

September 10-11, 2018
Zurich, Switzerland

A Vahed et al., J Dent Craniofac Res 2018, Volume 3
DOI: 10.21767/2576-392X-C3-008

HIBISCUS SABDARIFFA NATURAL FIBRES AS AN ALTERNATE MATERIAL IN REINFORCING ACRYLIC DENTURE BASES

A Vahed¹, S Singh¹ and K Okeke²

¹Durban University of Technology, South Africa

²Federal University of Technology, Nigeria

Natural fibres such as *Hibiscus sabdariffa* have become popular in reinforcing polymers due to their high toughness and strength. The low specific gravity, low abrasion, nontoxicity, renewability, availability, and environmentally friendly characteristics have promoted its use in the reinforcement of polymers. Despite *Hibiscus sabdariffa* being versatile and abundant, there is limited evidence of its use in Dental Technology, specifically in the reinforcement of denture base acrylics. This paper examines the hardness and wear resistance of *Hibiscus sabdariffa* fibre reinforced poly (methyl methacrylate) (PMMA) denture bases. An experimental research design within a quantitative framework was used. Two sample groups of PMMA specimens were prepared namely, the control (without fibres) and the test (7.5 weight% fibres). There were 27 PMMA specimens in each sample group. The surface hardness of the PMMA specimens (n=17 per group) were measured using a Barcol Impressor (Model GYZJ-934-1 from Barber-Colman Company). The specific wear rate was measured using a pin-on-disc set-up under ambient conditions at 200 g (n=5 per group) and 500 g (n=5 per group) fixed loads with a speed of 300 rpm for 60 seconds. Analysis of the results was obtained using a one-way ANOVA, an independent t-test and Mann Whitney test ($p < 0.05$). While there were no significant differences in the hardness value ($p < 0.707$) and the specific wear rate at 200 g load ($p < 0.156$), the specific wear rate at 500 g load ($p < 0.044$) between the two sample groups were significantly different. Results showed that mercerizing and pre-impregnating *Hibiscus sabdariffa* fibres potentially improves the wear resistance of PMMA denture bases, however, not the overall hardness. Using natural fibres to improve the mechanical properties of PMMA denture bases aligns with South Africa's national development plan, specifically in terms of using natural

resources to promote a greener and sustainable environment.

Biography

Anisa Vahed obtained her doctorate in 2014. She is a HELTASA TAU Fellow, awardee of the Vice Chancellor's Distinguished Teaching Award, DENTASA Educator of the Year Award and the HELTASA/CHE Award in Teaching Excellence. Dr Vahed is a senior lecturer/dental technologist in the Department of Dental Sciences, Faculty of Health Sciences at the Durban University of Technology. Her research interests include the teaching and supervision of both undergraduate and postgraduate research, metallographic structure of newly developed dental materials, and the teaching and learning through discipline-specific games to enable students' access to, and acquisition of, knowledge. She has delivered numerous papers, workshops and seminars on these interests in a range of national and international settings. Dr Vahed serves on the South African Dental Technicians Council, which is a Ministerial appointment.

Shalini Singh is an Associate Professor in the Department of Operations and Quality Management at the Durban University of Technology. Her qualifications are in Chemistry and Quality. She has also lectured at Universities in Switzerland, Germany and India. Shalini also serves as a moderator, examiner and supervisor at DUT and in a number of universities in South Africa and was a member of the Higher Education Quality Forum for Quality. She chaired the regional branch for the Southern African Society for Quality. Prof Singh has published posters and publications in international conferences, has several publications in accredited academic journals, and presented in Air pollution, Quality, Nanotechnology and Research Methodology related conferences nationally and internationally. She co-authored many chapters of books in Nanotechnology, Research Supervision and Work-Integrated Learning. Shalini hosts a research group focussing on quality practices in Nano-engineering material (NEM) and food security.

anisav@dut.ac.za
shalinis@dut.ac.za