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RESEARCH ARTICLE

Standardization of Narasimha Churna: A Poly-Herbal Formulation

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ABSTRACT

The purpose of this standardization involves the safe, proper selection and handling of crude materials, ensure efficacy and stability of finished product, and guiding the consumer about the product. With this aim the present study was designed; Narasimha churna an Ayurvedic formulation prepared from various medicinal plants which are commonly used in Cough, deficiency of semen, pain, wrinkles in the skin, graying of hair, alopecia, diabetes and anemia. The present study consists of preparation and standardization of Narasimha churna for parameters like physicochemical properties, phytochemical screening and physical properties of final formulation as per WHO guideline and the results were compared with the marketed formulation. These findings will be useful towards establishing pharmacopoeial standards for crude drugs as well as for formulation which is gaining relevance in research on traditional medicinal system.

Keywords: Narasimha churna, physicochemical parameter, phytochemical analysis, standardization

1. INTRODUCTION:

Ayurveda means the "science of life". Since ancient time a variety of pharmaceutical dosage form have been used in ayurvedic system of medicine and some of them are in practice even today [1]. Ayurveda is a time-tested, trusted worldwide plant based system of medicines and consists of various Ayurvedic formulations such as Asava, Arishta, Ghruta, Taila, Churna, Kwatha and much more. Among which churna is a fine powder consisting of a single drug or a mixture of more than one drug in a dry form [2]. The World Health Organization (WHO) has appreciated the importance of medicinal plants for public health care in developing nations and has evolved guidelines to support the member states in their efforts to formulate national policies on traditional medicine and to study their potential usefulness including evaluation, safety and efficacy [3]. Inspite of the large number of ayurvedic formulation available in the market, for many of them, Standard for their quality is yet to be laid [4]. Various marketed formulation shows dose variation, content variation and lack of standardization which affect its therapeutic activity, therefore it is imperative to establishment of quality control parameters for herbal of ayurvedic formulations which will be in alignment with modern technology [5]. Narasimha churna is one of the famous polyherbal ayurvedic churna formulation which is useful in Cough, phthisis, deficiency of semen, senility, pain, wrinkles in the skin, graying of hair, alopecia, diabetes, anemia, gout, chronic rhinitis, and diseases of skin, disease of abdomen, fistula-in-anus, dysuria and sciatica, chronic obstructive jaundice, disorder due to Vata aggravation, disorders of pitta aggravation, piles, and disorder due to kapha aggravation [6]. The formulation was stored in well closed airtight container in dry and cool place. Physicochemical properties, phytochemical screening studies have not been reported for the formulations. With this aim the current project was designed to prepare and standardized the Narasimha churna in accordance with the WHO guidelines.

2. MATERIALS AND METHODS

Plant material

The crude drugs used in preparation were purchased from the local Market, Pune, and were identified and Authenticated by Department of Pharmacognosy Marathwada Mitra Mandal's College of Pharmacy, Pune by correlating their morphological and microscopical characters with those given in literatures.

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Method of preparation of churna

All the herbal ingredients of Pharmacopoeial quality mentioned in Table 1 were washed, dried and powdered individually. The powders were completely passed through sieve number 44 and not less than 50 percent through sieve number 85. Each powdered ingredients were weighed separately, mixed together and pass through sieve number 44 to obtain a homogenous blend. At last Honey and Clarified butter from cow's milk was added to the mixture and mix thoroughly till it spreads evenly to give a moist granular powder. The final churna was stored in a ceramic jar smeared with ghee in its inner surface [6].

S.N.	Name of plant	Latin name	Part used	Quantity	Uses
1	Shatavari	*Asparagus racemosus*	Root	768 gm	Galactogogue
2	Gokshura	*Tribulus terrestris*	Fruit	768 gm	Aphrodisiac, Diuretic and Nervine
3	Varahi	*Dioscorea bulbifera*	Rhizome	960 gm	Diarrhea and Dysentery
4	Guduchi	*Tinospora cordifolia*	steam	1.20 kg	Immunomodulator
5	Bhallataka	*Semecarpus anacardium*	Fruit	1.53 kg	Leprosy and Nervous debility
6	Chitraka	*Plumbago zeylanica*	Root	480 gm	Headache, Anti-diarrheal
7	Tila	*Sesamum indicum*	Seed	768 gm	Antioxidant, Anti-cancer
8	Ardhraka	*Zingiber officinale*	Rhizome	128 gm	Colitis, Nausea, Piles
9	Maricha	*Piper nigrum*	Fruit	128 gm	Bacteriostatic and Fungistatic,
10	Pippali	*Piper longum*	Fruit	128 gm	Tonic,Useful in respiratory discomfort,
11	Sugar	----------		3.36 kg	Sweetening agent
12	Honey	----------		1.68 kg	Sweetening agent
13	Clarified butter	----------		840 gm	Moistening agent
14	Vidari kanta	*Pueraria tuberose*	Root	768 gm	Boosts immunity

Table 1: Composition of formulation of drug

Marketed samples

The marketed sample of Narasimha churna was procured of Krishna Gopal Ayurveda Bhavan, Rajasthan.

Standardization Parameters

Organoleptic Descriptions

Organoleptic evaluation was carried out to assess the color, odor and taste of the Individual drugs, In-house and marketed formulations [7].

Physicochemical Evaluation

Analysis of Physicochemical Constants of the Individual drugs, In-house formulations and marketed formulation has been done to evaluate the quality and purity of the powder drug. In physicochemical evaluation, ash value such as total ash, acid insoluble ash was evaluated. The ash value indicates the presence of inorganic salts present in the drug. The water soluble and alcohol soluble extractive values were determined [8]. The information collected from this evaluation was useful for standardization and obtaining the quality standards for crude drugs as well as for formulations. Determinations of these physicochemical constants were done as per procedures mentioned in accordance with WHO guidelines [3].

Physical characterization

The comparative account of the Physical characteristics of In-house formulation and marketed formulation were done as per pharmacopoeial procedures. The physical characteristics like moisture content, pH, Bulk density, Tap density, Angle of repose, Hausner's ratio and Carr's index indicates the flow properties as well as interparticulate resistance between powders. The information collected from this evaluation was crucial to avoid ambiguous predictions of stability or solubility of formulation [9-11].

Phytochemical evaluation

The qualitative chemical tests were carried out for the identification of nature of phyto-constituents present in the formulation [12].

3. RESULTS

The raw material used in Churna was examined for probable adulterants such as plant material of similar appearance by organoleptic and some physicochemical parameter. The result of evaluation of raw material lies within limit which is mentioned in Table 2 and Table 3. Narasimha Churna [Standard and In-house] were evaluated according to standard procedure. They were evaluated by comparative analysis for their organoleptic, Physicochemical and physical parameter.

S.N.	Name of plant	Color	Odour	Taste
1	*Asparagus racemosus*	White	Characteristics	Sweet
2	*Tribulus terrestris*	Gray	Pungent	Bitter
3	*Dioscorea bulbifera*	Yellowish	Aromatic	Bitter
4	*Tinospora cordifolia*	Greenish	Characteristic	Sweet
5	*Semecarpus anacardium*	Brown	Sweet	Sweet
6	*Plumbago zeylanica*	Brown	Slightly bitter	Bitter
7	*Sesamum indicum*	White	Characteristic	Sweet
8	*Zingiber officinale*	Yellow	Aromatic	Sweet
9	*Piper nigrum*	Black	Aromatic	Pungent
10	*Piper longum*	Green	Pungent	Pungent
11	*Pueraria tuberose*	yellow	characteristic	sweet

Table 2: Organoleptic Descriptions of individual ingredients present in Narasimha churna

S.N.	Name of plant	Extractive value %		Ash value %	
		Alcohol soluble	Water Soluble	Total	Acid insoluble
1	*Asparagus racemosus*	15.06±0.58	62.66±0.96	01.00±0.28	01.00±0.00
2	*Tribulus terrestris*	10.93±0.53	13.83±0.70	10.83±0.69	01.33±0.44
3	*Dioscorea bulbifera*	13.06±1.48	12.53±0.70	05.00±0.28	00.36±0.13
4	*Tinospora cordifolia*	17.06±0.70	15.73±2.62	07.50±0.86	04.00±0.28
5	*Semecarpus anacardium*	15.20±0.92	21.86±1.16	04.00±0.28	00.66±0.16
6	*Plumbago zeylanica*	22.40±2.01	35.33±1.41	02.16±0.44	01.50±0.28
7	*Zingiber officinale*	07.73±1.41	14.40±2.71	02.50±0.28	03.33±0.72
8	*Piper longum*	18.73±0.16	20.80±0.46	07.50±1.15	00.83±0.16
9	*Pueraria tuberose*	15.46±0.70	18.86±1.11	02.50±0.28	01.40 ±0.28

Table 3:Physicochemical evaluation of individual ingredients present in Narasimha churna

Organoleptic descriptions

The organoleptic evaluation of the crude drug was mentioned in Table 2 while the results of comparative organoleptic evaluation of both the formulation i.e. in house and marketed were mentioned in Table 4

S.N.	Formulation	Appearance	color	Odour	Taste
1	In-house	Powder	Brownish	Pleasant	Pungent
2	Standard	Powder	Brownish	Pleasent	Pungent

Table 4: Organoleptic properties of polyherbal formulation

Physicochemical evaluation

The results of physicochemical parameters of crude drugs were depicted in Table 3 and that of the formulations were mentioned in Table 5. The result of total ash value indicated the purity of drug that is the presence or absence of foreign matter such as metallic salt or silica present in the crude drug or in formulation; for In house formulation and for standard formulation the values were found to be 03.33±0.16 and 05.00±0.57 respectively while amount of acid insoluble siliceous matter present were found to be 01.46±0.26 and 01.00±0.28 respectively. The total soluble active constituents of crude drugs and of churna, in any particular solvent or mixture of solvent determined by extractive value. The alcohol soluble extractive value for In house formulation and for standard formulation was found to be 28.53±1.41 and 35.46±0.70 respectively and the water soluble extractive value was 36.00±1.38 and 47.46±1.62 respectively which signify that the large amount of constituents of churna was soluble in water than alcohol.

S. N.	Parameters	In house	Standard
1	Total ash (% w/w)	03.33±0.16	05.00±0.57
2	Acid insoluble ash (% w/w)	01.00±0.28	01.46±0.26
3	Alcohol soluble extractive value (% w/w)	28.53±1.41	35.46±0.70
4	Water soluble extractive value (% w/w)	36.00±1.38	47.46±1.62

Table 5: Physicochemical evaluation of In house and standard formulation

Physical characterization

The result of Physical Parameter of Narasimha Churna was tabulated in Table 6. Deterioration time of the churna depends upon the amount of water present in formulation. If the water content is high, the formulation can be easily deteriorated due to fungus and the moisture content of the In-house formulation and standard formulation was found to be 2.6 and 3.5 respectively which signify that the both churna was properly dried and properly stored. The pH was in the range of 3 to 5 which was in acidic range and may be because of acidic salts present in the churna. The necessary parameters like bulk density and tap density were calculated and it was found that the bulk density for In-house formulation and standard formulation was found to be 0.38±0.0017 and 0.53±0.002 respectively were as Tap density was found to be 0.56±0.0043 and 0.69±0.003 respectively. The Hausner's ratio was related to interparticulate friction and for In-house formulation and standard formulation it was found to be 1.47±0.0169 and 1.29±0.011 respectively. The percentage compressibility of In-house formulation and standard formulation was found to be 27.52±1.51 and 29.74±1.22 respectively which was responsible for property of fluid cohesive powder. The results for angle of repose shown that In-house formulation and standard formulation has medium flow properties which was 38.66^0 and 36.17^0 respectively.

S. N.	Parameters	In house	Standard
1	Loss on drying (% w/w)	2.6±0.26	3.5±0.15
2	P^H 1 % solution (% w/v)	3	3
3	P^H 10 % solution (% w/v)	5	5
4	Bulk density gm/cm^3	0.38±0.0017	0.53±0.002
5	Tapped density	0.56±0.0043	0.69±0.003
6	Hausner's ratio	1.47±0.0169	1.29±0.011
7	Carr's index (%)	27.52±1.51	29.74±1.22
8	Angle of repose	38.66^0	36.17^0

Table 6: Physical characteristics of In house and standard formulation

Phytochemical evaluation

The detail composition of churna and its activity was depending upon the major types of phytoconstituents present in the formulation which was expressed in Table 7.

Sr. N.	Parameters	In house	Standard
1	Carbohydrates	+	+
2	Amino acids	+	+
3	Glycosides	+	+
4	Flavonoids	+	+
5	Alkaloids	+	+
6	Tannins	+	+
7	Steroids	+	+

+ indicates presence; - indicates absence

Table 7: Phytochemical evaluation of In house and standard formulation

4. DISCUSSION

The organoleptic evaluation provides the simplest and quickest means to establish the identity and thereby ensure quality of a particular sample and these features are useful in judging the material in its entirety and in powder form [1, 2]. The results revealed that the crude drugs used for preparation of formulation lie within the limit which signifies their good quality and purity. Controlled incineration of churna results in an ash residue consisting of an inorganic material (metallic salt and silica). This value varies within fairly wide limits and is therefore an important parameter for the purpose of evaluation of crude drugs. Ashing involves an oxidation of the components of the product. A high ash value is indicative of contamination, substitution, adulteration or carelessness in preparing the crude drug for marketing. At higher temperature, the alkali chloride may be volatile and may be lost by this process [3, 7]. The total ash usually consists of carbonates, phosphates, silicates and silica which include both physiological ash and non-physiological ash. Acid insoluble ash particularly indicates contamination with silicious materials e.g., earth and sand, comparisons of this with the total ash value of the same sample will differentiate between contaminating materials and variations of the natural ash of the drug [7, 8]. As the ash values of the crude drugs used for formulation and the ash values of the final In House formulation and Standard formulation lies with in the fair limit which signify its quality and purity and gives idea about the total inorganic content.

Moisture is an inevitable component of crude drugs, which must be eliminated as far as practicable. The preparation of crude drug from the harvested drug plants involves cleaning or garbling to remove soil or other extraneous materials followed by drying which plays a very important role in the quality as well as purity of the material. The objectives of drying fresh material are, to aid in their preservative, to 'fix' their constituents, i.e., to check enzymatic or hydrolytic reaction that might alter the chemical composition of the drug, to facilitate subsequent comminution (grinding into a powder) and to their weight and bulk. Insufficient drying favors the spoilage by molds and bacteria and makes possible the enzymatic destruction of active principles. Not only is the ultimate dryness of the drug is important, equally important is the rate at which the moisture is removed and the condition under which it is removed. If the rate is too slow, much spoilage may occur before the drying process is completed [2, 3, 7]. The results of moisture content revealed that the crude drugs used for the preparation of in-House formulation and standard formulation were properly dried and also the rate of drying is proper, the results of the In House formulation were comparable with that of the standard formulation. The pH conventionally represents the acidity and alkalinity [7]; pH of in-house formulation and standard formulation were showing slightly acidic nature which may be because of acidic salts present with in raw materials.

Bulk characterization is necessary to avoid misleading predictions of stability or solubility which depends on a particulate flow ability of granules or powder. Bulk density and tapped density is useful for determination of packing of powders material [9, 10]. The results indicate that the bulk density and tap density of standard formulations and the in-house formulations were found to be comparable and variation was insignificant. Hausner's ratio was related to interparticulate friction and could be used to predict powder flow properties. It showed that powder with low interparticulate friction, such as coarse sphere, had ratio of approximately 1.2 whereas less free flowing powder such as flakes have Hausner's ratio greater than 1.6 [10, 11]. Hausners ratio of both formulations was signify that the both formulation have low interparticulate friction. The percentage compressibility of a powder that is Carr's index is a direct measure of a potential powder arch or bridge strength and stability. If percentage compressibility is in the range of 28-35 it show fluid cohesive powder [11], the percentage compressibility of formulations indicates that both formulations have fluid cohesive powder. Angle of repose has been indirect method of quantifying powder flow ability, because of their relationship with interparticulate cohesion. If powder have angle of repose greater than 50^0 have unsatisfactory flow properties, whereas minimum angle close to 25^0 correspond to very

good flow properties [10, 11]. so the result shown that both formulation has medium flow properties. The Phytochemical evaluation gives the information about phytoconstituents present in the formulation. Phytochemical evaluation of churna showed the presence of alkaloids, flavanoid, glycosides, tannins, Steroids type of major secondary metabolites which revealed their potent therapeutic activity [12].

5. CONCLUSION

From the present investigation various standardization parameters such as physicochemical standards, chemo profiles and safety evaluation were carried out, it can be concluded that the formulation of Narasimha churna was in accordance with the standards laid down for churna. The study shows that the contents of formulation presents within the permissible limits as per WHO, all these investigations are not specified in the standard literature such as in pharmacopoeia, which could helpful in authentication of Narasimha churna. The result of present study will may be serve as reference monograph in the preparation of drug formulation.

Conflict of Interest: None Declared

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