

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/385289784>

Design and development of Ayurvedic Shadanga Panaya as a comprehensible novel dosage form

Conference Paper · October 2024

CITATIONS

0

READS

192

3 authors:



Dilhan Jayathilake
University of Colombo

18 PUBLICATIONS 0 CITATIONS

SEE PROFILE



Kaumadi Karunagoda
University of Colombo

65 PUBLICATIONS 82 CITATIONS

SEE PROFILE



Jeevani Maheshika Dahanayake
University of Colombo

46 PUBLICATIONS 70 CITATIONS

SEE PROFILE



කැලණිය විශ්වවිද්‍යාලය
களனிப் பல்கலைக்கழகம்
UNIVERSITY OF KELANIYA



THE PROCEEDINGS

OF THE INTERNATIONAL CONFERENCE ON APPLIED & PURE SCIENCES ICAPS 2024

“Fostering Multidisciplinary Research Towards
Innovation, Invention and Commercialisation”



11th October 2024

Faculty of Science, University of Kelaniya, Sri Lanka



Proceedings of the
International Conference on
Applied and Pure Sciences
ICAPS 2024

Volume 4

11 October 2024

“Fostering Multidisciplinary Research towards Innovation, Invention and Commercialisation”



Faculty of Science
University of Kelaniya
Sri Lanka

Proceedings of the
International Conference on
Applied and Pure Sciences
ICAPS 2024
Volume 4

*“Fostering Multidisciplinary Research towards Innovation,
Invention and Commercialisation”*

© 2024 October

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, translated in any form or by any means, electronic or mechanical, including photocopying, recording or otherwise by any information storage or retrieval system, without prior permission in writing from the Faculty of Science, University of Kelaniya, Sri Lanka.

The materials in this publication have been supplied by the respective authors, and the views expressed remain the responsibility of the named authors. The statements and opinions stated in these publications do not necessarily represent the views of the Faculty of Science, University of Kelaniya, Sri Lanka.

ISSN 2815-0112

ISBN 978-624-5507-86-3

Editor:

Senior Prof. L. B. D. R. P. Wijesundera

Published by:
Faculty of Science
University of Kelaniya
Sri Lanka

List of Full Papers

Biological Sciences

ID	Title	Page No
BF-01	Design and development of Ayurvedic <i>Shadanga Panaya</i> as a comprehensible novel dosage form Jayathilake R. M. D., Karunagoda K. P. K. R. and Dahanayake J. M.	218
BF-02	Optimizing an extraction method to identify furosemide in human saliva for doping control analysis Alwis W. P. M., Rashani S. A. N., Perera N. T., De Silva A. P. and Fernando P. N. J.	223

Conference Paper No: BF-01

Design and development of Ayurvedic *Shadanga Panaya* as a comprehensible novel dosage form

Jayathilake R. M. D.^{1*}, Karunagoda K. P. K. R.², and Dahanayake J. M.³

¹Faculty of Indigenous Medicine, University of Colombo, Sri Lanka.

²Department of Ayurveda Surgery, ENT, Ophthalmology and Gynecology, Obstetrics and Pediatrics, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka.

³Ayurveda Pharmacology and Pharmaceutics, Faculty of Indigenous Medicine, University of Colombo, Sri Lanka.

dilhanjayathilake95@gmail.com*

Abstract

Shadanga Panaya, an Ayurvedic formulation comprising six raw materials (*Cyperus rotundus* L, *Fumaria parviflora* Lam, *Vetiveria zizanoides* L, *Santalum album* L, *Pavonia odorata* Willd, and *Zingiber officinale* Roscoe) known as Kashaya (Decoction), has diverse traditional uses, including treating fever, Pitta dosha imbalance, detoxification, dehydration conditions and COVID-19 symptoms. The lack of standardization and quality parameters, the development of a modern, comprehensible dosage form. This study aimed to achieve this by reviewing the literature, preparing it according to classical methods, and utilizing spray drying without or with Maltodextrin. The evaluation involved assessing solubility, physicochemical traits, and organoleptic properties, some essential standardization tests such as total ash (8.70%), acid insoluble ash (6.25%), water-soluble ash (10.80%), and moisture (1.25%) were calculated according to WHO-2012 guidelines. The final product, a spray-dried powder with adding only Maltodextrin without any other excipient, met Ayurvedic standards, with a pH of 6.77, refractive index of 0.4, and specific gravity of 1.10. This approach aims to enhance *Shadanga Panaya's* acceptability without compromising safety. The research team believes that with this new method and standardization process, *Shadanga Panaya* can be developed into a modern, comprehensible dosage form, potentially benefiting health in contemporary contexts.

Keywords

Ayurvedic decoction, Herbal product development, Herbal Powder, *Shadanga Panaya*, Spray dryer

Introduction

Ayurveda, meaning "knowledge of life" in Sanskrit, is an ancient system of medicine developed in India and Sri Lanka long before Hippocrates. It aims to preserve health and cure diseases by balancing the body's three doshas: Vata, Pitta, and Kapha. These doshas must be balanced for optimal health, and their imbalance defines each disease. Ayurveda uses plants, animals, minerals, spiritual aspects, and physical forces in its therapies, with over 70% of its medicines derived from plants. It emphasizes eco-friendly practices, including proper plant collection, identification, and seasonal considerations (Lloyd, 2009).

Ayurvedic products are popular today due to their minimal/no side effects and health benefits. However, Sri Lanka lacks quality, affordable, and standardized herbal products. The current circumstances have also hampered the importation of herbal medicines, underscoring the need to utilize Sri Lanka's abundant plant species for local production.

It has been used by Ayurvedic doctors to treat fever with thirst, fever caused by Pitta dosha vitiation, toxic substances removed from the blood (Raktapitta), Pitta-related fever alleviated through sweating, burning sensation throughout the body and during urination, vomiting, and

diarrhea similar to dehydration conditions. *Shadanga Panaya* has also been used to alleviate COVID-19 symptoms (Mehul et al., n.d.). Despite its long-standing use, there is a lack of standardization, leading to potential substandard quality. The study included a literature review on the method of preparation, Observation of the morphology of raw materials used, Preparation of *Shadanga Panaya* according to standard classical procedures, and development of *Shadanga Panaya* using a spray dryer process with and without the addition of a filler, [Maltodextrin (MD)] dosage form, for design and development of *Shadanga Panaya* as a comprehensible novel dosage form. Hence this study aims to develop comprehensive novel dosage form from traditional preparation, *Shadanga Panaya*.

Design and development of *Shadanga Panaya* as a powder form, the best method was selected Spray dryer process along with other drying processes considering advantages and disadvantages. Spray drying is a well-known method of particle production that comprises the transformation of a fluid material into dried particles, taking advantage of a gaseous hot drying medium, with clear advantages for the fabrication of medical devices. It is quite common for the production of microspheres and microcapsules designed for drug delivery systems (Khandelwal, 2002). This review describes the different stages of the mechanism of the spray-drying process: atomization, droplet-to-particle conversion, and particle collection (Lloyd, 2009).

In particular, this work addresses the diversity of available atomizers, the drying kinetics the importance of the configuration of the drying chamber, and the efficiency of the collection devices. The final properties of the dried products are influenced by a variety of factors, namely the spray dryer design, the feed characteristics, and the processing parameters. The impact of those variables in optimizing both the spray-drying process and the synthesis of dried particles with desirable characteristics is discussed. The scalability of this manufacturing process in obtaining dried particles on a submicron-to-micron scale favors a variety of applications within the Food, Herbal medicine, Chemical, Polymeric, Pharmaceutical, Biotechnology, and Medical industries (Baxi, Shukla, & Bhatt, 2001), (Anonymous, 2018).

Materials and methods

The experiment study was subjected to a comparison of three samples which are Ayurveda *Shadanga Panaya*, Spray dried *Shadanga Panaya* with MD, and Spray dried *Shadanga Panaya* without MD as aqueous solutions.

The dried, cleaned Ingredients were taken in one phalam/60 gm (6 gm of each). Then all the ingredients were pounded as course powder & mixed properly. After this mixture, water 3840 mL (64 phlam) was added as per Paribhasha of *Shadanga Panaya*. This mixture was heated at 80–100 °C till it became 1920 mL (32 phlam/half quantity). This liquid *Shadanga Panaya* was filtered through a clean white cotton cloth. Then it was divided into two parts (960 mL). MD (40%) was added as a filler to the hot decoction and another part was carried out without a filler. Both were stirred well and stored in autoclaved glass bottles with proper labeling at room temperature (25 °C). Within 24 hours, samples were subjected to spray drying at the Gannoruwa food research unit, and spray-dried powdered samples were stored in an air-tight sterilized container until use.

Some essential standardization procedures were conducted according to the World Health Organization (WHO)-2012 guidelines (WHO, 2012), and a comparison of solubility, physicochemical, and organoleptic properties was conducted according to the existing scholarly literature studies.

Method of the development process as a dosage form

The spray dryer process was selected for the development of *Shadanga Panaya* as powder form along with freeze dryer, Air drying, Fluidized bed drying, Vacuum drying, etc, considering advantages and disadvantages. 750 mL of *Shadanga Panaya* and 750 mL of 40% MD added *Shadanga Panaya* were subjected to a Spray drying machine separately. The inlet temperature was 125 °C, the outlet temperature was 80 °C, the pressure was 20 mmH₂O and the rpm was 4500 Hz.

Table 1. Comparative efficiency of the Spray drying process

Sample of <i>Shadanga Panaya</i> decoction	Initiate Volume (mL)	Time (Mins)	Final weight (g)
with MD*	750	42	452.40
without MD*	750	45	22.57

* The above comparative efficacy of the Spray drying process was conducted three times and mean values were provided.

The above table depicts the comparative efficiency of the Spray drying process with and without adding MD.



Figure 1. Spray dried *Shadanga Panaya* powder with MD



Figure 2. Spray dried *Shadanga Panaya* powder with MD

According to the above results in Table 1, the yield of spray dryer processes more efficacy than without adding MD. Meanwhile, the comparison observation of the nature of solubility was tabulated as per table 2.

Powdered *Shadanga Panaya* with MD dissolved in warm water was more soluble and had an eye-catching appearance as per the results in Table 2. Further, the comparison observation of organoleptic properties of *Shadanga Panaya* samples was tabled as in Table 3.

Spray-dried *Shadanga Panaya* powder with MD had better organoleptic properties than other samples of the experiment according to the results in Table 3. A comparison of the physiochemical evaluation of *Shadanga Panaya* is presented in Table 4.

Table 2. Comparison observation of the nature of solubility

Sample of powdered <i>Shadanga Panaya</i>	Soluble or not	Time	Appearance
with MD dissolved in drinking water	Fully dissolved by shaking	1min 50s	Turbid
with MD dissolved in warm water	Fully dissolved by shaking	1min 15s	Transparent
without MD dissolved in drinking water	Not Fully dissolved by shaking	3mins 56s	Dark with solid particles /mass
without MD dissolved in warm water	Not Fully dissolved by shaking	2mins 05s	Dark brownish-black with solid particles

Table 3. Comparison observation of organoleptic properties of *Shadanga Panaya* samples

Sample	Colour	Odor	Appearance
Spray dried <i>Shadanga Panaya</i> powder with MD	Whitish Creamy	No	Fine dried powder
Spray dried <i>Shadanga Panaya</i> powder without MD.	Reddish brown	Shape Characteristics	Fine dried powder
<i>Shadanga Panaya</i> Decoction	Reddish brown	Characteristics	Clear solution
Spray dried <i>Shadanga Panaya</i> powder with MD after dissolving in warm water	Light yellowish white	Slight Characteristics	Transparent clear solution
Spray dried <i>Shadanga Panaya</i> powder without MD after dissolving in warm water.	Dark brown	Shape Characteristics	Dark unpleasant liquid with particles

Table 4. Comparison of physiochemical evaluation of *Shadanga Panaya*

Physicochemical	<i>Shadanga Panaya</i> Decoction (10 mL)	Powdered <i>Shadanga Panaya</i> without MD (10 mL)	Powdered <i>Shadanga Panaya</i> with MD (10 mL)
pH	6.07	6.62	6.77
Refractive Index	0.1	1.1	1.4
Specific gravity	1.01	1.04	1.10

The above experimented powdered *Shadanga Panaya* with MD had approximately similar physiochemical measurements for the used scholarly literature. According to the WHO-2012 guidelines: the percentage of total Ash was 8.70%, the percentage of Acid Insoluble Ash was 6.25%, the percentage of water-soluble Ash was 10.80% and the moisture percentage was 1.25%.

Conclusion

Shadanga Panaya’s transformation into a spray-dried product with a filler added represents a major advancement in the modernization of conventional Ayurvedic therapy. The goal of this change is to solve the accessibility, quality, and standardization problems that have long

plagued the industry. The integrity and medicinal qualities of the original decoction are maintained by utilizing a filler that contains no additional excipients. The study emphasizes how crucial it is to keep pH criteria to guarantee both safety and efficacy. Spray drying extends *Shadanga Panaya's* shelf life and convenience while also making it easier for people to use, accept, and affordable more widely compared with the freeze dryer process. This method emphasizes the proper use of plant resources and is in line with the eco-friendly ideals of Ayurveda. The standardized *Shadanga Panaya* stands out for its ability to give health advantages without negative effects as the demand for herbal and natural goods keeps growing. Subsequent investigations and modifications will concentrate on refining the composition to fulfill all necessary criteria, ultimately supporting the more general objective of combining conventional treatments with modern medical procedures.

Acknowledgment

The authors extend their gratitude to both the Food Research unit in Gannoruwa and the laboratory staff of Pharmaceutics, Faculty of Indigenous Medicine, University of Colombo for their invaluable support for the success of the work.

References

- Lloyd, I. (2009). The energetics of health: A naturopathic assessment. Retrieved from https://openlibrary.org/books/OL23019601M/The_energetics_of_health
- Anonymous. (2018). General guidelines for drug development of Ayurvedic formulations (1st ed., Vol. I). New Delhi: Government of India, Central Council for Research in Ayurvedic Sciences, Ministry of Health & Family Welfare, Department of AYUSH.
- Khandelwal, K. R. (2002). Practical pharmacognosy - Techniques and experiments (9th ed.). Pune: Nirali Prakashan.
- Baxi, A. J., Shukla, V. J., & Bhatt, U. B. (2001). Methods of qualitative testing of some Ayurvedic formulations. Jamnagar: Gujarat Ayurved University.
- Mehul, M. D., Gohil, K. M., & Doshi, K. A. (2022). Development of tlc fingerprinting profile of shadanga paniya – an ayurvedic formulation to treat symptoms of covid-19. Research Connect. <https://rescon.jssuni.edu.in/ijhas/vol11/iss1/2/>
- WHO. (2012). Guidelines for quality standardized herbal formulations. World Health Organization.