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## CORROSION RESISTANCE: IMPACT OF TOOTHPASTES ON ORTHODONTIC WIRES

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The inhibition potentials of five toothpastes (Vicco, Dant Kanti, Sparkle Fresh, Emoform R and Colgate Visible White) was investigated by evaluating the corrosion behaviour of orthodontic wires made of 18 ct gold, SS 316 L, 22 ct gold, SS 18/8 and NiTi shape memory alloy immersed in artificial saliva solution containing 1% toothpaste. Linear polarization resistance, corrosion current, charge transfer resistance, double layer capacitance and impedance were utilized to evaluate the corrosion resistance and adsorption properties of the toothpaste. UV-visible absorption spectroscopy, Fourier transform infrared spectroscopy, fluorescence spectroscopy, scanning electron microscopic studies, electron dispersive X-ray spectroscopy and atomic force microscopy provided the confirmatory evidence of improved surface condition due to adsorption for the corrosion protection. The impedance measurement has shown that the change in the impedance parameters like charge transfer resistance with the addition of extract is due to the adsorption of active molecules leading to the formation of a protective layer on the surface of the orthodontic wire. NiTi shape memory alloy has shown highest percentage of inhibition efficiency ( $\eta\%$  of 98% and 97%) in the electrochemical analysis in the presence of Colgate Visible White toothpaste. Sparkle Fresh toothpaste has offered highest corrosion resistance to three of the alloys namely SS 316L, 22ct gold and SS 18/8

### Biography

Amit Chattree has graduated from the University of Allahabad in 1994 and completed his MSc in Chemistry (specialization in Analytical and Environmental Chemistry) from the University of Allahabad in 1996. He obtained first position in his Post-graduation and then he completed his PhD in Environmental Chemistry in 2002. His area of research includes environmental chemistry, corrosion chemistry and synthetic organic chemistry. Since July 2012, he is serving as an Associate Professor and the Head of the Department of Chemistry, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad. He has been in the teaching and research profession for more than 17 years. He has supervised about 28 MSc theses and at present, 8 PhD students are registered under him for their Doctoral program. He has more than 60 research publications in various peer reviewed national and international Journals. In addition to his responsibilities as the Head of the department, he is also the Member of the Editorial Board of a Journal *The Allahabad Farmer* published by the University. He is also a Referee in the *Arabian Journal of Chemistry* and the *Turkish Journal of Chemistry*. He is the Fellow of the Indian Chemical Society and a Member of the National Environmental Science Academy. He is also the Research Coordinator of the Faculty of Science, School Coordinator of the Directorate of Innovations, Patenting and Consultancy, Joint Secretary of the SHUATS Natural History Society and also a Member of the special events committee of the University. At present, he is working as a Co-Principal Investigator in a joint ISRO Project on "Assessment of Spatial and Temporal Variation of Water Quality in River Ganga using Remote Sensing Techniques".

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