doses at morning and night of 5, 10 and 15g respectively. Subjects' treated with the herbal powder for the period of 2 months. Group I showed no improvement but had increased level of serum uric acid and erythrocyte sedimentation rate and decreased level of serum calcium. Group IV who were given 15g of herbal powder twice a day were observed significant ( $P \leq 0.05$ ) decreased in erythrocyte sedimentation rate and serum uric acid level while serum calcium level was significantly ( $P \leq 0.01$ ) increased. The present study indicated the biochemical efficacy of the herbal powder in the treatment of arthritis.

**Keywords:** Arthritis, Serum uric acid, ESR, Serum calcium

**Introduction**

Rheumatoid arthritis (RA) is a chronic, systemic, inflammatory and progressive disease. Prevalence rate of osteoarthritis (OA) in north Gujarat (Mehsana and Palanpur) was found to be 3.11% where as that of RA was 0.06%. Furthermore, the prevalence ratio (male: female) for OA was 1:1.19, where that of for RA was 1:4. Prevalence of OA and RA is significantly higher in urban area than in rural area (Patel and Patel, 2011) [11]. In arthritis severe clinical disease activity, structural damage and deformities have been reported equally in both genders in RA. The control of both inflammation and bone damage is essential for effective management of arthritis. Generally, however, women report more severe symptoms and greater disability and often have higher work disability rates compared with men (Puolakka *et al.*, 2006) [12]. There are many synthetic drugs that are used in treatments of RA but they have adverse effect. Thus, there is a need to search for alternative natural therapy against RA with lesser side effects. Many herbal plants are in vogue for the treatment of arthritis. The herbal plants: Hempseeds (*Cannabis sativa* L.), Aswagandha (*Withania somnifera* L.), Brahmi (*Bacopa monnieri* L.) and Drum stick leaves (*Moringa oleifera* L.) with anti-arthritic properties were used in the present study. The ingredients used in this powder have been claimed to be effective in rheumatic disorders. Each herb has a unique quality in managing and controlling the symptoms of arthritis as, hemp is good source of gamma linoleic acid (GLA). The GLA and vitamin D of hemp is beneficial in preventing and treating osteoporosis (Borade, 2013) [3]. *W. somnifera* and *Moringa oleifera* leaves are prescribed as analgesic for a variety of musculoskeletal disorders arthritis and rheumatism (Mishra and Singh, 2000) [9]. Likewise, Brahmi juice mixed with petroleum can improve symptoms when applied in rheumatism (Nadkarni and Nadkarni, 2010) [10]. The efficacy of these herbs has been showed in many human and animal trials.

**2. Materials and methods:**

**2.1 Herbal powder preparation:** The raw herbal ingredients Hempseeds, Drumstick leaves, Aswagandha roots and Brahmi leaves were procured from a retail outlet of Palanpur city. Each herbal ingredient was cleaned and dried and then was ground by grinding machine. Each herbal powder was packed in zip lock polythene bags which were stored at dry and cool place and used as and when required. The proportion of Hempseeds, Drumstick leaves, Aswagandha roots and Brahmi leaves powder was used for preparation of the herbal powder in the ratio of 80, 12, 6 and 2 per cent respectively.

**2.2 Analysis of herbal powde**

Herbal powder was analyzed for moisture, oil, ash, crude fiber, protein, calcium, phenol and flavonoid content. Moisture, oil and ash content of the powder were determined by method described in AOAC (1984) [2]. While crude fiber content was determined by Raghuramula *et al.* (1983) [13], protein by Lowry *et al.* (1951) [8], calcium by Hawk and Kalyansundaram (1957) [5], total phenol by Bray and Thorpe (1954) [4] and total flavonoid by Loaeza *et al.* (2011) [7] method. Each analysis was done in triplicate on two replicates.

**2.3 Study design:** A total 48 arthritic subjects including both men and women of age 40 to 80 years were selected for assessment of biochemical examination. Group I was control (powder was not given) whereas groups II, III and IV were experimental ones which were given herbal powder in two equal doses at morning and night of 10g (5g twice a day), 20g (10g twice a day) and 30g (15g twice a day) respectively up to 60 days (November 2015 to December 2015) to examine the effect of herbal powder on arthritis.

**2.4 Biochemical assessment:** Biochemical parameters were assessed i.e., erythrocyte sedimentation rate by Westergren (1921) [16], serum calcium level and serum uric acid level by (Tietz, 2012) [17]. Parameters were analyzed in Adarsh Pathology Laboratory, Palanpur at regular interval of 0, 30 and 60 days to check the effect of herbal powder.

**2.5 Statistical analysis:** The data were statistically analyzed by using SPSS 19 software (Steel and Torrie, 1980) [15]. Difference in the effect of dosages were compared by pair 't' test and data were expressed as percentage, mean, standard

deviation and mean difference. The results from the sample were used to draw conclusions about the effect of this herbal powder.

### 3. Results and Discussion

Herbal powder was analyzed for moisture, oil, ash, crude fiber, protein, calcium, total phenol and total flavonoid.

**Table 1:** Nutritional composition of herbal powder on dry weight basis (Mean of 3 trials)

Nutrients	Amount
Moisture (%)	05.60
Oil (%)	31.10
Ash (%)	08.20
Crude fibre (%)	20.00
Protein (%)	29.50
Calcium (mg/100g)	820.80
Total phenol (g CE/100g)	01.16
Total flavonoid (mg QE/100g)	922.00

Table 1 showed nutritional composition of herbal powder, containing moisture 05.60g, oil 31.10g, ash 8.20g, crude fiber 20g, protein 29.50g, calcium 820.80mg/100g, total phenol 1.16g CE/100g and total flavonoid 922mg QE/100g.

**3.1 Biochemical assessment of arthritic subjects during the study:** The adult experimental subjects were assessed for three tests, i.e. Serum uric acid level (SUA), Erythrocyte sedimentation rate (ESR) and Serum calcium level (SC) at regular intervals. Periodical serum uric acid levels (SUA) of the arthritic subjects are presented in Table 2.

**Table 2:** Serum uric acid level (SUA) of adult arthritic subjects (Mean± SD of 3 trials)

Groups	Period (days)	Serum uric acid (mg/dl)		't' value	Per cent (+/-)
		Mean ±SD	Mean diff.		
Group I (n=10)	00	04.55± 01.13		0.742	+05.93
	30	04.82± 00.86	+0.27		
	30	04.82± 00.86		0.672	+02.07
	60	04.92± 00.93	+0.10		
	00	04.55± 01.13		0.951	+08.13
	60	04.92± 00.93	+0.37		
Group II (n=10)	00	04.11± 01.07		0.375	+02.43
	30	04.21± 00.79	+0.10		
	30	04.21± 00.79		0.588	-03.08
	60	04.08± 00.93	-0.13		
	00	04.11± 01.07		0.135	-00.72
	60	04.08± 00.93	-0.03		
Group III (n=18)	00	03.85± 00.82		2.237	+16.36
	30	04.48± 01.21	+0.63*		
	30	04.48± 01.21		2.246	-12.27
	60	03.93± 00.95	-0.54*		
	00	03.85± 00.82		0.303	+02.07
	60	03.93± 00.95	+0.08		
Group IV (n=10)	00	04.06± 00.93		0.835	+08.86
	30	04.42± 01.15	+0.36		
	30	04.42± 01.15		2.072	-14.93
	60	03.76± 00.53	-0.66		
	00	04.06± 00.93		1.218	-07.38
	60	03.76± 00.53	-0.30		

\* Significant at  $P \leq 0.05$ , (+/-) Increase/ decrease in serum uric acid level over 0 day  
Herbal powder fed Group I = 0g/day (control), II = 10g/day, III = 20g/day and IV = 30g/day

Group I showed the mean difference of SUA level was 0.27 and 0.37mg/dl respectively which was found non-significant ( $P \geq 0.05$ ) between 0 to 30 days, and 0 to 60 days. The serum uric acid level was increased by 5.93 per cent, 2.07

per cent and 8.13 per cent from 0 day to 30 days, 30 days to 60 days and 0 day to 60 days respectively. Similarly, in group II (5g herbal powder twice a day) the mean difference between 0 to 30 days, 30 to 60 days and 0 to 60 days serum

uric acid level was decreased 0.10, -0.13 and -0.03mg/dl respectively which was also not significant ( $P \geq 0.05$ ) and per cent value of serum uric acid level was increased by 2.43 per cent, then decreased by 3.08 and 0.72 per cent respectively.

Where as in group III the mean difference between 0 to 30 days, 30 to 60 days and 0 to 60 days serum uric acid level was increased 0.63 then decreased -0.54 further increased 0.08mg/dl respectively. Same trend found in per cent uric acid level. The serum uric acid level up to 30 days significant ( $P \leq 0.05$ ) increased 16.36 per cent then 30 to 60 days it was significantly decreased 12.27 per cent. Overall from 0 to 60 days, the result was found non-significant ( $P \geq 0.05$ ).

Similarly, in group IV the mean difference of serum uric acid between 0 to 30 days, 30 to 60 days and 0 to 60 days was found 0.36, -0.66 and -0.30mg/dl respectively which was non-significant ( $P \geq 0.05$ ). The serum uric acid level up to 30 days increased by 8.86 per cent then 30 to 60 days it was decreased 14.93 per cent. Overall from 0 to 60 days, the result was found decreased SUA 7.38 per cent which was non-significant ( $P \geq 0.05$ ). As per the results it was observed that at

initial the uric acid level increases and then it decreases.

It may be due to cold weather effect i.e. low temperature during 2<sup>nd</sup> and 3<sup>rd</sup> weeks of December, 2015. The second serum uric acid test was done at beginning of 3<sup>rd</sup> week so serum uric acid level found higher than first and third test in all groups. Similar results were reported by Abasoloa *et al.* (2013) [1] detected that patients with rheumatoid arthritis (RA) who were more likely to present a flare with lower mean temperatures as cold weather effects on arthritis. Rasool and Varalakshmi (2006) [14] studied the suppressive effect of *W. somnifera* root powder on experimental gouty arthritis and revealed that on treatment with the *W. somnifera* root powder the serum uric acid volume decreases in monosodium urate crystal-induced rats.

The periodical serum calcium level was measured and depicted in Table 3. The result indicated that the serum calcium level of group I, II, III and IV; at 0, 30 and 60 days was found 10.56, 10.08, 9.62, 9.45 and 10.47, 10.26, 10.51, 10.47 and 10.23, 10.98, 11.05 and 11.08 mg/dl respectively.

**Table 3:** Serum calcium (SC) level of the subjects (Mean $\pm$  SD of 3 trials)

Groups	Period (days)	Serum calcium (mg/dl)		't' value	Per cent (+/-)
		Mean $\pm$ SD	Mean diff.		
Group I (n=10)	00 day	10.56 $\pm$ 0.63			
	30 day	10.47 $\pm$ 0.48	-0.09	1.00	-00.85
	30 day	10.47 $\pm$ 0.48		2.125	-02.29
	60 day	10.23 $\pm$ 0.60	-0.24		
Group II (n=10)	00 day	10.56 $\pm$ 0.63		1.989	-03.12
	60 day	10.23 $\pm$ 0.60	-0.33		
	00 day	10.08 $\pm$ 0.83		0.468	+01.78
	30 day	10.26 $\pm$ 1.04	+0.18		
Group III (n=18)	30 day	10.26 $\pm$ 1.04	+0.72*	2.916	+07.01
	60 day	10.98 $\pm$ 0.56	+0.90*	2.922	+08.92
	00 day	09.62 $\pm$ 0.86		3.546	+09.25
	30 day	10.51 $\pm$ 0.86	+0.88**		
Group IV (n=10)	60 day	11.05 $\pm$ 0.86	+0.54**	3.166	+05.01
	00 day	09.62 $\pm$ 0.86		4.725	+14.86
	60 day	11.05 $\pm$ 0.86	+1.43**		
	00 day	09.45 $\pm$ 1.11		2.937	+10.79
Group IV (n=10)	30 day	10.47 $\pm$ 0.95	+1.01*		
	60 day	11.08 $\pm$ 0.76	+0.61**	3.284	+05.82
	00 day	09.45 $\pm$ 1.11		4.518	+17.24
	60 day	11.08 $\pm$ 0.76	+1.63**		

\* Significant at  $P \leq 0.05$ , (+/-) Increase/ decrease in serum calcium level over 0 day

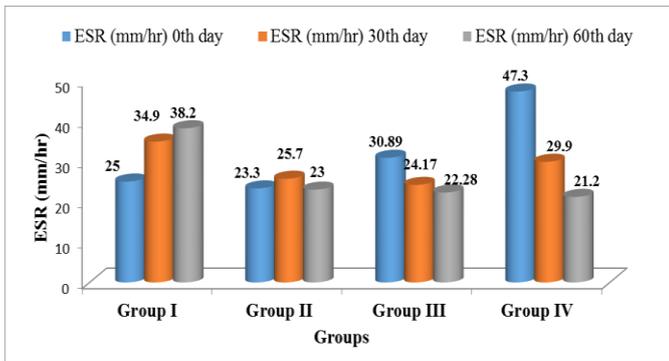
\*\* Highly significant at  $P \leq 0.01$

The mean difference of group I serum calcium between 0 to 30, 30 to 60 and 0 to 60 days SC was decreased -0.09, -0.24 and -0.33 mg/dl respectively which was non-significant ( $P \geq 0.05$ ). Same trend found in serum calcium per cent decreased between 0 to 30, 30 to 60 and 0 to 60 days was 0.85, 2.29 and 3.12 mg/dl respectively. Whereas in group II mean difference and per cent of serum calcium between 0 to 30, 30 to 60 and 0 to 60 days was significant ( $P \leq 0.05$ ) increased 0.18, 0.72, 0.90 mg/dl and 1.78, 7.01, 8.92 per cent respectively.

Similarly, in group III and IV mean difference and per cent of serum calcium between 0 to 30, 30 to 60 and 0 to 60 days was highly significant ( $P \leq 0.01$ ) increased 0.88, 0.54, 1.43 and 1.01, 0.61, 1.63 mg/dl and 9.25, 5.01, 14.86 and 10.79, 5.85, 17.24 per cent respectively. Trend shown that as the dose of herbal powder was increased the serum calcium level was also

increased. After the 60 days calcium level was found highest in group IV, 17.24 per cent. The serum calcium was significant ( $P \leq 0.05$ ) increased in all the experimental groups as the ingredients of herbal powder contain good amount of calcium as dried leaves of *M. oleifera* (2203mg/100g) and *C. sativa* seeds (180mg/100g) (Leson *et al.*, 1999).

Erythrocytes sedimentation rate of experimental groups are depicted in figure 1. Group I, mean erythrocytes sedimentation rate (ESR) was significant ( $P \leq 0.05$ ) increased 25, 34.9 and 38.2 mm/hr at 0, 30 and 60 days respectively. Group II, ESR was found 23.3, 25.7 and 23mm/hr at 0, 30 and 60 days. ESR of group III and IV was found significant ( $P \leq 0.05$ ) decreased 30.83, 24.17, 22.28 and 47.3, 29.9, 21.2 mm/hr at 0, 30 and 60 days respectively. Maximum ESR was decreased in group IV at period of 60 days.



**Fig 1:** Erythrocytes sedimentation rate (mm/hr) level of the subjects

The result showed that the ESR level decreased slowly and gradually from 0 day to 60 days in all the experimental groups but it increased in control group I. This result clearly indicated that herbal powder is highly effective to reduce and regulate the ESR of blood. It indicated that herbal powder is useful to reduce the inflammation and cure the arthritis diseases.

#### 4. Summary and Conclusions

The present study indicates the biochemical efficacy of the herbal powder in the treatment of arthritis. The herbal powder contains good amount of protein, fiber, oil and calcium which helped in increasing serum calcium level and decreasing serum uric acid level and ESR. Dose of 30g (15g in morning before breakfast and 15g at bed time in night) of herbal powder had much better effect in comparison of other dosages as its consumption decreases the level of serum uric acid and ESR and increases the level of serum calcium level.

#### Acknowledgement

Heartly thanks to Sardarkrushinagar Dantiwada Agricultural University's authority and principal of ASPEE College of Home Science and Nutrition for providing the opportunity and facility to carry out this research work. I would also like to extend my cordial thanks to Dr. K. Modi (Medical Officer), University Health Center, SDAU, Sardarkrushinagar, for providing patients as well as permitted to carry out the research and Devabhai (Adharsh Pathology laboratory), Palanpur for their cooperation in testing the samples and providing the data timely.

#### References

1. Abasoloa L, Tobíasb A, Leona L, Carmonac L, Fernandez-Ruedaa JL, Rodriguezd AB, *et al.* Weather conditions may worsen symptoms in rheumatoid arthritis patients: The possible effect of temperature. *Reumatol Clin.* 2013; 9(4): 226–228.
2. AOAC. Official methods of analysis (10<sup>th</sup> Edn). 1984. Association of official analytical chemists, Washington, D.C.
3. Borade SS. Chemical composition and characterization of Hemp (*Cannabis sativa*) seed oil and essential fatty acids by HPLC method. *Archives of applied science research.* 2013; 5 (1): 5-8. (<http://scholarsresearchlibrary.com/archive.html>).
4. Bray HG, Thorpe VW. *Methods of Biochemical Analysis.* 1954; 1:27-52.
5. Hawk, Kalyansundaram S. In a manual of laboratory techniques, NIN, ICMR, Hyderabad, India.1957.
6. Leson G, Pless P, Roulac J. Hemp foods and oils for Health. Sebastopol, CA: Hemptech. 1999, 56-79

7. Loeza AP, Santos- Sanchez NF, Valadez- Blanco R, Sanchez- Guzman BS and Salas- Coronado R. Chemical composition, colour, and antioxidant activity of three varieties of a non abdiversifolias afford fruits. *Industrial crops and products.* 2011; 34: 1262-1268.
8. Lowry OH, Rosenbrough NJ, Farr AL, Randa EJ. *Journal of Biological Chemistry.* 1951; 2: 193-265.
9. Mishra LC, Singh BB. Scientific basis for the therapeutic use of *Withania somnifera* (Ashwagandha): A Review. *Alternative Medicine Review.* 2000; 5: 334-346.
10. Nadkarni AK, Nadkarni KM. *Indian material medica.* Edn I, Popular Prakashan, Mumbai, 2010; 624-625.
11. Patel NG, Patel MM. Pharmacology and pharmacotherapy of arthritis in north Gujarat. *An International Journal of Pharmaceutical Sciences.* 2011; 2(1): 0976-7908.
12. Puolakka K, Kautiainen H, Pekurinen M, Mottonen T, Hannonen P, Korpela M, *et al.* Monetary value of lost productivity over a 5 year follow up in early rheumatoid arthritis estimated on the basis of official register data on patients' sickness absence and gross income: experience from the FIN-RACo Trial. *Annals of Rheumatic Disease.* 2006; 65:899-904.
13. Raghuramula N, Nair MK, Kalyansundaram S. *Manual of Laboratory Techniques,* NIN, ICMR, Hyderabad, India. 1983.
14. Rasool M, Varalakshmi P. Suppressive effect of *Withania somnifera* root powder on experimental gouty arthritis: An in vivo and in vitro study. *Chemico-Biological Interactions.* 2006; 164(3): 174-180.
15. Steel RGD, Torrie HH. *Principles and Procedures of Statistics.* McGraw Hill Co., New York, 1980.
16. Westergren A. Studies of the suspension stability of the blood in pulmonary tuberculosis. *Acta Medica Scandinavica.* 1921; 54: 247-282.
17. Tietz NW. *Clinical Guide to Laboratory Tests,* 2012; 5<sup>th</sup> Edition, W.B. Saunders.