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## Prediction of corrosion rates of pipeline steel in agricultural produce/hydrochloric acid corrosion system

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This preliminary investigation examines corrosion inhibition efficiencies of onion (Allium cepa) and its effects on pipeline steel in hydrochloric acid using gravimetric, gasometric and thermometric techniques. As a complimentary study, variously treated pipeline steel, exposed to natural environments were observed over several days of exposure. However, the corrosion rate of steel increased with increase in time of immersion in HCl whereas, it decreased as the concentration of the extract was increased in the corrosion system. In freely corroding state, the corrosion rates ranged from 2.15 mmpy to 1.08 mmpy in 10 M and 5 M hydrochloric acid respectively. At an inhibitor concentration of 20%, the corrosion rates decreased to  $1.3 \times 10^{-2}$ mmpy and  $2.5 \times 10^{-4}$  mmpy respectively corresponding to inhibition efficiencies of between 83% and 92%. The adsorption of active components in the extracts obeyed the Langmuir adsorption isotherm. Also, the predicted values of corrosion rates using a modified Milliams and De-Waards model agreed within a close approximation of experimental values. From examinations performed on painted steel specimens during natural exposure tests, the onion extracts dispersed in a white colored alkyd paint system preventing paint delamination over a period of 14 days.

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## Innovation at Henkel adhesives through strategic partnerships

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Henkel operates worldwide with leading brands and technologies in three business areas: Laundry and Home Care, Beauty Care and Adhesive Technologies. Founded in 1876, Henkel holds globally leading market positions both in the consumer and industrial businesses with well-known brands such as Persil, Schwarzkopf and Loctite. Our vision at Henkel is to be a global leader in brands and technologies. Innovations are the basis for successfully turning this vision into reality. Innovations are of great strategic importance for Henkel, because they provide the basis for our future business portfolio. Already today, more than 30% of our annual sales are generated by new, innovative products introduced during the preceding three years. Persil, Purex, Pril, Schwarzkopf, Dial, Fa, Loctite, Teroson, or Ceresit as varied as the brands and technologies from Henkel are, they have one thing in common that they are based on considerable know-how and innovative ideas. We are constantly at work to perfect our products and production processes, so that we can meet the needs of our customers and the consumer. During this presentation, I will present various examples of recent innovation advancements at Henkel Adhesive Technologies developed through in-house research and development activities, new innovation models and strategic partnerships.

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