RESEARCH PAPER | Healthcare | Volume : 4 | Issue : 3 | Mar 2014 | ISSN - 2249-555X

Quantification of Immunity Status of Dabur Chyawanprash - A Review Part- 2 (Clinical Studies)

KEYWORDS: Dabur Chyawanprash, Immunity, Nasal Allergy, Viral Infections, Quality of Life, Seasonal influences, Beneficial Effects

Dr. J. L. N. Sastry
Healthcare Research, Dabur Research & Development Centre (DRDC), Dabur India Limited, 22, Site IV, Sahibabad (Ghaziabad), UP 201010, India.

Dr. Arun Gupta
Healthcare Research, Dabur Research & Development Centre (DRDC), Dabur India Limited, 22, Site IV, Sahibabad (Ghaziabad), UP 201010, India.

Dr. N.B. Brindavanam
Healthcare Research, Dabur Research & Development Centre (DRDC), Dabur India Limited, 22, Site IV, Sahibabad (Ghaziabad), UP 201010, India.

Dr. Satyajyoti Kanjilal
Healthcare Research, Dabur Research & Development Centre (DRDC), Dabur India Limited, 22, Site IV, Sahibabad (Ghaziabad), UP 201010, India.

Mr. Satyendra Kumar
Healthcare Research, Dabur Research & Development Centre (DRDC), Dabur India Limited, 22, Site IV, Sahibabad (Ghaziabad), UP 201010, India.

Dr. Manju Setia
Healthcare Research, Dabur Research & Development Centre (DRDC), Dabur India Limited, 22, Site IV, Sahibabad (Ghaziabad), UP 201010, India.

Dr. Sasibhushan Vedula
Healthcare Research, Dabur Research & Development Centre (DRDC), Dabur India Limited, 22, Site IV, Sahibabad (Ghaziabad), UP 201010, India.

Dr. Ruchi Srivastava
Healthcare Research, Dabur Research & Development Centre (DRDC), Dabur India Limited, 22, Site IV, Sahibabad (Ghaziabad), UP 201010, India.

ABSTRACT *Ayurveda, the oldest Indian system of medicine, recommends the administration of a specified group of formulations known as Rasayana for preventing occurrence of diseases. Ayurvedic scholars like Caraka (500 BC) have mentioned that, the use of Rasayana would impart a long, healthy and a disease free life while promoting intelligence, memory and lustre. Chyawanprash (CP) is a well-known Ayurvedic Rasayana formulation and studies have indicated that they act as immunomodulators. In review part - 1, experimental studies (in vivo and in vitro), conducted by Dabur Research and Development Centre in evaluating the immunity benefits of Dabur Chyawanprash were reviewed. In the present review, Clinical Studies on Dabur Chyawanprash in establishing its beneficial effects on immunity have been reviewed. The criteria of assessment in the clinical studies was based on clinical symptoms, IgE, IgG, C3, C4, respiratory performance test, plasma cortisol levels and haematological parameters.*

INTRODUCTION

Chyawanprash (CP) is a well-known Ayurvedic formulation, which is being used time immortal for rejuvenation and immune boosting effects on the human body. It is claimed to be useful in reducing the effects of ageing and to provide resistance against diseases[1-3] CP is made up of more than forty five Ayurvedic ingredients where Amla (Emblica officinalis) is the main ingredient which confers significant antioxidant property to CP[4]. The other important constituents such as Guduci (Tinospora cordifolia) in the formulation have exhibited immunomodulatory activities in experimental models[5]. The immunologic causes of allergic rhinitis underscore the important roles of both adaptive and innate immune systems. In recent years, appreciation of the role of nasal innate immunity has grown and evidence suggests that the pathogenesis of allergic rhinitis is partially mediated by the innate immune system. Beneficial effects of Dabur Chyawanprash (DCP) have also been observed on nasal allergies and viral infections and seasonal influences. There, as such, exists a battery of evidence suggesting its multi faceted biological activity in favour of positive health.

Dabur Chyawanprash (DCP) is a time-tested immunity booster, which is being manufactured following the traditional methods for more than 60 years. There are several preclinical[6] as well as clinical observations documented over the last fifty years mostly on the immunity benefits of DCP. Recently, in a study to evaluate the toxicity reduction and early restoration by adjunct therapy of Ayurvedic drugs by increasing the bio availability of Anti Tubercular Therapy (ATT) in patients of pulmonary tuberculosis (PTB), adjunct therapy with DCP at doses 10mg/kg given orally thrice a day for 28 days produced appreciable changes in IgA and IgM patterns as compared to ATT given alone and with other drugs as add on therapy and in abating symptoms of PTB such as anorexia, cough with expectoration, weakness and generalized improvement in health. Dabur Research and Development Centre (DRDC) has conducted several pre-clinical and clinical studies on DCP. In the previous paper published in Indian Journal of Applied Research, February 2014 issue, preclinical studies in evaluating the immunomodulatory activity of DCP were reviewed. In the current paper, a review is being made covering the clinical studies which were instrumental in establishing the immunity status of subjects who consumed DCP.

1. AIMS AND OBJECTIVES

In this series of review (Part 2), it is intended to analyze the quantification of immunomodulatory benefits of DCP on Immune Status and/or Quality of Life in the subjects consuming DCP.

Volume : 4 | Issue : 3 | Mar 2014 | ISSN - 2249-555X

2. LITERARY SEARCH ON CLINICAL STUDIES ON DCP

DCP has been studied in various clinical studies, some of them are listed below:

a. Effect of DCP on seasonal influences – Ojha J K et al., 1998[7],
b. Adaptogenic properties of DCP – Singh R H et al., 1998[8]
c. Effect of DCP on Nasal Allergies and Infections – Jaggi O P., 1999[9]
d. Effect of Chyawanprash and Vitamin C on Glucose tolerance and Lipo protein profile – Manjunath et al., 2001[10]
e. Chyawanprash Awaleha: a genoprotective agent for bidi smokers – Yadav et al., 2003[11]
f. Adjunct therapy of Ayurvedic medicine with anti tubercular drugs on the therapeutic management of pulmonary tuberculosis - P. K. Debnath et al., 2012[12]

Out of the above study the following two clinical studies, which are directly linked to immunomodulatory activity of DCP are being critically reviewed In this paper.

- Effect of DCP on Nasal Allergies and Infections – Jaggi O P,[9] New Delhi
- Effect of DCP on seasonal influences – Ojha J K et al[7] IMS, BHU

I. Effect of DCP on Nasal Allergies and Viral Infections

The study reviwed is Open Label and was conducted on DCP to evaluate the immunity enhancement activity of DCP and its role in respiratory health (recurrent cough and cold).

Main features for identifying causative factors of recurrent cough & cold were a) allergy (history and/or other manifestations of allergy), diagnosis of allergic manifestation is on the criteria of Increase of eosinophil cells in the nasal secretions and blood, Increase in serum IgE levels. b) Viral: History of viral infection in the throat occurring in many people at a time and confirmed by absence of pyogenic bacteria in the throat swab culture. c) Bacterial: Sputum culture positive to pathogenic bacteria.

MATERIAL & METHODS

The study drug was provided by Dabur India Limited (DIL), No. 22, Site IV, Sahibabad, Ghaziabad-201010, India. Subjects attending OPD of chest and allergy center, New Delhi were included in the study after considering inclusion and exclusion criteria. Inclusion criteria (age between 5 – 75 years, history of allergy, history of recurrent viral infections in throat and subjects with recurrent bacterial infection) and Exclusion criteria (subjects with serious systemic disorders, subjects suffering from tuberculosis, chronic illness and subjects participating in any other clinical trial).

Each study group comprised 10 patients each of either sex (n=40) in the age group of 16-65 years out of which 29 were male and 11 were female. Recruited subjects were differentiated in to the following categories viz., (1) Normal (2) Allergy, (3) Viral infections and (4) Bacterial infections Groups. DCP (12 g) was given orally two times a day for 12 weeks to recruited subjects. Observations were recorded on each case at the base line, after 6 weeks and 12 weeks of study period.

Quantitative measurement of total human IgE in serum was done using UBI MAGIWAL™ IgE Quantitative HP-801 solid phase enzyme-linked immunosorbent assay (ELISA KIT). The readings were taken using 'Medilisa 318 Plus' Elisa reader. IgG, C3 and C4 estimation in the serum (quantitative) was done by immunoturbidimetric analysis using Elitech Test System. All other tests were done using standard techniques. All laboratory investigations were undertaken at independent labs.

OBSERVATIONS and RESULTS

Following observations were made in the respective groups:

Sputum Culture Test Results: The sputum of recruited subjects in the bacterial group was cultured to detect and identify the bacteria that infected the lungs or breathing passages. Most of the respiratory tract bacterial infections are caused by Penumococus, Staphylococcus aureus, Coliform bacilli, Pseudomonas aeruginosa, Candida albicans and Aspergillus fumigates. The present study showed a maximum of Pseudomonas infections followed by Klebsiella, Staphylococcus, E. coli and Streptococcus infections.

Effect on Haemoglobin Levels: Haemoglobin increased in all groups except in the normal group. The decrease in normal group was largely due to one person wherein haemoglobin fell considerably Table 1.

Table 1: Showing % change in Haemoglobin (in gm %) Levels

Group	Initial	At 6 wks	At 12 wks	In-creased	De-creased	% change
Normal	13.29	13.02	12.09	4	6	-2.9%
Allergic	12.63	12.76	12.92	6	4	+1.70%
Bacte-rial	12.71	12.62	12.89	6	4	+0.40%
Viral	11.95	12.74	12.83	7	3	+7.40%
Total				23	17	

Effect on ESR: ESR is known to increase in infections. It was observed that after taking DCP, ESR fell significantly in normal group, allergic and viral groups. ESR increased slightly in the bacterial group (Table 2).

Table 2: Showing % change in ESR (in mm) Levels

Group	Initial	At 6 wks	At 12 wks	In-creased	De-creased	% change
Nor-mal	20.9	19.3	15.8	2	8	- 24.4 %
Aller-gic	14.6	10.7	10.1	4	6	-30.8 %
Bacte-rial	20.6	22.7	21.9	5	5	+ 6.3%
Viral	17.7	13.3	13.1	1	9	-25.9%
Total				12	28	

Effect on Serum Albumin and Globulin and the Albumin Globulin Ratio: Estimation of serum albumin determines if a patient has liver disease or kidney disease, or if the body is not absorbing enough protein. Serum globulins are a heterogeneous group of proteins which include alpha and beta globulins as well as serum immunoglobulin (which account for the gamma fractions). Serum globulin was found to increase in all the study groups; maximum being in the bacterial group and minimum in the Allergic group. In the normal group, there was very little increase. Total serum proteins increased in all groups with maximum and minimum increase in the Bacterial and Allergic groups, respectively.

The Albumin/globulin ratio showed a decrease in all the groups of patients. The decrease was due to rise in levels of serum globulins. Albumin/globulin ratio showed increase only in the normal groups. Serum protein values and its various fractions or ratios before and after giving DCP did not indicate any particular trend in the immune status.

Effect on IgE Levels: Base-line IgE was maximum in the Allergic group; minimum in the viral group. In all groups, a definite decrease was noticed after taking DCP. Maximum decrease occurred in Allergic and in Normal groups. Furthermore, it was also observed that administration of DCP

Volume : 4 | Issue : 3 | Mar 2014 | ISSN - 2249-555X

was helpful in decreasing the elevated levels of IgE in 30 out of 40 subjects. Decrease in IgE lessens the tendency to develop an allergic reaction (Table 3).

Table 3: Showing % change in IgE (in IU/ml) Levels

Group	Initial	At 6 wks	At 12 wks	In-creased	De-creased	% Change
Normal	181.1	106.4	90.7	0	10	-49.9%
Allergic	215	150.4	115.5	2	8	-46.3%
Bacte-rial	105.7	115.2	96.4	4	6	-8.8%
Viral	79.5	67.6	86.6	4	6	-3.0%
Total				10	30	

IgG levels decreased in all groups except the Viral. Decrease was significant only in the Bacterial group. IgG is the predominant antibody in the serum and it carries the major burden of neutralizing bacterial toxins and binding to microorganisms to enhance their phagocytosis. Statistically significant lower levels of IgG antibody in the Bacterial group after taking DCP could be because of lesser bacterial stimulus to the production of IgG antibody (Table 4). Intake of DCP probably reduced the number of bacteria which could stimulate IgG production and hence resulted in lower IgG levels. This could be further substantiated by subsequent studies on bacterial colony counts after taking DCP

Table 4: Showing % change in IgG (in mg/dl)) Levels

Group	Initial	At 6 wks	At 12 wks	In-creased	De-creased	% change
Normal	1761.9	1706.4	1537.3	5	5	-12.7%
Allergic	1617.6	1662.2	1648.2	5	5	-1.9%
Bacterial	1884.1	1494.6	1434.2	4	6	-23.9%
Viral	1667.5	1721.2	1695.4	6	4	+1.7%

Effect on C3 and C4 Levels: The complement system is a cascading series of plasma enzymes and proteins capable of cell lyses. Activation of the classic complement pathway via C1, C4 and C2 and activation of the alternative complement pathway via factor D, C3 and Factor B ultimately leads to cell lyses. C3 and C4 levels thus indicate the function of the two arms of the complement pathway. The pivotal compound in this pathway is C3 which splits to form C3b and is necessary for activation of component C5 – C9 which cause lyses of the cells.

A decrease in serum C3 levels was noted in all the groups. A decrease in C4 was noted in all groups of recurrent cough and cold, but not in the normal group. In the bacterial group, 9 out of 10 showed decrease in C3 and 8 out of 10 in C4 (Tables 5 & 6). A decrease in C3 and C4 following administration of CP would indicate a lesser activation of the complement pathway. This would indicate less cellular destruction and an overall healthy individual.

Table 5: Showing % change in C3 Levels (in mg/dl)

Group	Initial	At 6 wks	At 12 wks	In-creased	De-creased	% change
Normal	289.4	226.7	130.5	5	5	54.9%
Allergic	225.2	171	168.6	3	7	-24.0%
Bacte-rial	330.5	243.5	220.5	1	9	-32.7%
Viral	234.1	197.3	189.3	4	6	-19.1%

Table 6: Showing % Improvement in C4 Levels (in mg/dl)

Group	Initial	At 6 wks	At 12 wks	In-creased	De-creased	% change
Normal	17.6	43.2	43.7	8	2	+ 148.3%
Allergic	45.5	27.5	28.1	3	7	-38.2%
Bacte-rial	62.1	52.1	48.3	2	8	-22.2%
Viral	45.2	36.7	35.5	4	6	-21.5%

Effect of DCP on improving the Quality of Life Index (QLI): The QLI increased in all the groups. Maximum increase was in the Allergic group. Maximum benefit perceived was in the physical symptoms aspect of QLI. Benefit in affective problems was also there. No significant change was observed in social dysfunction and ego problems. Increase in different parameters was observed in all the groups. Maximum increase was observed in Normal and Allergic groups. Minimum increase was found in Bacterial and Viral groups (Table 7).

Table 7: Showing the Improvement in Quality of Life Index in DCP Consumers

Group	Before					After 12 weeks					% change					Over-all % Change
	P	C	A	S		P	C	A	S	E	P	C	A	S	E	
Normal	76	81.7	71.4	80.5	71.4	79.4	82.8	79.4	80	73.1	+4.5	+1.3	- 11.2	-0.1	+2.4	+3.6%
Allergic	59.2	66.4	61.6	61.6	67.4	63.2	69.6	65.6	64	68.8	+6.8	+4.8	+6.5	+3.9	+2.4	+4.81%
Bacterial	50.3	57.1	52	56	57.1	56	57.7	54.3	53.1	57.1	+11.4	1.00%	+4.4	-5.1	+1.0	+2.30%
Viral	76	66	64.7	61.3	65.3	81.3	59.3	65.3	70	65.3	+7.0	-10.1	+3.9	+3.9	Nil	+1.57%

(P=Physical problems, C=Cognitive problems, A=Affective problems, S=Social dysfunction, E=Ego problems), Expressed out of a max 100)

2. Seasonal Effect of DCP on Seasonal Influences Over General Health:
The study was Double-Blind Placebo Controlled clinical study which was conducted on Dabur Chyawanprash (DCP) to establish

Volume : 4 | Issue : 3 | Mar 2014 | ISSN - 2249-555X

its effectiveness in health status throughout the year, in all seasons, involving, summer, rains, winter and the months falling in between these seasons.

OBJECTIVE:
The objective of this study was:
1. To elicit beneficial and/or adverse effect(s) of Dabur Chyawanprash when used throughout the year.
2. To evaluate the clinical efficacy of Dabur Chyawanprash in subjects having non-specific ailments due to the seasonal influences (with no underlying organic disease).

MATERIAL & METHODS
The samples (both the trial drug and placebo) required for the study were provided by Dabur India Limited (DIL), No. 22, Site IV, Sahibabad, Ghaziabad-201010. India, placed in similar containers with computer generated mock-up labels, in codified manner to blind the investigator, as well as the user.

Patients attending the OPD of the Department of Dravyaguna and Department of Medicine, Institute of Medical Sciences, BHU, were enrolled for the study, after an adequate pre-screening for inclusion and exclusion criteria. Patients meeting the following inclusion/exclusion criteria were enrolled in the study.

Inclusion & Exclusion criteria
Inclusion Criteria:
- Men or women aged between 15-75 years, having no chronic organic disease.
- Patients complaining of non-specific clinical symptoms like, loss of appetite, loss of weight, fatigue, weakness, malaise, recurrent attacks of cold/allergies, running nose, fever, sleeping abnormal, muscle pain, joint pain, perspiration etc.

Exclusion Criteria:
- Patients having chronic respiratory problems like tuberculosis and lung cancer were excluded from the scope of study on ethical grounds
- Patients with chronic indigestion or with history of gastric ulcers were excluded from the study
- Patients having any systemic disease like diabetes, renal impairment any serious from of cardiovascular problem and liver afflictions were excluded from the study
- Pregnant women were excluded from the scope of the study.

Effect of DCP on seasonal influences over general health was an elaborate study stretched over two years covering summer, rainy and winter seasons.

Two summer seasons, that of 1999 and 2000 was covered in this trial. The recruitment of the patients was initiated at the beginning of the month of April and was stopped by the end of April in order to complete 3 months therapy of the participants in the summer season itself. Similarly, two rainy seasons, those of 1998 and 1999, were covered. The recruitment was initiated at the 3rd week of the month of June up to 1st week of July, so as to cover a 3 months therapy period involving the rainy season as well as a complete follow-up. The winter study fragment involved the winter seasons of 1998 and 1999. The recruitment of the patients for the purpose of the trial was initiated mid November, which was stopped November end. The participants received 3 months of therapy over the winter season with regular follow-up.

A separate round-the-year group covered the patients who did not fall in the summer, rainy or winter group recruitment period, but were falling in time period between the recruitment phase of two different seasons and were visiting the O.P.D. Whereas each season covered 3 months of therapy. The round-the-year group covered a full year of therapy period and follow-up.The eligible patients were assigned to treatment with the trial drugs, CP- A or the CP-B, by means of an alternate drug allocation. The trial drug and the placebo were decoded at the end of the study as

- CP- A - Dabur Chyawanprash
- CP- B - The Placebo

Dosage: The Dose administered in both the study groups was 12 gms (equal to 1 spoon) twice a day.

Criteria of Evaluation:
Efficacy evaluation was done based on both subjective and objective criteria at the Baseline i.e., at the start of the therapy and at the end of 3 months of drug therapy. In round-the-year group however there were three regular quarterly time points of evaluation over 1 year of therapy.

Subjective Parameters:
The subjects were evaluated for various parameters like Cough, Fever, Running nose, Loss of appetite, Loss of weight, Dyspnoea, Chest Pain, Headache, Burning palm/sole, Perspiration, Constipation, Easy fatigability, Muscle pain, Joint pain, Weakness, Sleeping abnormalities, Forgetfulness, Irritability, Confusion, Inability to concentrate and Depression. The parameters from this list, if present in the subjects in the both the arms that is DCP and Placebo were considered for analysis

Objective Parameters:
- ❖ Haematological parameters: [Haemoglobin, TLC & DLC, ESR]
- ❖ Respiratory Performance (PFTs): [FEV-1 & FEV-1/FVC]
- ❖ Estimation of plasma Cortisol Levels: for the stress profile.
- ❖ Immunological Parameters: for the allergic profile
- IgE (Immunoglobin-E antibodies)
- C3 & C4 (Complement pathway mediators)

- ❖ Biochemical parameters:
- Random blood Sugar levels
- LFTs: S Bilirubin, S. Alkaline phosphatase, SGPT, SGOT
- S. Protein
- Lipid profile: S. Cholesterol, S. Triglycerides, HDL, LDL, VLDL

OBSERVATIONS AND RESULTS
Summer season gave an evaluable number of 52 subjects out of 61 enrolled. Rainy season enrolled 53 subjects eventually given 45 evaluable cases. Similarly, winter season offered 40 subjects out of 51 and the round-the-year group covered 40 evaluable subjects out of 52 enrolled. The subjects were of either sex (51M: 49F) in the age group of 15 years to 60. In effect the number of cases that could be taken in for analysis and observation resulted in total number of 177 subjects who completed the study. For the data analysis, percentage change in symptoms during summer, rainy and round the year groups were assessed. Percentage change in symptoms during winter season was not considered as the data was inconsistent.

Summer season: The total numbers of symptoms in DCP group was 35 out of which 29 are relieved after treatment of three months. However, total symptoms in placebo group were 54, out of which 20 relieved after treatment. The percentage of the symptoms relieved in DCP group was 82.8% however; the same was 37% in placebo group. Therefore, the percentage of relief in DCP group (CP-A) was 2.2 times more than the placebo group (CP-B) in summer season.

Rainy season: The total numbers of symptoms in DCP group was 135 out of which 100 relieved after treatment of 3 months. However, total symptoms in placebo group were 86 out of which 15 relieved after treatment. The percentage of the symptoms relieved in DCP group was 74.07% however; the same was 17.44% in placebo group. Therefore, the per-

Volume : 4 | Issue : 3 | Mar 2014 | ISSN - 2249-555X

centage of relief in DCP group (CP-A) was 4.2 times more than the placebo group (CP-B) in rainy season.

Combined effect of study drugs on symptoms in summer and rainy seasons:
When the symptoms of both summer and rainy season are assessed together, the total numbers of symptoms in sufferers in DCP group was 170 out of which 129 relieved after treatment. However, total symptoms in sufferers in placebo-group were 140 out of which 35 relieved after treatment.

The percentage of the symptoms relieved in DCP group was 75.88 however; the same was 25% in placebo group. Therefore, the percentage of relief in DCP group was found to be 3 times more than the placebo group (Table 8).

Table 8: Showing the effect of study drugs on symptoms on seasonal influences

Symptom	Effect (DCP)		Effect (Placebo)	
	Before Rx	After Rx	Before Rx	After Rx
Cough	27	24	19	8
Dyspnoea	27	23	21	7
Running nose	19	14	15	2
Feeling of run-down	23	19	24	7
Weakness	19	14	14	2
Loss of appetite	21	20	22	5
Fatigue	11	4	6	0
Muscle pain	5	3	5	1
Joint pain	5	2	3	0
Perspiration	13	6	11	3
Total	170	129	140	35
% Relief		75.88		25

Effect of DCP therapy on Haematological Parameters:
On Leucocytes: Following one year of treatment with the trial drug: DCP or the Placebo, no significant changes were observed in the Total Leucocytes Count as well as in the Differential Leucocytes Count (except Eosinophils) in both (CP-A & CP-B) groups. The same observation was made in any particular season. The variations were minimal and non-significant.

On Eosinophils: Observation during the summer season showed a decrease in the Eosinophil count after 3 months treatment with DCP (CP-A group), the percentage reduction being 25% (approx) was statistically significant. Eosinophil count decreased to some extent in the CP-B group which is statistically non-significant. Similarly, in the winter season, there was a clinically significant reduction (10.26%) seen in the eosinophil count in group CP-A subjects. On the contrary, there was a marginal rise in CP-B group. However, they were found to be within normal group limits in both the groups. Rainy season did not bring about any change in the eosinophil count.

On Haemoglobin: Neither DCP nor placebo could make any impact on increase nor decrease of Haemoglobin levels in any of the study groups.

On ESR: CP-A group showed statistically and clinically significant reduction in ESR after treatment. The reduction is consistent in all the seasons. Therapy during the summer season brought about a reduction in the ESR by 38.7% and the rainy season result showed 12.7% decrease. Even in the winter season, 26.14% reduction was seen in the ESR and the round-the-year group had a 39%. Such a trend showed DCP to have a beneficial effect on lowering the ESR hence indicating a decreased disease activity in the body as ESR is a marker of inflammation, infection or any allergic manifestations. CP-B group rather showed an increase in the ESR value.

Effect of DCP therapy on Pulmonary Function (PFTs): The pulmonary function tests assessed in the study were FEV-1 (the Forced Expiratory Volume in 1 second) and FEV-1/FVC (Forced Vital capacity). The percentage increase in the CP-A group for both the parameters was clinically significant in the summer season. An increase was seen in the FEV-1 by 11.8% as opposed to none in the CP-B and the ratio of FEV-1 and FVC rose by 4.08% The winter too saw an increase in the FEV-1 by 11.83% in the CPA group, as opposed to a minor decrease in the CP-B group. Round the year as well, in the CP-A group, a gradual increase in the mean value of both the parameters was seen throughout the study period at all time points, where as the changes in the CP-B group hardly showed any change.

Effect of DCP therapy on plasma cortisol levels: Plasma cortisol levels were measured at the decided time points to check upon the influence of DCP on decreasing the stress levels since plasma cortisol is a marker of stress.

In summer, DCP treated group showed a decreased mean plasma cortisol level after 3 months of treatment duration. A marked decrease by 22.15% was observed as opposed to a mere 0.10% decrease in the CP-B group. Even in rains, the trend was the same in DCP treated group a decrease by 12.9%was observed, whereas, the placebo showed a 5.5% increase. The winter data showed a decreased mean plasma cortisol level by 22.12% after 3 months of DCP treatment, the placebo showed a 13.1% increase.

Round the year the DCP treated group showed a decreasing trend in the mean plasma cortisol level throughout the treatment duration, and by the end of the therapy, a decrease by 25% was observed which is highly significant, both clinically and statistically ($p < 0.01$). In the placebo treated group, the changes were negligible. Therefore, it may be concluded that DCP has an advantage in comparison to the placebo, in decreasing the cortisol levels (a marker of stress), thereby indicating that it is capable of fighting stress irrespective of the season.

Effect of DCP therapy on immunological parameters: The immunological parameters assessed in the study were IgE antibodies; C_3 and C_4 complement activation agents.

CP-A group brought about a decrease in the levels of IgE after treatment, bringing down the baseline value by nearly 30% (+ve). On the other hand, the placebo showed increase in IgE levels after treatment, percentage increase being 18.3% (--ve) in the rains, DCP brought about a significant decrease in the levels of IgE antibodies by 15% (+ve). CP-B group showed a decrease as well but it was insignificant ($\pm$ve).

Regarding the C3 and C4 mediators, the changes before and after the treatment in either group in any particular season were not significant.

From the above results, it may be concluded that, CP-A (DCP) treatment helps in reducing the circulating IgE antibodies, thereby showing immunomodulatory activity of DCP and make individuals less prone to frequent infections, allergies etc.

Effect of DCP therapy on Biochemical parameters: The LFT and RFT test findings have no significant change at the end of the study in any of the groups when compared with baseline.

Serum proteins remained unaffected and Random Blood Sugar levels showed insignificant changes, which however remained within the normal group clinical range. None of the parameters showed any significant change in the lipid profile during/after the treatment with DCP, The bio-chemical values showed minor changes which was neither clinically nor statis-

Volume : 4 | Issue : 3 | Mar 2014 | ISSN - 2249-555X

tically significant. CP-B group share a similar pattern in the lipid profile changes.

Hence it is evident that DCP intake during any season throughout the year does not after any liver enzymatic activity function, nor does it hamper the renal system in any possible manner. Blood sugar levels remain in safe limits as well, and the lipid profile does not undergo any bad influence. These points hence prove the safety aspect and the possible wide compliance of DCP.

DISCUSSION

The results of both the clinical studies are suggestive of the fact that there was significant reduction in the symptoms as well as biochemical parameters like IgE, C3, C4, IgG, Cortisol and ESR. The immunologic variations in different seasons throughout the year and causes of allergic rhinitis underscore the important roles of both adaptive and innate immune systems. In recent years, appreciation of the role of nasal innate immunity has grown and evidence suggests that the pathogenesis of allergic rhinitis is partially mediated by the innate immune system. The interplay between the external environment and nasal mucosa contributes to innate-immune-mediated development of allergic rhinitis[13].

1) Percentage of Symptom relief after administering DCP

When the symptoms of both summer and rainy season are assessed together, the total numbers of symptoms in sufferers in DCP group was 170 out of which 129 relieved after treatment. However, total symptoms in sufferers in placebo group were 140 out of which 35 relieved after treatment. The percentage of the symptoms relieved in DCP group was 75.88 % however; the same was 25% in placebo group. Therefore, the percentage of relief in DCP group (CP-A) was found to be 3 times more than the placebo group (CP-B).

2.) Effect on IgE

In the first study, IgE levels in the serum came down even in the normal group, it could be summarised that the blood relatives of the allergic patients or normal groups exposed to lung irritants/pollutants either because of general air pollution or being in polluting occupations, would become less susceptible to recurrent cough and cold.

It was found that IgE values were the maximum in the Allergic group at the baseline and minimum in the viral group. In all the groups, a definite decrease was noticed after taking DCP. It was observed that the decline in IgE was more in children and young adults than in the elderly. It was clearly seen that administration of DCP was helpful in decreasing the elevated level of IgE in the allergic group. Decrease in IgE lessens the tendency to develop an allergic reaction. Consuming DCP thus should be helpful in reducing susceptibility to allergies.

In the second study, during Summer Season (n=52) - DCP brought about a significant decrease in the levels of IgE antibodies by 15%. CP-B group showed a decrease as well but it was insignificant (5%) During Rainy Season (n=53) - CP-A group showed a decrease in the IgE levels after treatment, bringing down the baseline value by nearly 30%. On the other hand, the placebo showed an increase in IgE levels after treatment, percentage increase being 18.3%.During winter Season (n=40) - CP-A showed a significant decrease in the levels of IgE antibodies after DCP treatment, bringing down the baseline value by 11.6% while CP-B group showed a decrease of 4%.

Round-the-year (n=40) - DCP therapy showed a reduction in IgE levels right from the baseline and eventually by the end of 1 year of therapy, at the 3rd time point, a reduction by 23% of the baseline was observed where as the placebo showed 7% reduction in IgE levels when compared to the baseline.

On observing the decrease in IgE levels in the two studies reviewed, it may be concluded that administration of DCP has definite effect on improving immunity status during different times of a year (seasonal variation) and this improvement in IgE levels was found to be more than 3 times compared to those who are on placebo

3) EFFECT ON C3 C4 CELLS

C3 and C4 levels showed a lot of scatter, but discernible trend in the patients was towards lowering of their values in the serum. A decrease in C3 level in the serum was noted in all the groups. A decrease in C4 was noted in all groups of patients but not in the Normal groups. In the Bacterial group, 9 out of 10 showed decreased C3, and 8 out of 10 showed decreased C4. As we know, the complement system is a cascading series of plasma enzymes and proteins capable of cell lyses. Activation of the classic complement pathway via C1, C4 and C2 and activation of the alternative complement pathway via D, C3 and factor B, ultimately leads to cell lyses. C3 and C4 levels thus indicate the functioning of the two arms of the complement pathway. The pivotal compound in this pathway is C3, which splits to form C3b and is necessary for activation of components C5-C9, which cause lyses of the cells. A decrease in C3 and C4 following administration of CP would indicate a lesser activation of the complement pathway. This would indicate less cellular destruction and an overall healthy individual. A lot of scatter in the results calls for a larger study in this area.

4) Effect on IgG levels:

Effect of DCP on IgG levels was observed in only first study (nasal allergies and viral infections).

One of the frequent clinical problems in any type of IgG deficiency are recurrent or chronic infections of the upper and lower respiratory tracts.

IgG decreased in all groups except the Viral. This was quite appreciable in the Bacterial group. IgG in the predominant antibody in the serum and it carries the major burden of neutralizing the bacterial toxins and binding to microorganisms to enhance their phagocytosis. Significantly lower levels of IgG antibody in the Bacterial group after taking CP could be because of lesser bacterial stimulus to the production of IgG antibody. Intake of CP probably reduced the number of bacteria which could stimulate IgG production and hence resulted in lower IgG levels. This contention could be further substantiated by subsequent studies on bacterial colony count in sputum cultures after taking DCP. IgG is well distributed in intravascular and extra vascular spaces and is important in the secondary antibody responses (immune memory). It plays an important role in host defence against infection. IgG protects tissues from bacteria, viruses, and toxins. Different subclasses of IgG neutralize bacterial toxins, activate complement, and enhance phagocytosis by opsonisation[14].

4) Effect on ESR counts

A decrease was observed in ESR levels in the study on nasal allergies and viral infections in all the groups of patients indicating lessened inflammatory activity in the body, be it in the lungs, nose, throat or anywhere else in the body. There were 70% of subjects who have shown significant reduction in ESR.

In the study on seasonal influences, CP-A group showed statistically and clinically significant reduction in ESR after treatment. The reduction is consistent in all the seasons. DCP therapy during the summer season showed 38.7% reduction in ESR levels while the same during rainy season was 12.7% decrease. During winter season, 26.14% reduction was seen in the ESR and the round-the-year group showed 39% reduction. This trend of reduction seen with the subjects on ESR lowering in DCP group indicates a decreased disease activity (immunity enhancing activity) in the body as ESR is a marker of inflammation, infection or any allergic manifestations. CP-B group which was on placebo on the other hand showed an increase in the ESR value. These findings suggest that there was a considerable improvement in ESR in DCP

Volume : 4 | Issue : 3 | Mar 2014 | ISSN - 2249-555X

group in comparison to placebo.

5) Effect on serum proteins:
Serum protein values and its various fractions or ratios before and after giving DCP did not indicate any particular trend in the immune status

6) Quality of Life Index (QLI): QLI took into consideration five types of problems, namely 1) Physical, 2) Cognitive, 3) Affective, 4) Social and 5) Ego. Each type had five entities, scales from 1 to 5 and the number achieved was multiplied by 4, to make up to a maximum of 100.

The QLI increased in all the groups. Maximum increase was observed in the Allergic group. Maximum benefit perceived was in Physical problems. Benefit in Affective (mood) problems was also there. No significant change was observed in Social Dysfunction and Ego problems.

CONCLUSION:
After reviewing critically the data from both the studies it can be concluded that

1. Dabur Chyawanprash (DCP) boosts immunity
2. DCP reduces the disease symptoms of seasonal influences.
3. DCP modulates IgE levels positively.
4. DCP modulates immunity markers C3 and C4 levels.
5. DCP improves pulmonary functions.
6. DCP decreases cortisol levels.
7. DCP does not alter LFT and RFT parameters
8. DCP increases Quality of Life.

Results are suggestive that regular usage of DCP in the recommended doasge is safe and effective in providing immunity and improves quality of life. It provides considerable (2.2 to 4.2 times) benefit on reduction of disease symptoms in different seasons. Finally, the reduction in the IgE levels (1/3rd decrease) is indicative of decreased possibility of occurrence of allergic symptoms including recurrent cough and cold after taking DCP. In light of overall positive results in immunity related clinical as well as laboratory parameters in the clinical studies, it can be concluded that DCP provides around three times immunity upon regular use in the recommended dosage. Earlier published pre clinical studies on safety and immunity markers were also showing that DCP is safe and provides more than three times immunity.

REFERENCE
1. Caraka Samhita of Agnivesa. English Translation by Sharma PV & Sharma TN. Second Ed., Vol III; 1992, Chaukhamba Orientalia, Varanasi 221005, UP, India. | 2. Sharma PV, Ojha JK. Chyawanprash Ke Vaigyanik Adhyayan. Sachitra Ayurveda, 1970 June (6). | 3. Thatte UM, Dahanukar SA. The Rasayana concept: Clues from immunomodulatory therapy. In: Upadhayaya SN, editor. Immunomodulation. New Delhi, India: Narosa Publishing House; 1997. p. 141-8. | | 4. Ghosal S, Tripathi, VK and Chauhan S. Active constituents of Emblica officinalis: Part 1 - The chemistry and anti-oxidative effects of two new hydrolysable tannins, Emblicanin A and B. Indian J Chem 1996; September (358): 941 - 948. | | 5. Dahanukar SA, Thatte UM, Pai NR, More PB, Karandikar SM. Immunotherapeutic modification by Tinospora cordifolia of abdominal sepsis induced by caecal ligation in rats. Indian J Gastroenterol 1988;7:21-3 | | | | | | | 6. Sastry JLN, Gupta A, Brindavanam NB, Kanjilal S, Kumar S, Setia M, Vedula S, Srivastava R. Quantification of immunity status of Dabur Chyawanprash - A Review (Part-1: Experimental Studies), Indian J Applied Res 2014; 4 (2): 3-7 | | 7. Ojha JK, Tripathi KK. A Double-blind Placebo-controlled clinical study to evaluate the effect of Dabur Chyawanprash on seasonal influences over general health. Clinical Study organized by Dabur Research Foundation, Sahibabad, Ghaziabad-201010 UP, India. July 1998 to January 2001. | | 8. Jaggi OP. Clinical study on Chyawanprash with reference of its effect on immune status and quality of life (QoL) in cases of recurrent cough and cold. Clinical Study organized by Dabur Research Foundation, Sahibabad, Ghaziabad-201010 UP, India. 1998 | | 9. Singh RH and Behere PB. Double Blind, Placebo Controlled Clinical Trial on Chyawanprash: A Pilot Study. Clinical Study organized by Dabur Research Foundation, Sahibabad, Ghaziabad-201010 UP, India. 1998. | | 10. Manjunatha S, Jaryal AK, Bijlani RL, Sachdeva U, Gupta SK. Effect of Chyawanprash and vitamin C on glucose tolerance and lipoprotein profile. Indian Journal of Physiology and Pharmacology. 2001; 45(1):71–79 | | 11. Yadav JS, Thakur S, Chadha P. Chyawanprash Awaleha: a genoprotective agent for Bidi smokers. International Journal of Human Genetics. 2003; 3:33–38. | | 12. Debnath PK, Chattopadhyay J, Mitra A, Adhikari A, Alam MS, Bandopadhyay SK, Hazra J.; Adjunct therapy of Ayurvedic medicine with anti tubercular drugs on the therapeutic management of pulmonary tuberculosis.; J Ayurveda Integr Med. 2012 Jul; 3(3):141-9. | 13. Melvin TA, Ramanathan M Jr. Role of innate immunity in the pathogenesis of allergic rhinitis. Curr Opin Otolaryngol Head Neck Surg. 2012 Jun; 20(3):194-8. | 14. Beers MH, Berkow R, eds. The Merck Manual of Diagnosis and Treatment. Vol 12. 17th ed. Whitehouse Station, NJ: Merck & Co; 2004;[2] |