Acta Crystallographica Section D
Biological Crystallography
ISSN 0907-4449

new commercial products

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The Robbins® First Edition Hydra®-Plus-One Microdispenser for rapid setup of protein crystallization plates

The new Hydra-Plus-One Microdispenser is designed for rapid setup of hanging drop, sitting drop, or microbatch screens starting from a deep-well block of pre-mixed crystallization solutions and a microtube of purified protein. This instrument represents a fusion of the well tested Hydra syringe technology with the innovative NanoFill™ single-channel, non-contact pipettor.

The Hydra array of glass syringes is used to transfer crystallization solutions (and oil) 96 channels at a time in coordination with a two-position XY stage. Positive displacement pipetting ensures accurate transfer of solutions of variable viscosity without the need to calibrate each channel. Commercially available crystallization reagents containing up to 50% glycerol and 30% PEG 8000 are accurately transferred in volumes as low as 200 nl. The narrow-diameter Hydra needles (0.46 mm OD for 100 µl syringes) and accurate plate positioning ensure reliable dispensing into the droplet wells and reservoir wells of any commercially available sitting-drop plate or 1536-well plate. The fixed, washable Hydra needles also eliminate the cost of disposable pipet tips.

Conservation of protein is a vital concern in high-throughput protein crystallization. A single-channel pipettor is preferred over a multichannel pipettor because it eliminates the dead volume associated with aspirating from reservoirs or troughs and thereby reduces protein waste. Moreover, non-contact pipetting enables distribution of sample into wells already containing different solutions without washing between wells. Using helium gas pressure as a highly uniform driving force, the NanoFill micro-solenoid device dispenses as little as 200 nl of concentrated protein with CV < 5%. In coordination with the XY stage it can dispense into 96 wells in ∼1 min, which allows the plate to be finished and sealed before any appreciable evaporation can occur.

Hydra is a registered trademark of Robbins Scientific Corporation. NanoFill is a trademark of Innovadyne Technologies, Inc.

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Proven automation technology transfer to a new application

1. Protein crystallization workstation

Crystal formation is driven by vapor diffusion as the concentration gradient across mother liquor and drop makes progress towards equilibrium. Typical screens for protein crystallization consist of hundreds of mother liquors differing in chemical content. For such large numbers of samples it is helpful to work with automation liquid handling systems. CyBio already provide a proven workstation for protein crystallization. The protein crystallization workstation consists of a CyBi™-Disk system with a 96-well pipettor and an additional eight-channel pipettor, the CyBi™-DiluS.

2. Features

Features include the following.

Setups are extremely fast (2880 drops per hour, 30 microplates per hour).

The technology is proven from high-throughput screening.

It is a robust and quiet device.

It has a small footprint which fits neatly onto a laboratory bench.

There is a ten-place turntable for high flexibility and capacity.

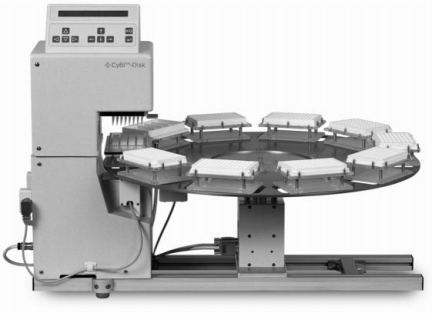
It works with all available microplates for crystallization (*e.g.* Greiner, Corning).

96-parallel pipetting is possible for high throughput.

The minimum dispensing volume is 0.5 µl.

There is high precision in drop placement to the centre of wells.

The software is user friendly.



3. Main application

A crystal screen setup of 96 drops is completed in 2 min.

Step 1: dispense 50 µl of mother liquor into reservoir. Fast 96-well parallel transfer of reagent is followed by tip washing.

Step 2: dispense 0.5 µl of protein solution into protein wells. CyBi™-Disk aspirates protein solution from v-bottom plate, containing protein stock, simultaneously from 96 wells, and finally dispenses 0.5 µl into protein well. Optionally, this step can also be handled by the eight-channel pipettor CyBi™-DiluS, configured as a second pipettor on the the turntable, thereby efficiently handling limited amounts of expensive proteins.

Step 3: add 0.5 µl of reagent from reservoir to protein drop. CyBi™-Disk aspirates mother liquor from the 96-well reservoir and delivers it to protein wells.

Step 4: manually seal plate with optically clear film.

The web address for Cybio is http://www.cybio-ag.com.

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