GeneTools - the essential software for accurate DNA/RNA or protein gel and blot analysis

Introduction

GeneTools software available with GeneSnap image capture software offers accurate, reproducible and quantitative analysis of numerous molecular biology based applications.

The array of GeneTools applications have been developed by Syngene from many years' experience of producing integrated imaging equipment as well as consultation and feedback given by many international scientists using Syngene systems.

Application specific analysis

Fluorescence Applications

GeneTools can be used to quantify DNA and protein on 1D gels stained with a range of fluorescent dyes. The results of any gel analysed by GeneTools is displayed in one window as a gel image alongside a histogram and tabulated data (**Figure 1**).

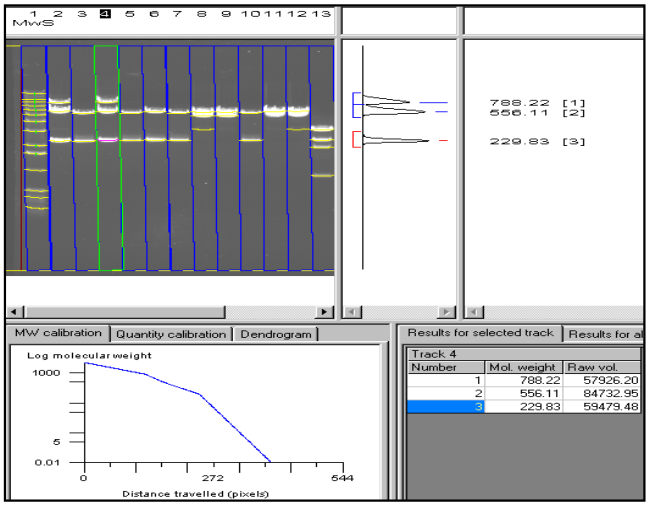

Figure 1- GeneTool analysis showing an agarose gel of DNA samples and its associated molecular weight data.

The GeneTools software effectively handles images of a agarose gels stained with the most commonly used fluorescent stains such as ethidium bromide (EtBr) and SYBR Green and techniques such as silver stained acrylamide gels and multiple gel analysis (**Figure 2**). For protein analysis GeneTools can automatically analyze commonly used protein stains such as, coomassie blue and SYPRO Ruby stained polyacrylamide gels. GeneTools software can also be used to analyze very small protein gels e.g. PhastGel from GE Healthcare, UK (**Figure 3**).

Chemiluminescent Applications

Slot and Dot Blots

GeneTools can be used to quantify the amount of DNA or protein on both chemiluminescent slot and dot blots in gridded or non-gridded formats (**Figure 3**).

Gels and Gel-based Blots

The GeneTools software can also analyze chemiluminescent samples directly from gels or when they have been transferred onto nitrocellulose or nylon membranes e.g. DNA analysis of Southern or Northern Blots and protein analysis of western blots.

Band and Spot Matching Applications

For comparing samples, GeneTools has a variety of rapid automated protein band matching methods. Users simply select a track they are interested in and using Syngene's one button click technology, any matched bands will be instantly displayed. For example, GeneTools can determine if two or more bands in a selected track match any other band on that gel according to their position, molecular weight or Rf value, thus saving a great deal of time.

GeneTools is so sophisticated that the analysis can also be extended to dot blots where the software can be set to find positive or negative results within user defined parameters.

The results of any match or score are displayed instantly in one window. The gel image appears alongside a histogram showing the track of interest overlaid in a different colour with the track selected as the matching reference track. The single analysis window of GeneTools also displays a dendrogram and comparison data with scoring being given in the form of ones and zeros.

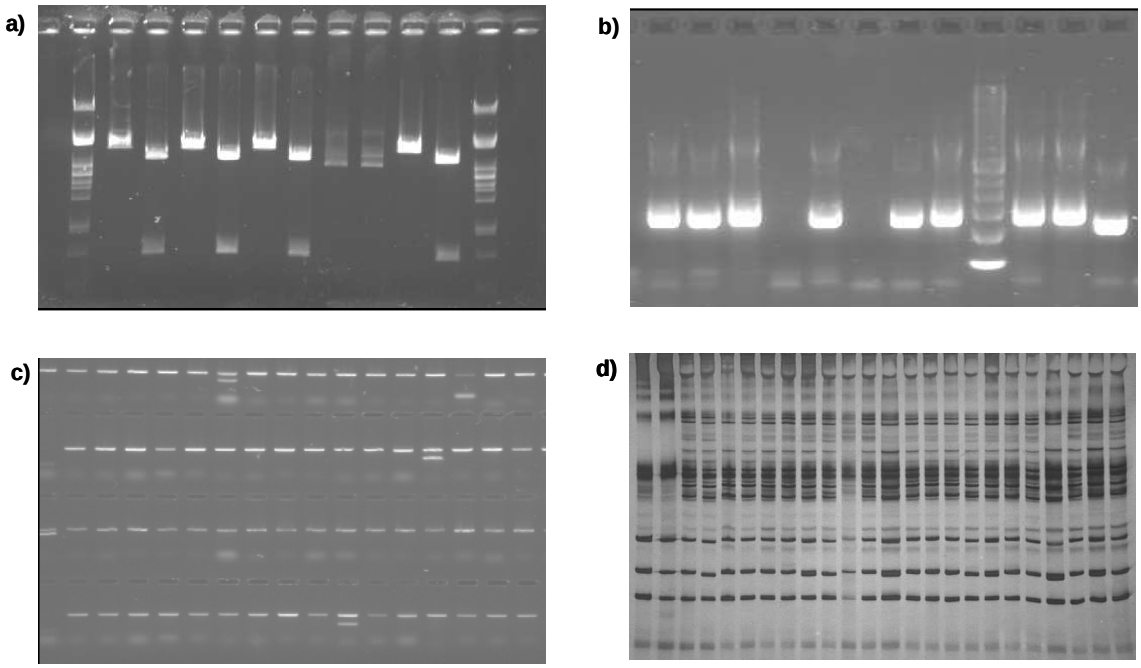

Figure 2- 1D DNA fluorescently stained gels
a) PCR products (lanes 2-11) stained with Eithidium bromide **b)** PCR products stained with SYBR Green, **c)** Agarose gel stained with ethidium bromide showing four layers (from top to bottom) of DNA samples (lanes 1-17), **d)** Silver stained acrylamide gel showing SSCP DNA bands (lanes 1-24).

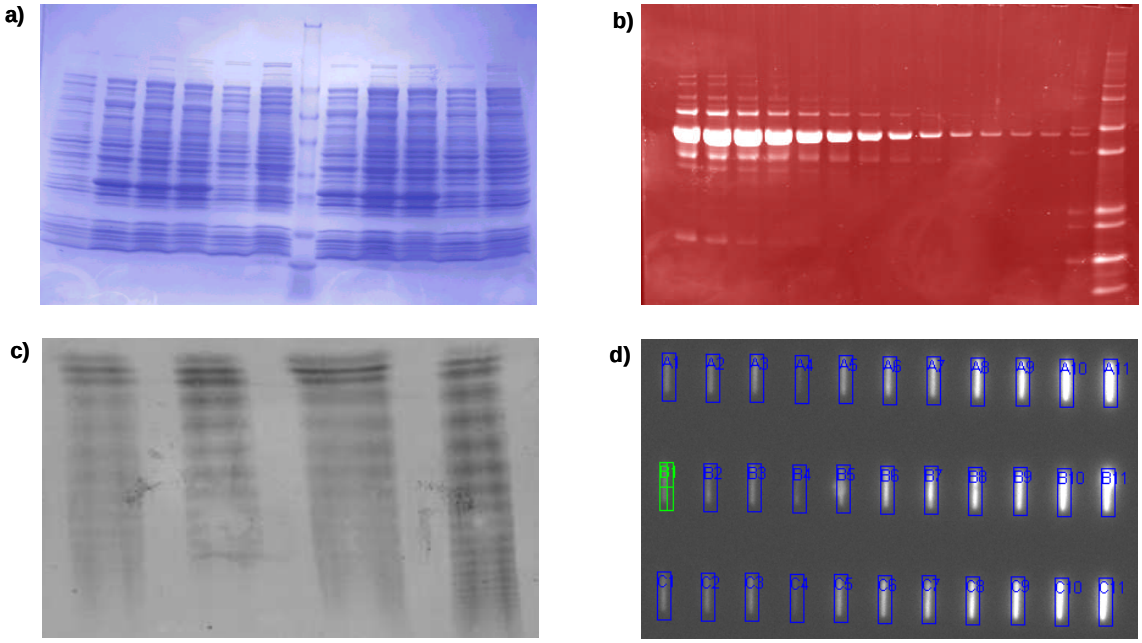

Figure 2- 1D Protein fluorescently stained gels
a) Protein (lanes 1-6 and 8-12) acrylamide gel stained with Coomassie blue **b)** SYPRO Red acrylamide gel showing protein samples (lanes 1-13), **c)** Silver stained PhastGel showing protein samples, **d)** Chemiluminescent slot blot with increasing amounts of protein (from left to right).

Conclusions

The flexibility, GLP compliance and the availability of upgrades are all factors potential users should consider when choosing image analysis software. GeneTools scores very highly in all of these areas. Since the software can produce a full analysis in less than eight seconds, it can be used for any applications where speed and accuracy are essential such as determining molecular weights or quantities of DNA or protein in a sample. Results from any analysis can be immediately transferred to Excel spreadsheets or saved as text files for archiving and use in reports.

GeneTools produces a comprehensive, GLP compliant report detailing all analysis performed on an image. The exact specifications and content of this report can be adjusted by the user. The entire report can be transferred to Word with a single mouse click. Consequently components of the report such as track histograms and results tables can easily be transferred into presentations and data summaries.

For users wanting to perform further matching, genotyping, VNTR or RFLP analysis, Syngene offers GeneDirectory. This software is fully compatible with GeneTools and can be used to create vast libraries of data for comparison and analysis.

GeneTools is so versatile that not only is it utilised for a range of DNA/RNA gel and blot applications but can also be used for colony and cell counting as well as protein gel and blot applications. Syngene also provides all GeneTools software upgrades for life, free of charge to ensure that GeneTools users will always have access to the most current application features. These benefits combined with Syngene's expert advice and assistance, makes using GeneTools an extremely attractive option for many busy molecular biology laboratories.

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