



2000/2001 MSPPSA SERIES

DNA AMPLIFICATION

AN ANALYSIS OF
MARKET SIZE & GROWTH
MARKET SHARE
PURCHASE PLANS &
SUPPLIER ASSESSMENT FOR
THE U.S. LIFE SCIENCE RESEARCH MARKET

A Multi-Client Report

by
PhorTech International
San Carlos, California

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I. BACKGROUND

A. SURVEY OBJECTIVES

The purpose of this survey was to provide the management of our client companies with an analysis of the current market for DNA amplification products, including the installed base of thermal cyclers and consumption of thermostable enzymes, and of the attitudes and expectations of a cross-section of researchers who utilize DNA amplification in their work.

The surveying was blind, with no reference made to any clients for the survey. To encourage respondents to express themselves freely, the survey was anonymous, and made frequent use of open-ended questions.

Several demographic screens were used to characterize respondents, including scientific discipline, type of organization and years of experience with DNA amplification.

Early on in the survey, respondents were asked whether or not they currently used PCR or other DNA amplification techniques in their work. Those respondents who answered negatively were directed to back out of the survey.

Respondents currently performing DNA amplification were then asked to indicate the size of the group that shares the most reagents and equipment. They were then queried about the total number of thermal cyclers owned by the group and the throughput in runs per month and reactions per run.

This was followed by the detailed audit question. Users were asked to itemize all thermal cyclers they owned or operated, providing the brand, model, sample capacity, quantity, year acquired, and cost for each unit beginning with the most recent purchase.

Respondents were questioned regarding their reasoning behind choosing their latest thermal cycler, whether they would choose this unit again, and if not, to provide the alternate model, or brand and model they would choose. Respondents were also asked to explain their reasoning.

They were then asked to detail desired improvements or features for future thermal cyclers and to select the highest-rated manufacturer in six key areas.

In particular, respondents were asked to choose the top-ranked supplier among seven leading thermal cycler manufacturers (or an eighth write-in choice) in the following areas: ease of use, most reliable quality, best technical and application support, innovation, value for money, and commitment to the field.

Respondents were next asked a series of questions regarding their primary nucleotide supplier, current amplification applications and the specific

thermostable enzymes used. Current usage of hot start procedures, type of PCR reaction vessels and PCR reaction volume, as well as typical values for the maximum, minimum and average magnesium concentration. Respondents were also asked to indicate the preferred format for consumables (individual reagents, master mixes or kits).

The next section consists of a detailed audit question regarding monthly thermostable enzyme consumption. Users were asked to indicate the brand(s), units per month, pack size, and price per pack for thermostable enzymes used for either cycle sequencing or other amplification. Respondents were asked why they chose these brands and whether there were any suppliers they would not buy from.

Those answering affirmatively were also asked to indicate the brand and reason why. As with thermal cyclers, they were then asked to rank eight leading thermostable enzyme suppliers in seven key areas, choosing the highest ranked supplier for best value for money, highest yield, best for long range PCR, highest specificity, highest fidelity, products for problematic PCR and ease of optimization. From a list of ten improvements, respondents were asked to identify all which were important to their current work.

All respondents were asked a question regarding the likelihood of future thermal cycler purchases over the coming 12 months, and were asked to specify which instruments and suppliers they were considering. Similarly, respondents were also queried regarding the anticipated change in thermostable enzyme consumption over the coming twelve months.

Major objectives of the survey were to estimate the present size of this market and to determine the present market share for leading companies based upon the installed base of units, to measure the market's historic growth rate, to identify the leading suppliers in terms of units placed and estimated dollar sales volume, and to segment DNA amplification users by application category.

In addition, market shares for major thermostable enzyme suppliers for cycle sequencing, and separately for other amplification would be calculated. Finally, the type of thermostable enzymes currently in use, primary nucleotide supplier and current methodology would be examined, along with the profiles of respondents most likely to purchase new instrumentation in the near term.

The audit should permit the evaluation of our clients' present market positions, identify marketing strengths and weaknesses, and suggest strategies to develop or improve sustainable competitive advantage.

This report is the second 2000/2001 study in a growing series of market research analyses that began in 1993. We plan to continue the series, adding

titles and alternating between U.S. and international markets, depending upon our clients' suggestions and support.

The 2000/2001 series will cover the following three reports:

U.S. DNA Amplification
U.S. Molecular Biology Reagent Systems, Vol. 1
Molecular Biology Reagent Systems, Vol. 1 in the Far East.

In the 1999/2000 series, we have released three reports examining the following markets. These are:

Microplate Equipment in Europe
DNA Sequencing in the U.S.
Monoclonal Antibodies in the U.S.

The following nine titles have been released in the series for 1998/1999:

Cell & Tissue Culture in the U.S.
Cytokines & Growth Factors in the U.S.
DNA Amplification in the Far East
DNA Sequencing in Europe
Electrophoretic Gel Media in Europe
HPLC in the Life Sciences in the U.S.
Molecular Biology Reagent Systems, Vol. 1
Molecular Biology Reagent Systems, Vol. 2 in the Far East
Protein Expression Systems in the U.S.

The following titles have been released in the U.S. series for 1997/8:

DNA Sequencing
Molecular Biology Reagent Systems, Vol. 1
Molecular Biology Reagent Systems, Vol. 2
Molecular Diagnostics.

Seven topics in the U.S. series were also covered in 1996/1997. These included:

Low Pressure Chromatography
Centrifugation
Protein Electrophoresis
Blotting & Hybridization
Cell Biology Reagent Systems
Densitometers & Image Analysis
Synthetic Oligonucleotides

Clients are reminded that additional copies of any of these reports that have been purchased in the past are available at a modest cost. Please contact us for further details. Those wishing to know publication dates for any of these reports, or wanting to read summaries of the 72+ reports in this series are invited to visit our Web site at: www.phortech.com.

B. SURVEY METHODOLOGY

E-mail invitations to take part in the survey were sent to a selected cross-section of life science researchers from our panel of 4,000 U.S. life science researchers. After selection for appropriate areas of interest, invitations were sent to a random selection of 2,000 U.S. members of the panel who have been in contact with us in the last year. Customized e-mail invitations to the web site survey were sent on February 10th and again on March 8th.

Each participant received an e-mail invitation including the web address of the survey and a unique validation code.

To improve response rates, respondents were able to select from a choice of five prizes for completing the survey. These were a laser pointer, a mini-Mag lite flashlight, 30 Ferrero Rocher chocolates, a \$5 gift card good towards any purchase at Barnes & Noble or a custom designed tee-shirt with a special San Francisco motif.

By the close of the survey on April 10th, 584 responses had been received. After removing duplicate responses and non-users, there were a total of 577 valid responses which translates to an 28.9% response rate. This nicely exceeded our expectations.

Apart from the prize, no inducements were employed. The questionnaires were anonymous, using a combination of tabular entry, check-offs, and open-ended probes. However, almost all respondents did identify themselves by filling in the prize entry form. This makes it possible for us to double-check the responses to any questions by telephoning respondents, improving the overall confidence in the data. We did not observe any survey fatigue in this questionnaire, and felt that respondents spent considerable time explaining their positions on the open-ended questions.

Based upon 577 responses, the overall statistical results presented in this report are accurate to within ± 4.1 percentage points at the 95% confidence level. In our experience, 95% confidence levels are appropriate primarily for scientific experiments. Most business people making decisions are content to be right more often than they are wrong. In this case, a 65% confidence level, (in which you would be right twice as often as you would be wrong) is more appropriate. Conveniently, 65% confidence levels are nearly exactly one half the size of the 95% level, thus our 65% levels would be $\pm 2.0\%$ for all respondents.

According to the binomial distribution theory, these values are valid when the measured event has about a 50% probability. When the measured event is considerably more rare than this, the corresponding confidence intervals get smaller. On the other hand, these confidence intervals are valid for answers

based upon the complete pool of respondents. When analyzing data for a group that includes only a small segment of respondents, the answers are less certain and confidence intervals are correspondingly larger.

In this report, we will calculate more exact individual confidence intervals when appropriate. In our comments, we will note whether given differences are significant at either the 65% or 95% level. To aid our clients in determining the appropriate confidence interval for various combinations of sample size and measurements, we have created the following table. Just read the closest percentage on the left and find the closest sample size column. The intersection will show the confidence interval for that combination. For example, a measured 35% value with a sample size of 200 has a 95% confidence interval of $\pm 6.6\%$.

95% Confidence Intervals for Various Percentages & Sample Sizes

Percent	n=10	n=20	n=50	n=100	n=200	n=500	n=1000
5%	$\pm 13.5\%$	$\pm 9.6\%$	$\pm 6.0\%$	$\pm 4.3\%$	$\pm 3.0\%$	$\pm 1.9\%$	$\pm 1.4\%$
10%	$\pm 18.6\%$	$\pm 13.1\%$	$\pm 8.3\%$	$\pm 5.9\%$	$\pm 4.2\%$	$\pm 2.6\%$	$\pm 1.9\%$
20%	$\pm 24.8\%$	$\pm 17.5\%$	$\pm 11.1\%$	$\pm 7.8\%$	$\pm 5.5\%$	$\pm 3.5\%$	$\pm 2.5\%$
35%	$\pm 29.6\%$	$\pm 20.9\%$	$\pm 13.2\%$	$\pm 9.3\%$	$\pm 6.6\%$	$\pm 4.2\%$	$\pm 3.0\%$
50%	$\pm 31.0\%$	$\pm 21.9\%$	$\pm 13.9\%$	$\pm 9.8\%$	$\pm 6.9\%$	$\pm 4.4\%$	$\pm 3.1\%$
65%	$\pm 29.6\%$	$\pm 20.9\%$	$\pm 13.2\%$	$\pm 9.3\%$	$\pm 6.6\%$	$\pm 4.2\%$	$\pm 3.0\%$
80%	$\pm 24.8\%$	$\pm 17.5\%$	$\pm 11.1\%$	$\pm 7.8\%$	$\pm 5.5\%$	$\pm 3.5\%$	$\pm 2.5\%$
90%	$\pm 18.6\%$	$\pm 13.1\%$	$\pm 8.3\%$	$\pm 5.9\%$	$\pm 4.2\%$	$\pm 2.6\%$	$\pm 1.9\%$
95%	$\pm 13.5\%$	$\pm 9.6\%$	$\pm 6.0\%$	$\pm 4.3\%$	$\pm 3.0\%$	$\pm 1.9\%$	$\pm 1.4\%$

