Research Article

Preformulation Study of Talisadi Suspension - An Herbal Formulation

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Received: 18-05-2024; **Revised:** 30-08-2024; **Accepted:** 10-09-2024; **Published on:** 15-09-2024.

ABSTRACT

Background: The preparations which are mentioned in the field of Ayurveda few of them have certain disadvantages in the oral administrations especially like *churna, Kwatha* etc. There is a need to modify and develop into newer, attractive, acceptable dosage forms as a consumer-friendly medicine with the help of modern pharmaceutical technology. This undertaken study is to develop *Talisadi churna* into suspension a Liquid dosage form. *Talisadi churna* being used by all the physicians in the management of common ailments like *kasa, shwasa* (Respiratory disorders) and Evaluate its Physico chemical properties.

Aim: To develop *Talisadi churna* into suspension a Liquid dosage form by Evaluating its physicochemical properties, Quality control parameters and HPLC.

Methods and Materials: Total four trials conducted to formulate master formula in that 4th trial which contains *Talisadi churna* at a dose of 1gm/2.5 ml and 4% gum tragacanth solution as a Suspending agent with suitable excipients are taken as master formula for the preparation of suspension.

Results: As per criteria the *Talisadi churna* shown with particle size 8 µ, With Carr's index 15.07%, Hausner's ratio 1.16 and angle of repose 26˚. *Talisadi churna* suspension shown with pH at arrange of 4.65, HPLC 89.35 µg/mL. **Conclusion:** *Talisadi churna* can be developed into *Talisadi churna* suspension without altering basic concepts of Ayurveda with the modern pharmaceutical technology. Qualitative and quantitative analytical study reveals that there is minimal variation in the properties of *Talisadi churna* compared to its suspension.

Keywords: Ayurveda, *Talisadi churna*, Suspension, Evaluation, HPLC.

INTRODUCTION

Ayurveda is recognized as the science of life from the ancient period of time and holistic system for diagnosis and treatment. Even today herbal medicines play an important role in the management if diseases. Though we are in 21st century where modern technology and scientific discoveries are ushering remarkable changes in our lives, nevertheless, the story of plants as herbal medicines definitely continues to unfold, however, quietly and independently.[1]

Bhaishajya Kalpana consists of *Panchavidha Kashaya Kalpnas* and their upakalpanas. *Churna* is a upaklpana of *Kalka Kalpana*. *Churna* is a fine powder of a completely dried drug or drugs which is filtered through the cloth.[2]

Talisadi churna is one of the most commonly used churna consisting of *Talisa (Abieswebbiana* Linn*), Maricha (Piper nigrum* Linn*), Shunthi (Zingiber officinale* Rose*), Pippali (Piper longum* Linn*), Vamshalochana (Bambosaaruninaceae* Wild*), Twak (Cinnamomum Zeylanicum* Blume*), Ela (Elettariaca cardamomum* Maton*), Khanda Sharkara (Sacrum officinarum* Linn) which is widely practiced in *Kasa, Swasa, Jwara, Chardi, Atisara, Sosa, Admana, Pliha, Grahani, and Panduroga.*[3]

Churnas are Solid dosage forms, having certain disadvantages like drugs having bitter, nauseous and unpleasant taste can't be dispensed. If *Churnas* are prepared in combination with sugar or salt, such preparations are prone to deteriorate when exposed to external atmosphere. Its dose is larger and it is difficult to swallow specially in pediatrics and it had got slow action on the body as well compared to liquids.

Suspensions are liquid dosage forms, in which solid particles are dispersed into the liquid medium. Suspensions are easy to swallow, easy to administration especially for pediatric and geriatric group. Suspensions exhibits higher rate of bioavailability and rapid onset of action than solid dosage forms, brings attractive colour, odor by masking unpleasant and bitter taste of drugs using suitable additives. Suspension is ready to use formulation.[4]

In the present study an attempt has been made to develop suspension from *Talisadi churna* to improve the patient's compliance, chemical stability of the *churna* and to fulfill the need of the consumer.

MATERIALS AND METHODS

The ingredients of the Talisadi churna is mentioned in [table 1]. The raw materials were procured from GMP Certified Ayurveda Pharmacy and authenticated in AYUSH approved Drug Testing laboratory. The preparation of *Talisadi* into suspension form done at authentified analytical lab.

Table 1: Ingredients of the *Talisadi churna* [5-12]

Sl. No	Sanskrit name	Botanical Name	Part used	quantity
1	*Talisa*	*Abieswebbiana* Linn	Leaves	1 gm
2	*Maricha*	*Piper nigrum* Linn	Dried fruits	2 gm
3	*Shunthi*	*Zingiber officinale* Rose	Rhizome	3 gm
4	*Pippali*	*Piper longum* Linn	Dried fruit	4 gm
5	*Vamshalochana*	*Bambosaaruninaceae* Wild	Sweta Pinda churna	5 gm
6	*Twak*	*Cinnamomum Zeylanicum* Blume	Stem bark	½ gm
7	*Ela*	*Elettariaca cardamomum* Maton	Seeds	½ gm
8	*Khanda sharkara*	*Sacrum officinarum* Linn	Sugar candy	32 gm

The Authentified and Quality assessed drugs are taken in required ratio as mentioned above and made into fine powder separately and sieved through clean cotton cloth (80-120 mesh).

QUALITY CONTROL PARAMETERS OF TALISADI CHURNA:

Organoleptic characters of *Talisadi churna is* analyzed by sensory profile like color, Taste, Odor and touch.

The Physico-chemical analysis of *Talisadi churna* like Bulk density, tap density, Angle of repose, Carr's index, Hausner's ratio are mentioned in [Table 3].

PREPARATION OF *TALISADI CHURNA* SUSPENSION:[13]

While preparing the Suspension Various trials are conducted to achieve the standard pharmaceutical parameters of suspension. In the present study pre formulation experiments are conducted in 4 consecutive trial to finalize the concentration of suspending agent as shown in [table 2].

Step 1: Preparation of gum tragacanth solution

100 ml of lukewarm distilled water was taken in a beaker. Then weighed quantity of gum tragacanth powder was added. By continuous stirring homogenous mixer of gum tragacanth solution was prepared.

Step 2: Semi solid preparation of *Talisadi churna* by mixing honey

60 gms of accurately weighed *Talisadi churna* was taken in a mortar, to that 50 ml of Honey was added little by little and mixed it properly to bring semisolid consistency.

Step 3: Preparation of colloidal form of suspension

Gum tragacanth solution and honey mixed semisolid form of *Talisadi churna* were mixed homogenously, finally turned to colloidal form.

Step 4: **Addition of preservatives**

Appropriate quantity of methyl and propyl paraben were added and mixed properly.

Step 5: Preparation of *Talisadi churna* suspension

Finally, 150 ml volume of *Talisadi churna* suspension was prepared and the preparation was stored in air tight container in a cool and dry place.

Table 2: Formulation of *Talisadi churna* suspension

Sl. No	Ingredient	Fabricating materials	Trial 1	Trial 2	Trial 3	Trial 4
1	*Talisadi churna*	API	60 gm	60 gm	60 gm	60 gm
2	Honey	Sweetening agent	50 ml	50 ml	50 ml	50 ml
4	Gum tragacanth	Suspending agent	1% (8.75 ml)	2% (17.5 ml)	3% (26.25 ml)	4% (35 ml)
5	Methyl paraben	Preservative	0.12 mg	0.12 mg	0.12 mg	0.12 mg
6	Propyl paraben	Preservative	0.03 mg	0.03 mg	0.03 mg	0.03 mg

Figure 1: Preparation of *Talisadi churna* suspension

RESULTS

The Organoleptic characters of all the individual raw drug and formulation are complied with the organoleptic limits of API. Which shows that Physical properties and characteristics of the drugs which show the specific identification. Talisadi churna suspension was Brown in colour, Sweet in taste and had aromatic odor.

Table 3: Physico-chemical analysis of *Talisadi churna*[14]

Parameter	Result
Tap density	0.5288 gm/ml
Bulk density	0.436 gm/ml
Carr's index	15.07%
Hausner's ratio	1.16
Angle of repose	26 degrees

Table 4: Physico-chemical analysis of *Talisadi churna* suspension

Parameter	Result
Color	Brown
Odor	Aromatic
Taste	Sweet
Consistency	Good
Fungal growth	Not seen
Sedimentation volume	0.95
pH	4.65
Viscosity	2000

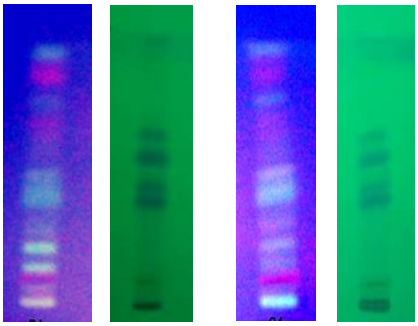
Table 5: Microbial limit test for *Talisadi churna* and *Talisadi churna* suspension[15]

Sl. No	Organism Name	*Talisadi churna*	*Talisadi churna* suspension
1	*Escherichia coli*	Absent	Absent
2	*Staphylococcus aureus*	Absent	Absent
3	*Pseudomonas aeruginosa*	Absent	Absent
4	*Salmonella ebony*	Absent	Absent

Table 6: Rf values of *Talisadi churna* and Its suspension

Drugs	Visible light	Rf short wavelength (254 nm)	Rf long wavelength (365 nm)
Talisadi churna	0.16, 0.83, 0.91	0.3, 0.48, 0.5, 0.66, 0.86, 0.9	0.15, 0.26, 0.35, 0.51, 0.58, 0.73
Talisadi churna suspension	0.16, 0.83, 0.91	0.3, 0.48, 0.5, 0.6, 0.66, 0.86, 0.9	0.15, 0.26, 0.35, 0.51, 0.58, 0.73

Figure 2: TLC study of *Talisadi churna* and Suspension[16]

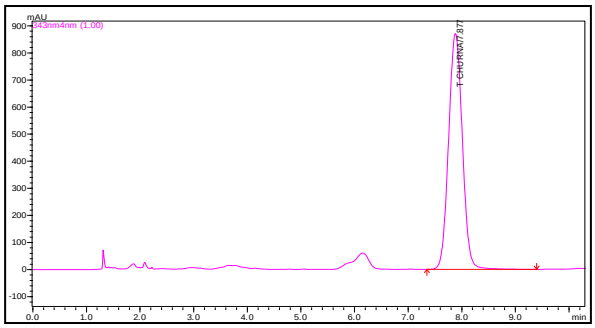


254 nm 365 nm 254 nm 365 nm

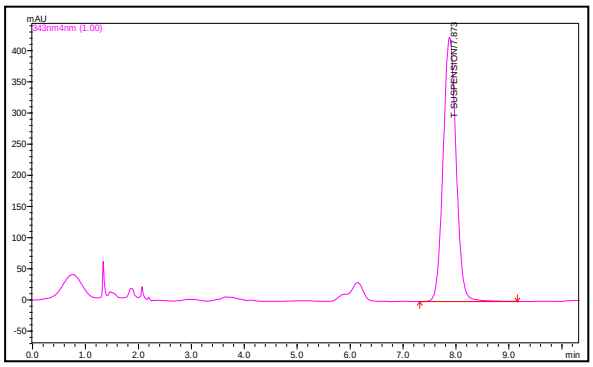
Talisadi churna ***Talisadi churna* suspension**

Table 7: Quantitative estimation of piperine in *Talisadi churna* and its suspension by HPLC[17, 18]

Drug	Piperine quantity
Talisadi churna	192.89 µG/mL
Talisadi churna suspension	89.35 µG/mL



HPLC profile of Piperine in *Talisadi churna*



HPLC profile of Piperine in *Talisadi churna* suspension

Figure 3: HPLC study of *Talisadi churna* and Suspension

DISCUSSION

Talisadi churna is an herbal formulation which is repeatedly used in the conditions of *Swasa, kasa, Jwara, Chardi* etc by the practioners, even though the *churna* is having therapeutic action but due to the administration problem in paediatric and geriatric the *churna* is modified into suspension to make customer friendly and to increase the bioavailability.

While preparing individual *Churnas* yield of the each churna is different because of the Nature of the drugs, in that compared to other drugs yield of *Shunti churna* and *Ela* is less because of presence of fibres and also the *Pippali* yield is less because of its hygroscopic nature, even after continuous pounding also it is remained as granules.

While preparing suspension various trials were conducted to get ideal suspension, for that gum tragacanth was taken as a suspending agent at the percentage of 1%, 2%, 3%, after conducting these three trials also the particles are started to sediment at the bottom of the container immediately after shaking, which means the percentage of suspending agent is used was not able to suspend the particles in the solution, to avoid this another trial was conducted by taking 4% of gum tragacanth solution by which it passed the properties of ideal suspension i.e., even after shaking container the particles are not settled down immediately, so finally this percentage along with other additives is taken as master formula for the preparation of suspension. While preparing Gum tragacanth solution Continuous stirring was done in order to prevent the formation of lump, for this Water should be lukewarm, if cold water is used the gum tragacanth will not dissolve properly, ultimately forming the lumps. Gum tragacanth is a natural suspending agent which is not altering the activity of *Talisadi churna*.

Honey is used as one of the main ingredients in the developed form of *Talisadi churna* suspension. The main reason of inclusion of honey is act as a natural preservative and helps to increase palatability and flavour to the suspension. The honey was also commonly used as an important *Anupana* in the administration of *Talisadi churna* orally.

A suspension was prepared in aqueous media it is prone to deteriorate, so to increase the stability of suspension methyl and propyl parabens were used. Both are safe and most commonly used preservatives in food and pharmaceutical industry.

Organoleptic characteristics of all the individual drugs were checked based on the *grahya laxana* for the assessment of quality. Organoleptic characteristics of all the individual drug comply with the organoleptic results of API.

Discussion on preliminary phytochemical screening:

Particle size has a major role in the uniform distribution of drug substance in a powdered formulation ensure uniformity in dose. So, it can be considered as an important physical character which ensures the stability and bioavailability, The smaller the particle size there will be greater rate of absorption, bioavailability and thereby increase the solubility of even poorly soluble drugs.[19] Drugs are taken in required ratio as mentioned above and made into fine powder separately and sieved through clean cotton cloth (80-120 mesh). Particle size of *Talisadi churna* is 8µ, but after preparation of suspension particle size is increased due to swelling index of herbal drugs.

pH value fundamentally represents the value of hydrogen ion activity in solution. It represents the acidity or alkalinity of an aqueous solution. pH of *Talisadi churna* is 6 (10% aqueous solution), whereas pH of the *Talisadi churna* suspension is 4.65 which may be because of addition of honey in the suspension as honey is having pH 4.

Thin layer chromatography is particularly valuable for the qualitative determination of small amounts of impurities. As it is effective and easy to perform and the equipment required is inexpensive, the technique is frequently used for evaluating medicinal plant materials and their preparation. TLC of *Talisadi churna* is having maximum similar spots as that of API standards values. TLC bands which are present in the *Talisadi Churnas* are similar in prepared suspension which is evident for no loss of active constituents in the prepared suspensions.

Medicinal plant materials normally carry a great number of bacteria and moulds, often originating in soil. While a large range of bacteria and fungi from the naturally occurring micro flora of herbs, aerobic spore forming bacteria frequently predominate. Current practices of harvesting, handling and production may cause additional contamination and microbial growth. The determination of Escherichia coli and moulds may indicate the quality of production and harvesting practices. When the microbial limit test was carried out for both *Talisadi churna* and its suspensions, results are complying with API limits.

Sedimentation volume plays an important role in the physical stability of the suspension. It is the ratio of ultimate volume of the sediment to the initial volume of the suspension. When the sedimentation volume is one, it is a desirable property of an ideal suspension. The sedimentation volume is maintained by adding suspending agent which helps to suspend or to avoid the sedimentation of particles at the bottom of the container in liquid media which helps to fulfil proper therapeutic dose. In general, the higher the sedimentation volume, the better is the physical stability. Normally it lies in the limit 0 to 1. Sedimentation volume of the prepared *Talisadi churna* suspension is 0.95, which is nearer to 1.

In suspension the flow properties have profound influence in the manufacture, during the storage and administration of the drugs. Evaluation of viscosity is routinely used as a quality control parameter for comparing products. *Talisadi churna* suspension was developed and evaluated for its viscosity by Brookfield viscometer. Viscosity of *Talisadi churna* suspension is 2000.

High performance liquid chromatography is a powerful tool in analysis and uses the same principles as in thin layer chromatography and column chromatography. It is basically a highly improved form of column chromatography. Instead of solvent being allowed to drip through a column under gravity, it is forced through high pressures of up to 400 atmospheres. That makes it much faster. It is also using a very much smaller particle size for the column packing material which gives a much greater surface area for interaction between the stationary phase and the molecules flowing past it. This allows a much better separation of the components of the mixture. The other major improvement over column chromatography concerns the detection methods which can be used. These methods are highly automated and extremely sensitive. The result of HPLC analysis clearly indicate the presence of *piperine* in the *Talisadi churna* is 192.89µG/mL. Where as in suspension 89.35µG/mL. i.e.in the ratio of 2.15:1(*Talisadi churna: Talisadi Churna* suspension)

CONCLUSION

Talisadi churna can be developed into *Talisadi churna* suspension without altering basic concepts of Ayurveda with the modern pharmaceutical technology. Qualitative and quantitative analytical study reveals that there is minimal variation in the properties of *Talisadi churna* compared to its suspension. The few disadvantages of *Talisadi Churna* can be over ruled by developing it in the form of its suspension (Liquid dosage) as per satisfaction of physician, Pharmacist and consumer.

Source of Support: The author(s) received no financial support for the research, authorship, and/or publication of this article

Conflict of Interest: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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