

Gentle, cell-sensitive pumping

Comparison of different peristaltic pump systems for use in animal cell cultures



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Aim: Gentle cell delivery
The cell vitality remains high
The cell damage remains low

Pumping application

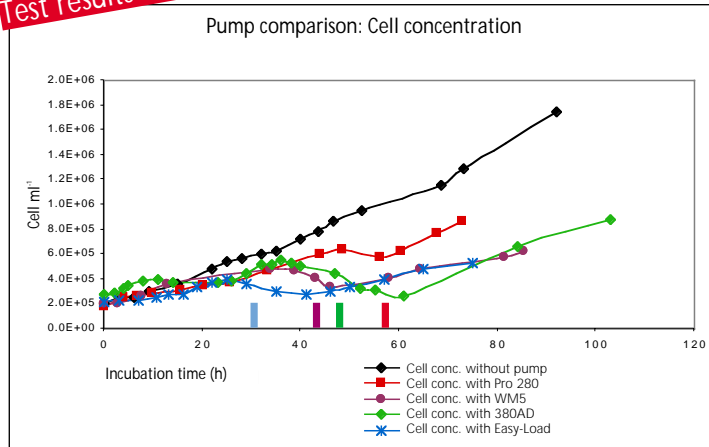
Production monitoring by analysis of by-pass cell streams and reactor inoculation.

Method

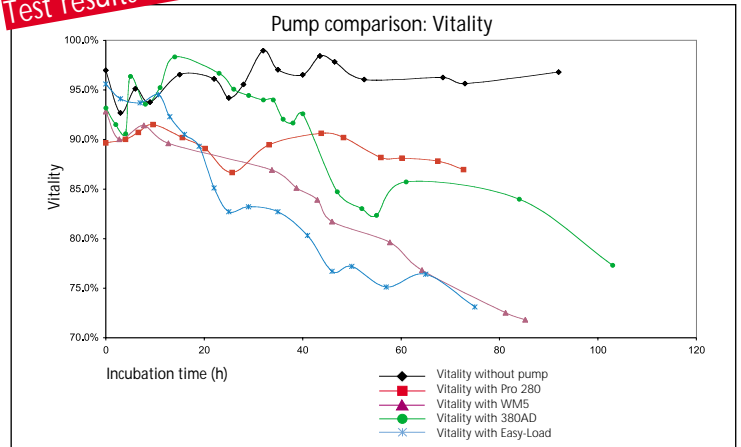
Cultivation of hybridoma cells in spinner bottles.

The cells are continuously pumped through an external loop at a constant flow rate ($1/2$ reactor volume / hour = 250 ml/h) until a identifiable cell death is observed.

Test results



Test results



In the best case we have observed cell death only after **56 hours** when using a Pro 280 pump whilst with the Easy-Load cell death was already observed after 29 hours.

In the best case with a Pro 280 pump we have a **vitality of 87%** after 56 hours, whilst with an Easy-Load we have only 72% after 29 hours.

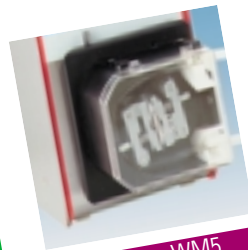
Pumps tested
(colors according to diagram)



MCP Process Pro-280
2 convex, non-spring-loaded rollers



MCP Process 380 AD
3 convex, non-spring-loaded rollers



MCP Process WM5
2 straight, spring-loaded rollers



MCP Process Easy-Load
3 straight, non-spring-loaded rollers

Comparative Parameters

- Number of pump rollers
2 vs. 3
- Rollers
spring-loaded vs. non-spring-loaded
- Tube-bed / roller geometry
convex vs. straight rollers

The secret of the Pro-280

Before the roller totally closes the squeezed tubing, **the cells can escape through a gap** towards the tubing wall and, hence, are neither «squashed» nor damaged.

The pump-head Pro-280 has 2 convex rollers and the tube-bed is concave.



Conclusion

The Pro-280 (mounted either on an MCP or BVP Process drive) is a uniquely designed pump system especially suited for use in biotechnology.

It has been tested for use in laboratory scale and small production scale up to 30 liters.

The winner MCP Process Pro-280

The gentlest pump with respect to cell vitality and cell concentration.