

## PHCOG REV.: Short Review 'Chyawanprash - Truth or Mythy'

Kasar Rahul P. \*, Laddha K.S., Chaudhary Jayesh and Shukla Anil #,

*Medicinal Natural Products Research Laboratory, A-286, Pharmaceutical Division,  
University Institute of Chemical Technology, Matunga, Mumbai-19. Mumbai.*

*rahul76kasar@yahoo.com, ksl4@udct.org*

*#Vedic Lifesciences, 118 Morya House, Off New link road, Andheri (W), Mumbai-400053.*

### ABSTRACT

**CHYAWANPRASH** traditional Polyherbal formulation, which widely used as tonic, rejuvenator, anabolic, immunomodulator and memory enhancer. Chyawanprash contains the pulp of *Emblica officinalis* as the prime ingredient, along with powders and extracts of several other herbs. It is observed that the consistency and the taste etc vary from one manufacture to another. Even these variations are observed in the same pharmaceutical company. Hence there is a need to standardize the raw materials, method of preparation and q.c.of final product to offer quality product. The results obtained were compared with similar formulations available in the market employing tests for identification and purity determination. Logic to write this article is awareness to the consumer regarding chyawanprash as a Health product and the developed method for their determination may be considered as an additional tool for quality control of chyawanprash.

**KEYOWRDS** : Chyawanprash, Standardization, Polyherbal Formulation

### INTRODUCTION

#### **Chyawanprash- The medicine:**

Chyawanprash manifests the entire human quest for immortality, freedom from disease and prevention of aging. The formulation as whole is an expression of a blessing from *Rigveda*. Perhaps it also represents the quest of mankind for a 'Panacea', which could address a wide array of health issue from aging to cough and common cold. To get the full effect of chyawanprash you have to purify the body first. The person who has undergone the body purification therapy can take the *rasayana* during young age and middle age. Without purifying the body rejuvenation therapy does not work.

#### **Marketed trend: -**

#### **Chyawanprash- the most celebrated one:**

Chyawanprash certainly, could make a real impact in the consumer health care scenario. It is contributing its bit to the national economy as well. The entire Indian chyawanprash market stands is very huge.

In the midst of all the marketing techniques adopted, by the companies chyawanprash is losing its real meaning and efficacy. Though the name remains the same the ingredients and the preparation changed according to the market and the company. Chyawanprash is under going a lot of changes these days. This is apparently essential to get a hold in the market, as it is one of the most consumed of all the ayurvedic medicines.

Companies are promoting chyawanprash as an immuno-booster, which can be consumed by anybody without the prescription of a doctor. These marketing tactics entices people to buy chyawanprash as an OTC Product. Most of these consumers are not aware of the fact that it is a medicine and it is better to take it according to the requirement. Since the day of its known inception dating back 1500BC to the age of

technology-it remained in the hearts of Indian common-folk irrespective of political, cultural and scientific upheavals(1). Everyday companies are coming up with some added ingredients and call them as a special product. As the specialty increases the price also goes up. Even metals like gold and silver are added to it for some miraculous effect. The original chyawanprash is lost somewhere in between the procedures of preparation and the methods of promotion.

According to the professors Dr. Mangala Jadhav at Potdar Ayurvedic Medical College Mumbai, chyawanprash if produced in bulk quantity, the cost of production will be around Rs. 70-80 per kg. But the companies are getting enormous freedom for pricing their products, as price control measures are not applicable to ayurvedic products.

#### **Classical Chyawanprash as per Ayurveda: -**

Nature's Formulary chyawanprash follows the original 2,000-year-old recipe from the *Charaka Samhita*.

#### **Preparation:-**

In the original instructions for making chyawanprash the text first lists numerous herbs, such as *Aegle marmelos*, *Sida cordifolia*, *Piper longum* as well as substitute herbs that might be used when certain ones are not available. Over time, various formulas for chyawanprash comprised of herbs highly respected and available in modern India, have been developed from the ancient instructions. In all cases *Alma (Emblica officinalis)* is the principal constituent. Most of the herbs in the formula are boiled in water, and then the dried extract is combined with honey; a few aromatic herb powders are then added to the extract: *Elettaria cardamomum*, *Cinnamomum tamala*, *Cinnamomum Zeylanicum*, *Mesua ferrea*. The finished product is syrup that is not unlike molasses, but with a bright sour and spicy taste. Some

versions have a "crunchy" quality from unprocessed herb ingredients.

**Special Chyawanprash:** -

If an ingredient other than the traditional mix-up is added it can no more be called as chyawanprash. Sometimes metals, which are said to be added into it for making it more effective, it can adversely affect people, as metal in excess amount is harmful to the body. Thus the companies are making use of the latest technology to prepare a traditional medicine and are trying to improve the quality of their product. The suitable time to prepare chyawanprash is during the season of *Amalaki*. Even the preservatives should be very carefully added as it can affect the efficacy of the drug.

FDA should take care of all the matters regarding adulteration and standardization; Things are in progress regarding the standardization process of ayurvedic drugs. Ayurvedic medicines are prepared using herbs and the property of these plants can change according to the geography. This is important factor to be taken care of as it can create problems while implementing standardization guideline (2).

Dr.Pimplegaonkar at Potdar Ayurvedic Medical College Mumbai, opines that there is only one chyawanprash and one cannot prepare anything special by keeping the base as such. If ingredients other than the traditional mix-up is added it can no more be called as chyawanprash.

**Classical Chyawanprash /Ayurvedic Chyawanprash:-**

In the original instructions for making chyawanprash the text first lists numerous herbs having different class, like Dashmula drug, Ashtavarga Class, Chaturjata Class include in ayurvedic chyawanprash. But in today fast life there certain ones of class herbs are not available.

Classical chyawanprash these substituted herb class used in chyawanprash preparation, Today Ashtavarga Class not finding in well quantity so that class substituted by *Asparagus racemosus* [Substitution for Meda, Mahameda], *Pueraria tuberosa* [Substitution for Jivak, Risabhaka], *Withania Somnifera* [Substitution for Kakoli, Kshirkakoli], *Ipomoea Digitata* [Substitution for Vidharikand] and also *Aegle marmelos*, *Sida cordifolia*, *Piper longum* as well as substitute herbs that might be used when certain ones are not available. Over time, various formulas for chyawanprash comprised of herbs highly respected and available in modern India, have been developed from the ancient instructions. In all cases chyawanprash contains the pulp of *Emblica officinalis* as the prime ingredient, along with powders and extracts of several other herbs, which contain many phytoconstituents other than phenols [Gallic acid, Catechin, Epicatechin] and alkaloid [Piperine].

**Ingredients (3,4,5) :**

While the chyawanprash formula is made up of many herbs about 37-40 in numbers, its main functions can be understood by grouping several of these herbs by similar therapeutic actions. The main functions of the formula are to improve digestion and respiration, the sources of metabolic energy. [See Table 1.]

Digestive system effects:

- *Piper longum*, *Cinnamomum zeylanicum*, and *Emblica officinalis* help correct hyperacidity, dyspepsia, and flatulence.
- *Cinnamomum tamala* helps reduce intestinal cramping and flatulence.
- *Aegle marmelos*, and *Pistacia integerrima* alleviate intestinal inflammation and diarrhea.
- *Terminalia chebula* have anti-ulcer astringent and mild laxative effects.

**Respiratory system effects:**

- *Pistacia integerrima*, *Adhatoda vasica*, *Inula racemosa*, *Tinospora cordifolia*, *Cinnamomum tamala* and *Mesua ferrea* are commonly used to alleviate cough, asthmatic breathing, and bronchi spasm.
- *Piper longum*, *Elettaria cardamomum* are used for respiratory infections (e.g., common cold and bronchitis) and asthmatic breathing.

In addition, the formula has a calming effect on nervous energy and on stress, while improving concentration and memory, with its inclusion of *Withania somnifera*, *Bacopa monnieri*, and *Asparagus racemosus*.

There are ingredients in which many companies done adulteration as like honey, Amala bulb, Ghee, raw crude drugs, Vanshalochan. These adulterations can detect by Total fiber, total fat, Sap value, and Inorganic matter parameter.

**Pharmacological Activity ( 6,7,8,9)**

Chyawanprash traditional polyherbal formulation, is widely used as tonic, rejuvenator, anabolic, immunomodulator and memory enhancer. In the modern times it is used to cure cough, asthma and used as a tonic for heart disease. It promotes growth in children. It increases the sexual power and aid in digestive.

Amla fruit also offers calcium, phosphorous, iron, carotene, carbohydrates, thiamin and riboflavin. Amla has ascorbic acid conjugated to gallic acid and reducing sugars forming a tannoid complex, which is to be more stable. When these compounds are ingested, Vitamin C is released into the body due to an inherent mechanism; several studies have proven its utility in improving body resistance and protecting against infection.

The observation made in the study also that the antioxidant profile of amla could be traced to Vitamin C like activity of its phenolic compounds and not just due to its Vitamin c content (10,11,12) Consumption of this fruit has a great effect in maintaining health because of its antioxidant properties. Chyawanprash has been used as a *Ramayana* (health tonic), a rejuvenator and an immune builder. It has also show benefits in decreasing anxiety, stress and depression.

**Sugar and honey in Chyawanprash?**

The unrefined sugar and honey play an important role in chyawanprash. They work together as an anupan, which means "a carrier of herbs." They help the herbs absorb deep into the tissues. In Ayurveda there are 6 tastes: sweet, sour, bitter, pungent and astringent. Each of the 6 tastes plays an important role in healing. Chyawanprash has 5 of the 6 tastes (no salty taste). The sugar and honey provide the sweet

taste, which is rejuvenating. Without the sugar and honey, chyawanprash wouldn't work! Besides, there are only 7.8 grams of sugar per teaspoon and less than 1 gram of fat.

**Does it need to be refrigerated?**

No. chyawanprash does not need refrigeration. The jar is about a 1-month supply. If you plan on keeping it open longer than 1 month, it should be refrigerated.

According to the *Charaka Samhita*, the ideal way to use Chyawanprash is to first undertake cleansing of the body, perform meditation and religious ceremonies, and develop a cheerful disposition. The herbal preparation should be consumed in a place where the room is clean, the temperature is mild, and one is out of direct sun (during the hot season). While the herbal honey helps correct the problems that have been caused by poor habits, correcting improper diet, in particular, is an important aid to the effects of all the *rasayana*.

It observed that the high intensity of heat destroyed the tannin content and has a negative impact on Vitamin C content in the final product of chyawanprash<sup>13</sup>. There was a loss of 34.8% of vitamin C on frying the boiled amla pulp. The loss of Vitamin C on may be due to high temperature of about 140°C to 150°C achieved during frying. Also such high temperature may destroy vitamin C as well as the constituents, which may be otherwise responsible for its stability (14,15).

**Need for Standardization**

Standardized Formulations arose out of the need to create a uniform product for clinical trial. The primary reason standardized herbal extracts exist is because they are considered necessary to achieve as much control in double blind studies as is possible. Standardization does have advantages. It produced a consistently strong product with guaranteed constituents. When you consider the quality of most commercial formulation, this at least assures that they have something in it and that correct herb is being used.

In the case of ayurvedic drug lack of quality control procedures exist. So a question is, how do these companies prepare quality chyawanprash? The original chyawanprash is lost somewhere in between the procedures of preparation and

the methods of promotion. More than this, the companies are manufacturing chyawanprash in large quantities and thus they need all those rare herbal ingredients in bulk amounts. These arises the chance of adulteration. For them it is an easy way of preparation especially when there are no measures available to check the added ingredients or its quantities. This is the area, which needs to be addressed. The issues involved are methods of manufacturing and the ways of promoting the chyawanprash. It is an age-old traditional medicine, which was prepared in a well thought out manner.

**Difficulties in Polyherbal formulation: -**

Standardization problem arises from the complex composition of drugs, which are used in the form of whole plant, parts of the plant(s), and of plant extracts. Standardization of the presumed active compounds of drug in general does not reflect reality. Only in a few cases does drug activity depends up one single component. Generally, it is the result of concerted activity of several active components. Generally, it is the result of concerted activity of several active components as well as of inert accompanying substances. Through these inert accompanying components do not directly affect pathological mechanism, it is reasonable to use the complex mixture of components provided by a medicinal plants because these inert components might influence bioavailability and excretions of the active components.

Further, by inert plant components the stability of the active component might be increased and the rate of side effects can be minimized.

Logic to write this article is awareness to the consumer regarding chyawanprash as a Health product and the developed method for their determination may be considered as an additional tool for quality control of chyawanprash.

Owing to the medicinal properties to a crude drug, it is necessary to maintain its quality and purity in commercial market. The establishment of perfect quality control profiles of herbal medicines based on physical, chemical, biological evaluation, backed with their stability and bioavailability parameters is the need of the hour in order to ensure the acceptance of phytopharmaceuticals as an integral part of modern drug therapy.

**Table1: - Herbal plants used in Chyawanprash (3, 4).**

Sr.No.	BOTANICAL NAME	TRADITIONAL NAME
<b>Dashmula Class</b>		
1	<i>Aegle marmelos</i> Corr.	Bel, Bilva
2	<i>Desmodium gangeticum</i> DC	Shalparni, Sarivan.
3	<i>Gmelina arborea</i> Roxb.	Gambhari, Kashmarya
4	<i>Oroxylum indicum</i> Vent.	Shyonaka, Sonapatha, Aralu.
5	<i>Premna Integrifolia</i> Linn.	Arani, Aagnimantha.
6	<i>Solanum indicum</i> Linn.	Brihat Kantkari, Vanbhantha,
7	<i>Solanum xanthocarpum</i> Schrad.	Laghu kantakari, Kashtakari.
8	<i>Stereospermum suaveolens</i> DC	Patha, Padhal, patal
9	<i>Tribulus terrestris</i> Linn.	Gokharu, Gokshura.
10	<i>Uraria picta</i> Desv.	Pithwan, Prishniparni, Devala.

General class		
11	<i>Adhatoda vasica</i> Nees.	Aduso ki patti, vasa.
12	<i>Aquilaria agallocha</i> Roxb.	Agarkashta, Agar, Kalaagar.
13	<i>Bambusa arundinacea</i> Retz.	Vamshalochan
14	<i>Boerhaavia diffusa</i> Linn.	Punarnava, Gadhapuran.
15	<i>Curcuma zedoaria</i> Linn.	Kachur, sathi kchora.
16	<i>Cyperus rotundus</i> Linn.	Mustak, Nagarmotha, Motha.
17	<i>Emblica officinalis</i> Gaertn. [Average Wt# 21 gm.]	Amla, Awala
18	<i>Inula racemosa</i> Hook F.	Pushkarmool, Pohkarmul.
19	<i>Leptadenia reticulata</i> W. & A.	Jeevanti
20	<i>Nymphaea stellata</i> Willd.	Neelkamal.
21	<i>Phaseolus trilobus</i> Ait.	Van-mug, Mataki, Mudgaparni.
22	<i>Phyllanthus amarus</i> Schum.	Bhueawala, Bhumyamalaki
23	<i>Piper longum</i> Linn.	Pippali
24	<i>Pistacia integerrima</i> Stew.	Kakad singi, Sringi, Karkatshringi.
25	<i>Martynia diandra</i> Glox.	Kakakshi, Kaknasa, Kauathodi.
26	<i>Santalum album</i> Linn.	Safed chandan, Chandansaar.
27	<i>Sida cordifolia</i> Linn.	Bala, Bariyara.
28	<i>Teramnus labialis</i> Spreng.	Mashparni, Van-udadh, Mashvan
29	<i>Terminalia chebula</i> Retz.	Harad, Haritaki, Abhaya.
30	<i>Tinospora cordifolia</i> Meirs	Guduchi, Amrta.
31	<i>Vitis vinifera</i> Linn.	Draksha
Chaturjata Class:-		
32	<i>Cinnamomum tamala</i> Nees & Eberm.	Tejpatta, Patra, Tamalpatra.
33	<i>Cinnamomum zeylanicum</i> Blume.	Dalchini
34	<i>Elettaria cardamomum</i> Linn.	Elaichi
35	<i>Mesua ferrea</i> Linn.	Nagakeshar
Substitution of Ashtavarga:-		
36	<i>Asparagus racemosus</i> Willd.	Shatawari [Substitution for Meda, Mahameda]
37	<i>Dioscorea bulbifera</i> Linn.	Barahikand, Varahikand [Substitution for Rddhi, vrdhi]
38	<i>Pueraria tuberosa</i> D.C.	Vidarikand [Substitution for Jivak, Risabhaka.]
39	<i>Withania somnifera</i> Dunal	Ashwagandha [Substitution for Kakoli, Kshirkakoli.]

One of the major problems faced by user industry is the non-availability of rigid quality control profiles for herbal raw materials and their formulation. With the advent of new analytical tools and sophisticated instrumental technology, it is possible to suggest a practicable quality assurance profile for a drug or its bioactive constituents. The purpose of standardizing traditional remedies is obviously to ensure therapeutic efficacy. The Indian Council of Medicinal Research (ICMR) has adopted a disease-oriented strategy for validating the claims of efficacy of traditional herbal remedies (16).

**QUALITY ASSURANCE PROFILE FOR A CHYAWANPRASH (17).** CHYAWANPRASH is very commonly used health supplement and medicine since centuries. Chyawanprash is a Paste

preparation, which incorporates 35-40 herbal ingredients. It is observed that the consistency and the taste etc vary from one manufacture to another. Even these variations are observed in the same pharmaceutical company in different manufacturing batches. Hence it is the need of the hour to standardize the raw materials to obtain product consistency. The chief ingredient Amalaki being a seasonal fruit is a problem for manufacturing the product throughout the year. In practice, the received raw material, to begin with, has to be checked for its acceptability. With the advent of new analytical tools and sophisticated instrumental technology [Like HPLC, HPTLC, Spectrophotometry], the quality assurance profile for a crude drug or its bioactive constituent can be made possible.

The method of drug evaluation includes confirmation of its identity, determination of its quality, purity and detection of the nature of adulteration. The evaluation of crude drug is necessary because of the biochemical variation in the drug, deterioration due to treatment and storage, and substitution and adulteration. Evaluation should also include methods of estimating active constituent present in the crude drug in addition to its morphological and microscopic analysis.

**Microscopic** evaluation allows detailed examination of a drug and it can be used to identify the organized drugs by their histological characters. For eg. Dashmula and Chaturjata used in this formulation can be identified and evaluated by this parameter.

**Physical** evaluation of the drugs can be carried out with reference to moisture content, Solubility, optical rotation, refractive index and ash values. The moisture contents of the final product of chyawanprash ranges from 6-9 per cent. If it is so then there no need to added preservative in chyawanprash.

**Chemical** evaluation comprises of different chemical tests and chemical assays. For e g. Total carbohydrates, tannin, and saponin. The isolation, purification and identification of active constituents are chemical methods of evaluation. Quantitative chemical test such as acid value, saponification value, Estimation of Gallic acid, Catechin, Epicatechin and Piperine. **Fingerprint** of Individual class drug is important parameter for identification and presence of drug in chyawanprash formulation. For e.g. Fingerprint of Dashmula , Amalki and Chaturjata class. Co-matching with chyawanprash

formulation, that conformation of presence of individual drug class present in chyawanprash formulation.

**Biological** evaluations should be carried out, as standardization is not critically possible by physical or chemical means in case of chyawanprash. Herbal antioxidant like chyawanprash have also exhibit significant immunomodulator activity, so that we can check antioxidant activity of chyawanprash with respective of standard sample of tannic acid or Catechin. As chyawanprash is a well know rejuvenator [ *Raayana*] to the respiratory system, it is often used as a preventive and curative for bronchial asthma. This mean chyawanprash prevents infection so we can check anti-microbial, antifungal activity of chyawanprash. Also it adds to the stability and shelf life of the formulation, that give study of Degradation, Complexion of active constituent due to change in temperature, P<sup>H</sup>: Contact with inorganic metal present in chyawanprash. It will be a rational combination in the preparation of chyawanprash to blend the ayurvedic criteria, which are being used for centuries along with the above-mentioned parameters to get a noble product.

**Label Clams** should necessary for Standardization of Chyawanprash

We should take care of label claim as a one of important factor for standardization parameter of chyawanprash. This is one parameter on that basis consumer get benefited in term of his / her health

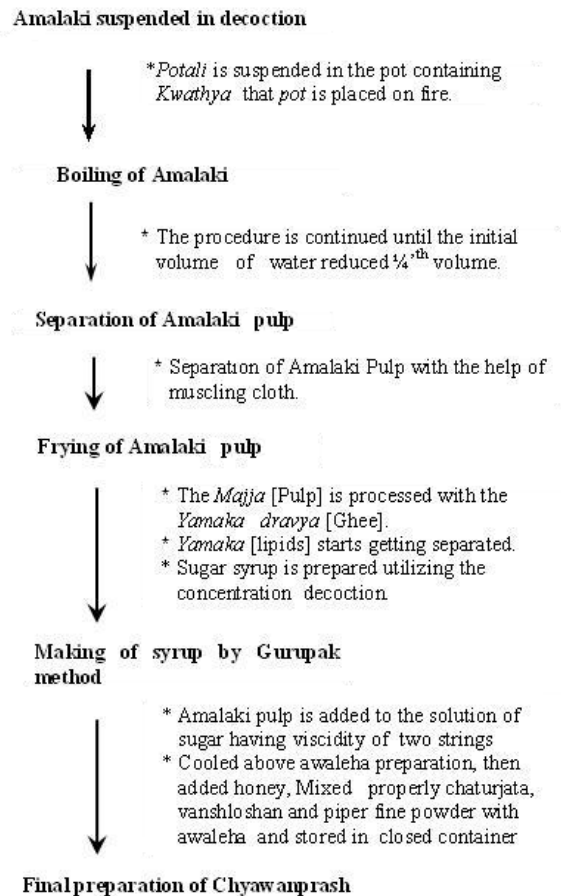
**Conclusion:** - This will help induced to come out uniform standard products, which will restore faith of product and ayurvedic system.

**Label Clams:-**

<i>Chyawanprash</i> AUTHENTIC AYURVEDA <i>Caraka Samhita special</i>	AYURVEDIC MEDICINE	ALL NATURAL
<i>Dosage: 1 or 2 teaspoonfuls, twice a day. Can be taken on bread, crackers, milk, juice or soft drink.</i>	<i>Nutrients Values:- Total Calories- 1.972 kcal /gm, Total Protein- 4.83gm/kg, Total free Tannin- 1.804 % Silica contents 0.133 % Total Acidity 0.030 % Crude Fat 0.583 % Total fibres 2.154 %,</i>	<i>Each nearly about 100 g of Chyawanprash awaleha is prepared /derived from: Dashmula churna , Kakakshi, Munakka, Guduchi, Bala, Jeevanti, vasa, Bhumyamalaki, Kachur, Nagarmotha, Mudgaparni, Mashparni, Pushkarmool, Neelkamal, Punarnava, Chandansaar, Kalaagar, Kakadsingi-0.09gm each drug Extracted with water, Barahikand, Shatawari, Vidarikand, Ashwagandha, - 1.71gm each drug Extracted with water, Pippali fine powder 1.7gm, Amlagreen 100gm, Go ka ghee 5.98gm, Sharkara 58gm, Vanshalochan 2.78gm, Honey 5.12gm, Chaturjata class fine powder 0.09gm Each.</i>
<i>Net weight : 1kg Batch no : 1B Mfd. Date: 17/03/2003 Mfd by : MNPRL, Matunga, Mumbai.</i>	<i>Container should be store in cool place.</i>	<i>Caution :</i> <i>To be taken under Medical supervision</i>
<i>Usage Precautions:- Avoid during pregnancy or nursing. This product is not suitable for Diabetic individuals</i>	<i>Best use within one year from the date of packing</i>	
<i>Uses: Anti-stress, antioxidant, Immunity support, respiratory conditions, rejuvenator.</i>		



CHART NO:1 (13):-



REFERENCES

1. G. Sreekala, The ideal Chyawanprash. *Holistic Healings* 3(6): 5-7 (2001).
2. Herbrew, Youngken, *Text Book of Pharmacy*, 6<sup>th</sup> edition, (The blakistiion Co., Toronto, 1950) pp 30.
3. V. Lad, An introduction to Ayurveda, *Alternative Therapies* 1(3): 57-63 (1995).
4. R.K. Sharma (Translator), *Caraka Samhita*, (Bhagwandas Chowkhamba Sanskrit Series Office, Varanasi, 1988) pp. 20.
5. P. Kutumbiah, *Ancient Indian Medicine*, (Orient Longman Ltd., Bombay, 1962)
6. C.K. Katiyar, M.B.Brindavanam, P.Tiwari, D.B.A. Narayana, In: S.N. Upadhyay eds. *Immunomodulatory Products from Ayurveda*. New Delhi, India: Narosa Publishing House; 163-87 (1997).
7. J.K. Ojha, H.S. Bajpai, P.V. Sharma, M.N. Khanna, P.K. Shukla and T. S. Sharma. Chyawanprash as an anabolic agent. *J Res Ind Med* 8: 11-4 (1973).
8. M. Verma and R.H. Singh. Physiological, Endocrine & Metabolic studies on the Chyawanprash. *Journal of Indian Medicine* 8(2): 1-10 (1973).
9. J.K. Jose and R. Kuttan. Hepatoprotective activity of *Emblca officinalis* and Chyawanprash. *J Ethnopharmacol.* 72(1-2): 135-40 (2000).
10. S. Ghosal S, V.K. Tripathi and S. Chauhan. Active constituents of *Emblca officinalis* Part-I. The chemistry and anti-oxidant effect of two new hydrolysable tannins Emblicanin A and B. *Indian J Chem B* 35B(9): 941-5 (1996).
11. *Pharmacopoeial Standards for Ayurvedic formulation*, C.C.R.I.M.H. 15, 87 (1976).
12. A. Bhattacharya, A. Chaterjee, S. Ghosal and S.K. Bhattacharya. Anti-oxidant activity of active tannoid principles of *Emblca officinalis*. *Indian J Exp Biol.* 37(7): 676-80 (1999).
13. J.K. Ojha, *Chyawanprash from Vedic to genomic Era*, (Chaukhamba Sanskrit Pratishthan Delhi, 2003) pp. 25-40.
14. C.J. Shishoo, S.A. Shah, I.S. Rathod and S.G. Patel. Determination of vitamin C Content of *Phyllanthus emblica* and Chyawanprash. *Indian J Pharm Sci* 5: 268-70 (1997).
15. C.J. Shishoo, S.A. Shah, I.S. Rathod and S.G. Patel. Quality assurance of Chyawanprash through determination of free radical scavenging activity. *Ind J Pharm Sci* 3: 179-81 (1998).
16. *Indian Herbal Pharmacopoeia*, (RRL (Sammu Tawi) and IDMA (Mumbai), India, 1998) pp. 67, 165.
17. Rahul P Kasar, K. S. Laddha, Jayesh Chaudhary and Anil Shukla. Development of quality control methods for polyherbal formulation, Chyawanprash. *Nat Prod Rad* 5(1): 33-41 (2006).

\*\*\*\*\*