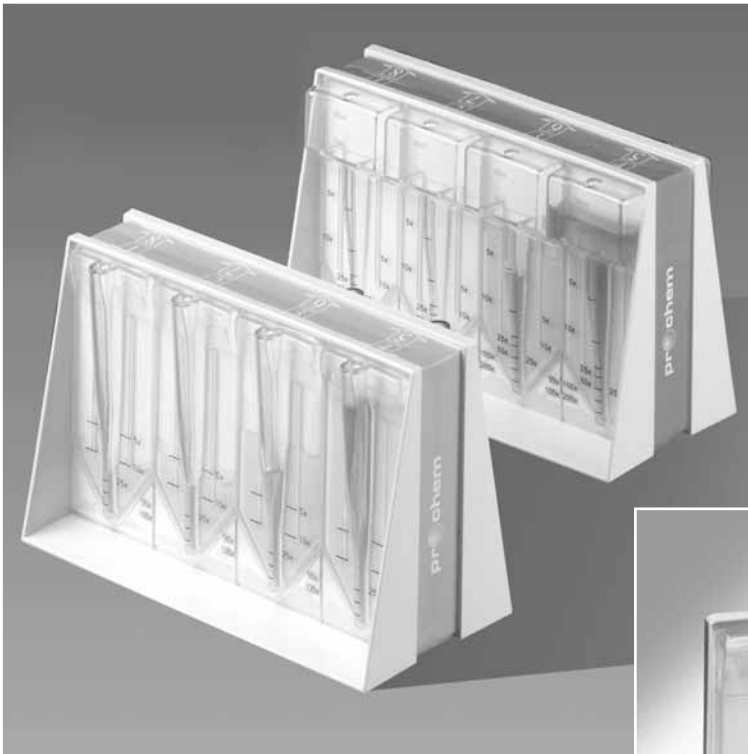


BJP

CLINICAL CONCENTRATORS



Technical Information & Operating Instructions
BJP 5, BJP 10 & BJP 20

prochem
ADVANCED PROTEIN SEPARATIONS



BJP 5, BJP 10 & BJP 20

BJP concentrators offer fast and convenient means to concentrate multiple clinical or research samples for analysis by electrophoresis or immunofixation. No set-up, minimal hands-on time, no pressure, vacuum or centrifuge required. Just add the sample, wait to concentrate, and remove the enriched material. Absorbent pulls solvent and microsolutes through the ultrafilter, concentrating the sample. An absolute deadstop pocket at the bottom of each cell prevents filtration to dryness. Typical performance is 100 x concentration in 45 to 100 minutes.

Applications

- Concentrating proteins in urine (Bence-Jones protein)
- Concentrating other clinical samples prior to electrophoresis or immunofixation
- Simple concentration of biological samples
- Improved band visualization of dilute protein solutions following electrophoresis
- Increasing sensitivity for subsequent testing of cerebrospinal fluid or other dilute body fluids (e.g., human milk, saliva, semen, tears, cervical and amniotic fluids, sputum)
- Enrichment of serum or plasma
- ELISA test enhancement for initial protein concentrations below detection limits
- Cell washing and harvesting
- Buffer exchange or desalting
- Concentrating enzymes or isoenzymes (alkaline phosphatase, lactic dehydrogenase, etc.)

Principle of Operation

BJP concentrators have eight separate sample cells and are also available in individual units. The inner surface of each cell is a membrane of selective permeability, backed by an adsorbent pad. The pad absorbs water and low molecular-weight molecules from the sample solution so that the retained components are progressively concentrated. Each unit is graduated and concentration can be estimated for any sample volume. After use, the concentrators can be disposed of easily without contamination risks by incineration or autoclaving.

Part No.	Description
BJP-5/40	Pack of five 8-test-block units (40 tests), 5 mL sample volume, 7,500 MWCO
BJP-5/30	30 individual units, 5 mL sample volume, 7,500 MWCO
BJP-5/100	100 individual units, 5 mL sample volume, 7,500 MWCO
BJP-10/40	Pack of five 8-test-block units (40 tests), 10 mL sample volume, 7,500 MWCO
BJP-10/30	30 individual units, 5-10 mL sample volume, 7,500 MWCO
BJP-10/100	100 individual units, 5-10 mL sample volume, 7,500 MWCO
BJP-20/30	30 individual units, 10-20mL sample volume, 7,500 MWCO
BJP-20/100	100 individual units, 10-20 mL sample volume, 7,500 MWCO
BJP-5/40P	Pack of five, 8-test-block units (40 tests), 5 mL sample volume, 7,500 MWCO, Inc. 40 plastic recovery pipettes
BJP-5/30P	30 individual units, 5 mL sample volume, 7,500 MWCO, Inc. 30 plastic recovery pipettes
BJP-5/100P	100 individual units, 5 mL sample volume, 7,500 MWCO, Inc. 100 plastic recovery pipettes
BJP-10/40P	Pack of five, 8-test-block units (40 tests), 5-10 mL sample volume, 7,500 MWCO, Inc. 40 plastic recovery pipettes
BJP-10/30P	30 individual units, 5-10 mL sample volume, 7,500 MWCO, Inc. 30 plastic recovery pipettes
BJP-10/100P	100 individual units, 5-10 mL sample volume, 7,500 MWCO, Inc. 100 plastic recovery pipettes
BJP-20/30P	30 individual units, 10-20 mL sample volume, 7,500 MWCO, Inc. 30 plastic recovery pipettes
BJP-20/100P	100 individual units, 10-20 mL sample volume, 7,500 MWCO, Inc. 100 plastic recovery pipettes
Part No.	Samples
BJP-SP5	BJP 5 mL sample kit (two individual units)
BJP-SP540	BJP 5/40 5 mL sample (one 5 mL 8-test unit)
BJP-SP10	BJP 5-10 mL sample kit (two individual units)
BJP-SP1040	BJP 10/40 5 mL sample (one 5-10 mL 8-test unit)
BJP-SP20	BJP 20 mL sample kit (two individual units)
Part No.	Accessories
BJPA-P500	500 Plastic recovery pipettes
BJPA-P250	250 Plastic recovery pipettes
BJPA-P100	100 Plastic recovery pipettes
BJPA-P40	40 Plastic recovery pipettes
BJPA-P30	30 Plastic recovery pipettes
BJPA-ER20	Pack of 10 Expansion Reservoirs for use with BJP-20 units
BJPA-AS	Acrylic stand for BJP individual units

Operating Tips: Improving speed of concentration:

Speed of filtration is affected by several parameters including temperature, pH and protein concentration. While BJP concentrators will provide rapid filtration in most environments, the following suggestions may be helpful in optimizing speed. Filtration speed will increase proportionally to ambient temperature. Should you require faster concentration, place the concentrator near a source of heat. An acid sample with a pH of less than 5 will take longer to concentrate than a neutral sample. Adjustment to a physiological pH will result in faster filtration.

Suspended particles will tend to foul the filter element and slow filtration speed. Prefiltration with a syringe filter will clarify the sample and result in faster filtration speed and improved analytical results following concentration. Initial protein concentration levels will have a significant effect on concentration speed. While a highly dilute sample will concentrate rapidly, once macromolecular concentration exceeds 2 % the speed of filtration will rapidly decrease. Static concentrators are not practical for concentrations above 5 %.

Recovering dry samples

BJP concentrators have an impermeable concentrate pocket (dead stop) which impedes concentration to dryness. However, if the concentrate inadvertently remains too long in the concentrator, the remaining solvent will eventually evaporate and the sample may go to dryness. Should this occur, proteins may be retrieved to solution by pipetting approximately 100 µl of buffer in and out of the concentrate pocket several times.

Following are the concentration factors for common biological solutions. Locate the starting sample volume and the graduation mark for the liquid level; then read the concentration factor in the box at the row and column intersection. To calculate volume, divide the initial volume by the concentration factor.

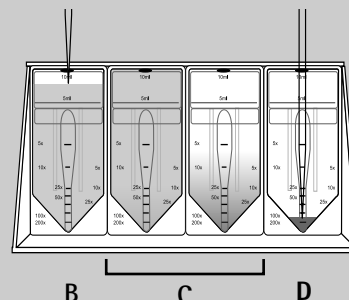
Operation: Concentrating macromolecules

A. Determine approximate sample microsolute content (for electrophoresis or immunoelectrophoresis protein concentration should be approximately 25 mg/mL)

B. Pipette sample through aperture at the top of the device. Device can be left unattended until desired concentration is achieved.

C. Solvent and micromolecules are pulled through the membrane by a high capacity absorbent, a dead stop feature prevents the sample from concentrating to dryness.

D. Once the desired volume is achieved, the concentrate is withdrawn using Pasteur, thin plastic or ger loader type pipettes. The sample is now ready for further analysis.



If you are not filling your unit to the full level, these tables will help determine the concentration factor you want to achieve. For instance, using the BJP 10, if the starting volume of the sample you are concentrating is 2.0 mL and you need to concentrate to 20X, match the 2mL starting volume at left and look across until you reach the concentration factor you need to reach (20X) and look at the top of that column. Your sample will be concentrated to 20X when it reaches the 100X graduation mark on the unit.

Concentration Factors: BJP units

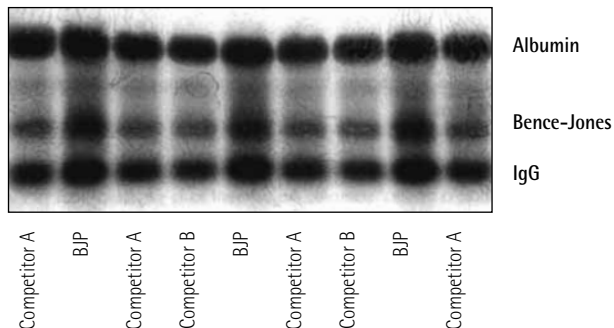
BJP 20 unit						
Start Vol.	Graduation Mark					
	5X	10X	25X	50X	100X	200X
20 mL	10X	20X	50X	100X	200X	400X
15 mL	7.5X	15X	37.5X	75X	150X	300X
10 mL	5X	10X	25X	50X	100X	200X
5 mL	2.5X	5X	12.5X	25X	50X	100X
2 mL	1X	2X	5X	10X	20X	40X

BJP 10 unit						
Start Vol.	Graduation Mark					
	5X	10X	25X	50X	100X	200X
10 mL	5X	10X	25X	50X	100X	200X
5 mL	2.5X	5X	12.5X	25X	50X	100X
2.5 mL	1.3X	2.5X	6.3X	12.5X	25X	50X
2 mL	--	2X	5X	10X	20X	40X
1.5 mL	--	1.5X	3.8X	7.5X	15X	30X
1 mL	--	--	2.5X	5X	10X	20X

BJP 5 unit					
Start Vol.	Graduation Mark				
	5X	10X	25X	50X	100X
5 mL	5X	10X	25X	50X	100X
4 mL	4X	8X	20X	40X	80X
3 mL	3X	6X	15X	30X	60X
2.5 mL	2.5X	5X	12.5X	25X	50X
2 mL	2X	4X	10X	20X	40X
1.5 mL	1.5X	3X	7.5X	15X	30X
1 mL	--	2X	5X	10X	20X

Competitive Comparisons

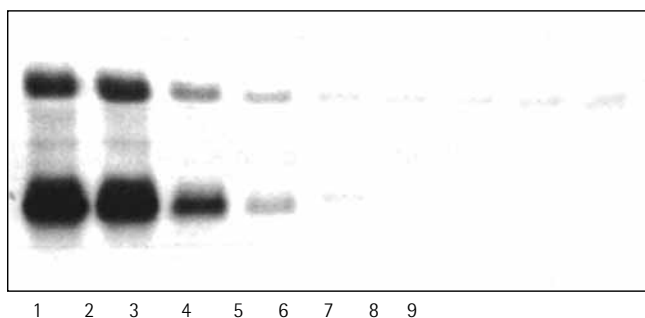
The electrophoresis plate to the right was obtained by running 5 µl aliquots from samples of a pathological urine concentrated 50 times using BJP and two competitive concentrators. The plate clearly shows the higher recovery obtainable using BJP.



Bence-Jones Protein Recovery

The electrophoresis plate to the right was obtained by running 3 µl aliquots from repeated dilutions of a urine containing Bence-Jones (free light chains) protein with a normal (healthy) urine. The table details the concentration of Bence-Jones proteins in the urines tested.

The level at which Bence-Jones proteins indicate a pathological condition is 0.06 mg/ml (Damacco). As can be seen, BJP is clearly able to recover and allow visualisation of at least 0.008 mg/ml Bence-Jones proteins - well below that required by the clinician.



Lane No.	Bence-Jones protein before concentrating
1	0.543
2	0.271
3	0.136
4	0.034
5	0.017
6	0.008
7	0.004
8	0.002
9	normal urine

Storage

BJP devices should be stored in a dry environment at 4 to 30° C.

Disposal

Used units may be incinerated or autoclaved.

Technical specifications	BJP 5	BJP 10	BJP 20
Membrane material	PES	PES	PES
Membrane MWCO	7,500	7,500	7,500
Membrane surface area	25 cm ²	25 cm ²	28 cm ²
Reservoir material	SAN	SAN	SAN
Volume range	1 - 5 ml	1 - 10 ml	2 - 20 ml *
Minimum concentrate volume	50 µl	50 µl	50 µl
	* with additional reservoir		
Overall dimensions			
Width (mm)	38	38	70
Height (mm)	100	100	100
	** dimensions for both BJP-5/40 and BJP-10/40 - length 147mm, width 70mm, height 94mm		

Typical Performance 7,500 MWCO PES	Time to concentrate 10x min. at 20° C				Concentrate recovery %		
	BJP 5	BJP 10	BJP 20	BJP 20	BJP 5	BJP 10	BJP 20
Start volume	5 ml	10 ml	10 ml	20 ml	5 ml	10 ml	10 ml
BSA (66,000 MW)	30	100	55	115	92%	92%	92%
IgG (160,000 MW)	35	110	70	160	75%	78%	78%
	Time to concentrate 50x min. at 20° C				Concentrate recovery %		
BSA (66,000 MW)	41	210	105	218	88%	90%	93%
IgG (160,000 MW)	55	130	140	290	65%	74%	74%