

Slow release hydrogel system for nutrient delivery to recombinant cell lines

EXECUTIVE SUMMARY

Slow release polymer hydrogel system to feed nutrients to cell lines for optimal selection of high protein yielding recombinant cell lines

BACKGROUND

Recombinant proteins have wide ranging applications like biotechnology, medicine, research, drug development etc. The production of recombinant protein requires constant nutrient feeding to the selected mammalian cell lines. Identifying high yielding clones through the batch mode (which is traditionally done) can skew the results and lead to sub-optimal selection of the highest yielding cell lines, hence increases the chances of failure at large scale production stage. To overcome this, a process of slow nutrient feeding is required- that mimics the fed batch mode in shake flasks (most industrial production processes use fed-batch mode)

TECHNOLOGY DESCRIPTION

Polymer hydrogel mentioned can be used for slow/extended release (ranging over a period of 2-3 days to about 2 weeks) of nutrients to desired levels that can mimic fed batch conditions and hence used to identify more reliable clones and reducing the chance of failure at large-scale culture stage. These hydrogels could be used to release various nutrients like glucose, peptides, amino acids, nucleotides, etc.

MARKET POTENTIAL

- In 2008, the global market for biologics and biotechnology drugs was estimated to be over \$125 billion*

- The recombinant therapeutic protein market was projected to mature to \$53 billion in 2010[^]
- Any method that could increase the success rate of biotech-based drug discovery process has a huge market among biotech and pharma companies and R&D organizations.

**<http://knol.google.com/k/global-biotechnology-market-review-world-top-ten-biotech-drugs-2008#-viewed 06/06/11>,
[^]<http://www.datamonitor.com/Products/Free/Report/DMHC1975/010DMHC1975.pdf-viewed 06/06/11>

VALUE/ADVANTAGES

- Nutrients of differing molecular weights (even lower) can be administered with controlled/slow/continuous release profiles
- A short 2 step formation procedure
- Non- cytotoxic; does not affect cell growth
- Sterilizable by gamma irradiation
- Usage leads to more reliable clone identification and less chance of failure at large scale culture stage

APPLICATIONS

- Nutrient delivery, especially small molecules (in solid and liquid forms) for production of recombinant proteins in conditions that could mimic fed-batch mode. For ex., glucose, peptides, amino acids, nucleotides, vitamins, protein hydrolysate
- Cell culture- where controlled/slow release of nutrients is required

TECHNOLOGY STATUS

- Demonstrated at the lab scale
- On the lookout for potential partners for spin-off and licensing

Publication: Gadgil, M. et al (2012) Controlled release of nutrients to mammalian cells cultured in shake flasks, *Biotechnology Progress*, Vol 20, Iss 1, Pg 188-195