Compacted media 4.0

The new level of convenience in handling dry powder media.

Meeting the challenges of dust reduction, solubility, and flowability

To provide you with a new level of convenience when handling dry powder media, we have compacted the powder into granules. The result: compacted media – for improved flowability, faster dissolution rate, and a cleaner work environment thanks to decreased dust.

Compaction is a granulation technology that is completely water- and additive-free, working with compression force only. In addition to minimized dust formation and less dust exposure of staff, a further advantage of our compacted media is their fixed and stable homogeneity. Our strong expertise in milling and mixing leads to excellent powder homogeneity, which is fixed in place through the compaction process.

The compaction process does not alter the media's amino acid or vitamin composition, and leaves intact the physico-chemical parameters of dissolved media and feeds, preserving the media's ability to support cell growth and productivity.

Features & Benefits

- Minimized dust formation for improved handling and cleanliness
- Less caking for better flowability
- Easier handling during dosage and mixing
- Higher density for accelerated dissolution
- Reduced bulk volume requires less storage space

Flow properties

Compacted media have excellent flow properties. Forming larger agglomerates of fine cell culture media powders (1 to 3 mm) prevents de-mixing and makes the medium flow more easily. The flow properties of powders can be addressed by determination of break energy in kJ/kg using a Revolution Powder Analyzer. The break energy represents the amount of energy needed to get dry media flowing. The reduction of break energy achieved by compaction is between 2.5 and 4.7 kJ/kg for medium and feed formulations respectively.

Dust reduction

Using compacted media also leads to significant dust reduction during the dry media handling. Analyzed by an online Aerosol Spectrometer, it was shown that the load of particles < 34 µm in the air (Figure 1) could be reduced 7- to 13-fold, leading to cleaner production spaces and less dust exposure of the staff.

Solubility

Faster dissolution rate is one of the key advantages of compacted cell culture media due to the higher density of the particles. When introduced into the liquid, compacted media settle to the impeller rather than floating on the water surface, thus accelerating dissolution. Results from endpoint turbidity measurements as well as Focused Beam Reflectance Measurement (FBRM®) analyses monitoring the particles going into solution with an online probe are summarized in table 1. An increase of dissolution rate was observed for highly concentrated formulations (80 to 120 g/L), whereas for media with lower concentrations (around 20 g/L) the effects are less obvious.

Performance

Compaction does not influence any critical media components. As growth profiles and titer measurement data confirm, there is no decrease of cell growth, viability, or antibody productivity compared to powder media (Figure 2). Also, critical quality attributes of the product remain stable, as is shown in the profile of the different glycoforms (Figure 3).

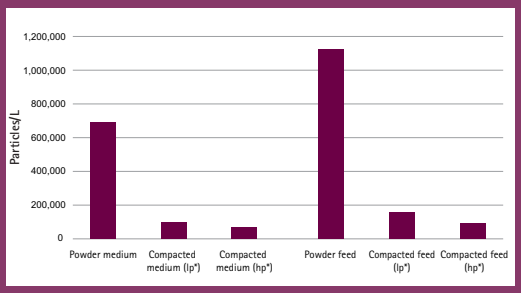

Fig. 1: Dust formation measured in particle counts per liter volume of air after pouring powder and compacted medium.

Dissolution time (min)	Sample			
	Dry powder medium	Compacted medium (hp*)	Dry powder feed	Compacted feed (hp*)
FBRM®	3	3	29	12
Turbidity	4	3	22	7

Table 1: Solubility speed of powder and compacted Cellvento™ CHO-210 medium and Cellvento™ Feed-210.

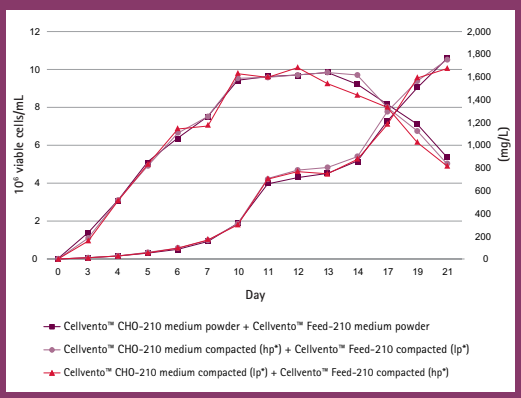

Fig. 2: Growth and titer data from fed-batch experiments using compacted feed and medium in comparison to powder components. Experiments were conducted in 30 mL medium in 50 mL shake tubes, with feeding every second day.

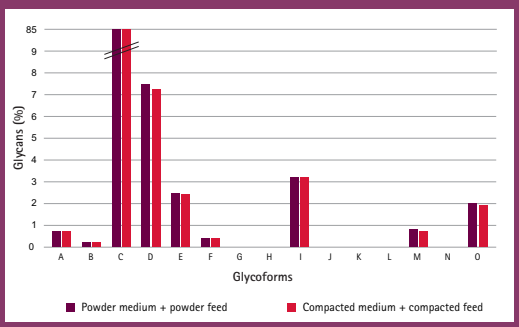

Fig. 3: Customer data on product quality from scale-down fed-batch experiments using compacted feed and medium in comparison to powder components of customer recipe.

*lp = low pressure
hp = high pressure

The typical technical data contained herein serve to generally characterize the cell culture media in industry-relevant expression systems. The product information is available separately, from the website: www.merckmillipore.com

We provide information and advice to our customers on application technologies and regulatory matters to the best of our knowledge and ability, but without obligation or liability. Existing laws and regulations are to be observed in all cases by our customers. This also applies in respect to any rights of third parties. Our information and advice do not relieve our customers of their own responsibility for checking the suitability of our products for the envisaged purpose.

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