PACKAGE ID - 001355IBMPC00 MICROCHIP IMAGER V4

KWIC TITLE - Biochip Image Grid Normalization Absolute Signal Fluorescence Measurement Using

AUTHORS - Alferov, Oleg
Argonne National Lab., IL (United States)

LIMITATION CODE -COPY **AUDIENCE CODE -** LIM

COMPLETION DATE - 11/01/2000 **PUBLICATION DATE -** 11/01/2000

DESCRIPTION - This software was developed to measure absolute fluorescent intensities of gel pads on a microchip in units defined by a standard fluorescent slide. It can accomodate varying measurement conditions (e.g. exposure time, sensitivity of detector, resolution of detector, etc.) as well as fluorescent microscopes with non-uniform sensitivity across their field of view allowing the user to compare measurements done on different detectors with varying exposure times, sensitivities, and resolutions. The software is designed both to operate Roper Scientific, Inc. cameras and to use image files produced by the program supplied with that equipment for its calculations. the intensity of the gel pad signal is computed so as to reduce background influence.

PACKAGE CONTENTS - Media Directory; Software Abstract; Media Includes Source Code, Help File;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 CD Rom

METHOD OF SOLUTION - Initially the "dark frame", an exposure made under the same conditions as the measurement including exposure time, but without illumination is subtracted from all images. This reduces variation in "dark current" between CCD cameras and the fluorescent signal from ambient light. Next, the "test object", a slide the size of the usual microscope glass slide coated with a uniform fluorescent material is measured and the "dark frame" subtracted. Separate measurements are made to ensure that fluorescence from the "test object" is uniform and to measure the fluorescent response in relation to the standard slide. In step 3, the signal received from the biochip is divided by the signal from the "test object" in each individual pixel and multiplied by the "test object's" exposure time divided by the exposure time of the biochip. This ensures that the individual pixel intensities do not depend on experimental conditions. Then, in step 4, square (or rectangular or elliptical) cells are overlaid on the image to place signals from the gel pad into the cell and the mean intensity of the pixels inside the cell calculated. The mean intensity of background (i.e., nearest outside pixels) is subtracted and the result multiplied by the square of the cell. This yields the sum of

PACKAGE ID - 001355IBMPC00 MICROCHIP IMAGER V4

METHOD OF SOLUTION -(CONT) gel pad intensities without background, independent of the cell's shape or size. Finally, if the resolution of the current detector is not the same as the standard one, the grid results must be divided by the difference in magnifications because the number of pixels with signal depends on magnification, not on experimental conditions.

COMPUTER - IBM PC

OPERATING SYSTEMS - Windows 95 or higher

PROGRAMMING LANGUAGES - C++

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - A. Easy image acquistion, grid application and modification, and exporting of data to standard spreadsheet packages. B> Normalization feature allows user to measure and compare fluorescent signals acquired from different detectors under varying conditions. C. An all-in-one solution, no additional software is needed to run the MicroChip Imager. D. No installation is required.

RELATED SOFTWARE - The MicroChip Imager supersedes the ANALYSE program, written by Evgeny Dreval, Englehardt Institute of Molecular Biology, Moscow, Russia

OTHER PROG/OPER SYS INFO - The software uses files with the extension "img" to store images and normalizations.

HARDWARE REQS - Pentium II 450 or faster with mouse, a minimum of 64 Mbytes RAM and 1024X768 SVGA or better.

ABSTRACT STATUS - Released AS-IS 5/2/2001

SUBJECT CLASS CODE - Z

EDB SUBJECT CATEGORIES -
990200

SPONSOR - DOE/ER

PACKAGE TYPE - AS - IS