Testing for Caffeine Right in the Cup

By Michael D. Shaw For millions of nervous and sleep-deprived people, the last thing they want is caffeine in their coffee, tea or cola. Although they may request decaffeinated alternatives, many can’t taste the difference and, as a result, have to wait to see if they get a caffeine buzz. That will soon change, thanks to the work of Dr. Jack Ladenson and company at Washington University School of Medicine in St. Louis. Ladenson has long been known for his work in medical diagnostics involving well-chosen antibodies. Why not, he reasoned, couldn’t he find a caffeine antibody to develop a “dipstick-style” test that can be deployed in a beverage cup? This is a clever idea especially considering that other testing methods involve UV spectroscopy, gas chromatography, high-performance liquid chromatography and a few other technologies that wouldn’t be practical for use in the home or at a restaurant. But, there’s a problem: You have to find an antibody protein that can withstand the inhospitable environment of hot coffee. It turns out that certain members of the Camelidae family (camels and llamas) produce a suitable antibody that can handle temperatures up to 90&#176C (194&#176F) because of its so-called heavy-chain-only chemical structure. Talk about your basic overkill! Ladenson used this protein to test various beverage samples, and the results compared quite favorably with high-performance liquid chromatography testing. Efforts are currently underway to package the test for consumer use. Pleasant dreams! When RFID is used in the chemical processing environment, it offers additional functionalities related to liquid products. RFID can incorporate quality measures in addition to quantity measures. Just as liquid level sensors measure quantity, various quality-related sensors, such as temperature and oxygenation monitoers that may be identified through chemical analysis or sensors may be used so that a specific product or batch of a product may be identified at any point in the operational flow.
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