

# Sample Preparation Trends 2009



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## Executive Summary

- This market report summarizes the results of HTStec's industry-wide global web-based benchmarking survey on sample preparation carried out in March 2009.
- The study was initiated by HTStec to meet the needs of the survey sponsors and was part of HTStec's ongoing tracking of emerging life science technologies and marketplaces. The main objectives were to comprehensively document current practices, preferences and trends in sample preparation instruments, extraction/purification reagents, kits and validated protocols, and to understand future user requirements. Part of the study specifically addressed magnetic-particle based sample preparation. Equal emphasis was given to soliciting opinion from all organizations types where sample preparation is currently being investigated, with no geographic bias in the distribution of persons contacted.
- The survey looked at the following aspects of sample preparation (SP) as practiced today (2009) and in some cases as predicted for the future (2011): main SP application areas; technologies/methods used in SP and future purchasing plans; main sample source; end products of DNA or RNA purification; ligands attached to base (beads or resin) used in proteomics; primary sample volume size used in SP processing; manual and automated throughput requirements in SP application areas; main downstream applications of SP and purification/reagent assay kits used; main bottlenecks; manufacturer most associated with desired product attributes; most important factors in a general SP purchasing decision; preferred ways of information gathering to support a purchasing decision; instrument and consumable budgets; use of magnetic beads; ligands attached to base magnetic beads; preferred magnetic bead source and instrument supplier; most important factors in a magnetic bead SP purchasing decision; importance placed on aspects of SP process using magnetic beads; importance of parameters in magnetic bead washing; current use of Luminex xMAP technology; interest in transitioning to magnetic xMAP beads; microplate washer requirements for use with Luminex assay technology.
- The main questionnaire consisted of 27 multi-choice questions and 1 open-ended question. In addition, there were 5 questions related solely to the administration and demographics of survey.
- The survey collected 313 responses. 40 of these responses were subsequently excluded as did not meet the initial respondent selection criteria, provided minimal input or came from vendor companies active in the area. This left 273 survey respondents that met our selection criteria (i.e. were currently undertaking or have plans to use SP in the future), provided verifiable business email addresses and gave input in a significant proportion of the questionnaire.
- Survey responses were geographically split: 46% Europe, 38% North America, 9% Asia (Excluding Japan), 4% Rest of World and 2% Japan.
- Respondents came from 195 University/Research Institute/Government Lab; 21 Biotechnology Company; 17 Hospital/Clinical Research; 13 Large Pharma; 8 Diagnostic Company; 7 Other; 4 Biochemical/Chemical Manufacturer; 3 Food & Dairy Industry; and 1 Medium-Small Pharma labs.
- Respondents main group activity was: 43% Life Science Research; 28% Basic Academic Research; 8% Molecular Diagnostics; 7% Other Activity; 5% Clinical Research; 5% Drug Discovery; 1% Applied Science; 1% Forensic Testing; and 1% Agribusiness
- Survey respondents had the following job roles or positions which were in descending order: 66 Research Scientists; 38 Post-docs; 37 Other Roles; 34 Senior Scientist/ Researcher; 29 Professor; 23 Lab Managers; 19 Section/Group Leaders; 14 Principle Investigators; 6 Directors; 5 Dept. Heads; and 2 Vice Presidents.
- Survey results were expressed as an average of all survey respondents. In addition, the data was fully reanalyzed after sub-division into the following 4 survey groups: 1) University/Research & Gov. Lab; 2) All Other Organizations; 3) Europe; and 4) North America.
- The main SP application areas under investigation were DNA (80% investigating); RNA (70%) and Protein/Peptides (68%).
- The SP technologies/methods most used today were manual spin columns (84% using), manual magnetic particle based methods (38%); and then homebrew methods (31%).
- The preferred reagent/kit vendor for the following SP technologies/methods were: Qiagen for manual spin columns; Invitrogen for manual magnetic particle based methods; No Company for homebrew methods; Other Company for automated liquid handling robots; Qiagen for automated workstations, other than magnetic particle based; and No Company for automated magnetic particle based workstations.

- The preferred instrument vendor for the following SP technologies/methods were: Qiagen for manual spin columns; Invitrogen for manual magnetic particle based methods; Qiagen for homebrew methods; Tecan for automated liquid handling robots; Qiagen for automated workstations, other than magnetic particle based; and ThermoFisher for automated magnetic particle based workstations.
- The main sample source under investigation using SP was mammalian cells.
- The main end product of DNA or RNA purification was total RNA.
- The ligand most attached to respondent's base beads or resin for proteomic SP was Protein A.
- The primary sample volume used in SP processing was 100µL–1 mL.
- A median manual throughput of 6 to 10 separations/8h day was required for DNA, RNA and sugars, and 1 to 5 separations/8h day for protein/peptides, cell isolation, cellular components and lipids.
- A median automated throughput of 101 to 200 separations/8h day was required for lipids; 21 to 100 separations/8h day for DNA, RNA and sugars; 10 to 20 separations/8h days for protein/peptides, cell isolation, and cellular components.
- The main downstream applications of SP in the following application areas were: DNA – cloning; RNA – real-time PCR; Protein/Peptides – Western blot; Cell Isolation – in vitro assays.
- Details of the purification reagents, kits & instruments used by respondents in their SP application areas are documented.
- Insufficient sample yield was rated the most limiting SP bottleneck.
- Qiagen was the most preferred SP instrument manufacturer, followed by Applied Biosystems and then Invitrogen.
- The most preferred instrument manufacturers for the following desired SP product attributes were: Qiagen for precision, reliability, throughput, value for money, low running costs and ease of integration; Applied Biosystems for sensitivity, cutting-edge technology, best after-sales support and user-friendly software; Invitrogen for best field service and application support/knowledge; and NO company for walk away solution.
- Product reliability/robustness was rated the most important factor in respondent's decision to purchase an SP instrument.
- Colleague recommendation was rated the most important info source when purchasing an SP instrument.
- Scientific articles were rated the most important info that supports a SP purchasing decision.
- Email was ranked the preferred way to receive info about a new SP instrument/development.
- The median SP CAPEX (instrument) budget was \$10K–\$25K per lab. Based on this budget the global market for SP instruments was estimated to be around \$125Million in 2009.
- The median SP consumable (reagents & kits) budget was \$5K–\$10K per lab. Based on this budget the global market for SP consumables was estimated to be around \$50Million in 2009.
- 73% of respondents were currently undertaking or considering undertaking SP with magnetic beads.
- The ligand most attached to respondent's magnetic base beads used in magnetic separation SP was Protein G.
- The preferred source for magnetic beads/magnetic bead-based assay kits and magnetic bead separation instruments was Invitrogen.
- Reliability was rated the most important factor influencing the purchase of a magnetic particle-based SP instrument.
- Result consistency was rated the most important aspect of sample processing when using magnetic particle-based approaches and the most important parameter in magnetic bead plate washing.
- 31% of those respondents using magnetic beads, were also Luminex xMAP users.
- The majority of xMAP users (44%) don't know or they are not sure if xMAP polystyrene bead-based assays will be discontinued when Luminex magnetic beads are fully available.
- The majority of xMAP users (67%) are currently not transitioning from polystyrene Luminex microspheres to the next generation Luminex magnetic beads.
- Supports 96-well plates was rated as the most important feature wanted in new microplate washer for Luminex assay technology.
- The full report provides the data, details of the breakdown of the responses for each question and the estimates for the future (2011). It also highlights a few interesting differences between the survey groups.

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## General Information on HTStec and HTStec's Trends Market Reports

- HTStec Limited an independent market research consultancy founded in September 2003 whose focus is on assisting clients delivering novel enabling platform technologies (liquid handling, laboratory automation, detection instrumentation and assay reagent technologies) to drug discovery and the life sciences. Over the past 5 years HTStec has published 41 market reports mainly on drug discovery technologies and authored 27 review articles in Drug Discovery World.
- HTStec's Trends reports owe their origins to the need by developers and vendors of new enabling technologies in drug discovery to get up-to-date relevant market metrics on which to base informed business decisions.
- Typically focused on a specific market niche or segment, in many cases overlooked or frequently misunderstood by broader market studies.
- Investigations are mainly initiated in response to a sponsor's specific requests.
- HTStec's extensive experience of the market, both as a Pharma End-User and working for a major Life Science Tool Provider ensures the industry relevance of the market research collected.
- Based entirely on web-based feedback from potential customers typically drawn mainly from Pharma and Biotech, although increasingly University and Research Institute labs are also being researched.
- Produced extremely rapidly and typically published within 3 weeks of starting the collection phase.
- Reports are short, concise and focused on giving readers the basic data, analyzed in several different ways.
- Limited to reporting the main findings alone, without exhaustive discussion on the relevance of the results.
- Market estimates are mainly based on bottom-up calculations and usually avoid attempts to forecast widely beyond the next 2-3 years. Full details on the derivation of market estimates are given so readers can apply their own factors and easily make alternative estimates if they prefer or know better.
- Owing to the sensitivity of some of the data collected, all reference to the origin of participating companies is removed, data is pooled to get an industry average and the anonymity of all respondents fully preserved and guaranteed.
- Unlike alternatives HTStec's Market Surveys and Report are aimed at giving readers, information they want and can rely on, not information they don't need, cannot easily discern or is of dubious authenticity.
- HTStec aims to be the premier global provider of highly focused market research on enabling technologies in drug discovery.
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