COMPETITIVE EXTRACTION ROBOT AUDIT: A COMPARISON OF THE APPLIED BIOSYSTEMS™ AUTOMATE EXPRESS™, QIAGEN® EZ1® ADVANCED XL, AND THE PROMEGA MAXWELL® 16

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The DNA extraction capabilities of three medium-throughput extraction robots were evaluated. The instruments all use a similar extraction methodology that involves binding DNA to silica-coated magnetic resin in the presence of a chaotropic salt, washing of the resin to remove undesirable compounds, and elution of DNA from the resin in a low-salt solution. The AutoMate Express™ (Applied Biosystems Inc., Foster City, CA), EZ1® Advanced XL (Qiagen Inc., Valencia, CA), and Maxwell® 16 (Promega Corporation, Madison, WI) were compared using a variety of samples including: blood on swabs, blood on denim, blood on cotton, blood doped with inhibitors (a mixture of indigo, hematin, humic acid, and urban dust) on cotton, blood on FTA paper, saliva residue on cigarette butt paper, epithelial cells on cotton, semen on cotton, hair roots, bone and teeth. All extractions were performed in triplicate for each sample type and strictly according to each manufacturer's protocols. The three instruments were compared on the basis of quantity of DNA recovered (as determined by real-time PCR), relative level of inhibition present post-extraction (shown as shifts in the real-time PCR internal positive control), STR (short tandem repeat) peak heights, use of consumables not included in the extraction kits, ease of use and application flexibility. Fundamental differences were expected and observed between the DNA IQ™ and other resins due to its dual function of DNA purification and normalization. All three performed well but extraction efficiency varied by sample type and with the preprocessing protocol applied to the various samples.