

**INVESTIGATION OF TEMPERATURE PROFILES OF  
TRADITIONAL PUTA AND PREPARATION OF  
CHALCOPYRITE ASH FOR AYURVEDIC  
TREATMENT USING MUFFLE FURNACE**

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Degree of Master of Science

Department of Chemical & Process Engineering

University of Moratuwa

Sri Lanka

May 2016

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Thesis submitted in partial fulfillment of the requirements for the degree Master of  
Science in Sustainable Process Development

Department of Chemical & Process Engineering

University of Moratuwa

Sri Lanka

May 2016

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**DECLARATION**

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text.

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## Abstract

*Bhasmas* (ashes) are complex compound forms of metals, minerals or gemstones obtained after a series of ayurvedic pharmaceutical preparation processes; purification (*shodhana*), trituration (*bhavana*) and incineration (*marana*) in combination with various herbal extracts and other substances. These three processes play an important role in preparation of ashes. *Putra* is the specific quantum of heat required to get the desired quality ashes in the process of incineration (*marana*) and naturally available fuels like cow dung cakes are used to produce heat in the conventional *putra*. The amount of heat required to produce a specific ash is substance specific and described in terms of fuel burnt. The objectives of this research are to establish temperature profiles for *Maha Putra*, *Gaja Putra* and *Varaha Putra* and to verify temperature profile of *Varaha putra* using a muffle furnace. Temperature profiles were established using dried cow dung cakes with an average calorific value of 15.44 MJ/kg as the fuel and the maximum temperatures achieved for *Maha Putra*, *Gaja Putra* and *Varaha Putra* were 1380 °C, 1060 °C and 850 °C respectively. Then temperature profile of traditional *Varaha Putra* was matched with a muffle furnace and Chalcopyrite ash (*Swarna Makshika bhasma*) was prepared using both traditional method and electric muffle furnace. The ashes produced using both methods showed similar properties and hence the temperature profile obtained for traditional *Varaha Putra* using the muffle furnace was verified.

Key words : *Putra*, ash (*bhasma*), Chalcopyrite



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## ACKNOWLEDGEMENTS

I wish to express my deepest appreciation to my supervisors Dr.(Mrs.) S.H.P.Gunawardena, Senior Lecturer, Department of Chemical & Process Engineering, University of Moratuwa and Dr.(Mrs.) S.K.M.K.Herapathdeniya, Senior Lecturer, Institute of Indigenous Medicine, University of Colombo, for their precious and necessary advices, invaluable guidance, supervisions and offering their valuable time throughout my M.Sc. research study.

Special thanks goes to Mrs. Y.M.M.K.Ranatunge, Principal Research Engineer, NERD Center, for offering me this valuable research that she has found through the need survey conducted in the area of Indigenous Medicine.

I would like to express my sincere gratitude to Eng. D.D. Ananda Namal, Director General of NERD Centre, for granting permission and allocating funds to carry out this research and his valuable guidance to make this research success. My sincere appreciation also goes to Eng. G.K.K.A. de Silva, Deputy Director General (R&D) of NERD Centre for his guidance, encouragement and motivation provided throughout the period.

I'm also grateful to Eng. K.Y.H.D. Shantha, Director, Department of Agricultural Engineering & Post Harvest Technology, NERD Centre for providing facilities to carry out the research in the department and his valuable advices and the supervision to success this research. I would like to express my sincere appreciation to all the engineers and staff members of the Department of Agricultural Engineering & Post Harvest Technology for their heartiest corporation and support for the completion of this research successfully.

My sincere appreciation goes to all the Directors, Engineers and Scientists of the NERD Centre who provided me required facilities, support and necessary interpretations throughout the period.

I'm also grateful to Mr. Handagama, Technical Officer and staff members of Department of *Dravya Guna Vingnana*, Institute of Indigenous Medicine, Rajagiriya for their immense support, information and facilities provided me to complete this research.

---

I'm also grateful to Department of Earth Resources Engineering, University of Moratuwa, Material Technology Section, Industrial Technology Institute and Analytical Laboratory in Geological Survey & Mines Bureau for providing testing facilities and required instructions.

Finally, I must express my hearty gratitude to my dearest husband & son for their understanding & sacrifices during the research period, and without their support I would have not been able to complete my M.Sc.



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