

# Advanced Granulation Technology™ (AGT™) Media for Bioproduction



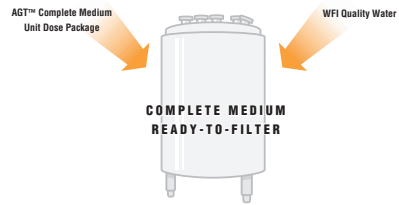
# Advanced Granulation Technology™ Media

Patented technology enables complex, chemically-defined media to be supplied in an innovative, complete, dry granular format.

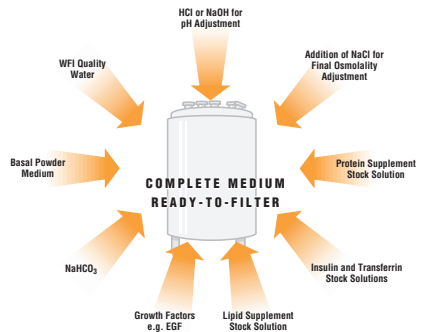
- Simplify media preparation by eliminating the need to add multiple ingredients and adjust pH and osmolality
- Reduce multiple vendor audits and qualifications
- Reduce raw material QC testing and documentation
- Improve inventory management and warehouse storage efficiency
- Decrease overall process-associated documentation and training requirements
- Minimize dust generation, reducing clean-up and possibilities for contamination
- Dissolve instantly for faster mixing time

## Media Preparation

Prep with Advanced Granulation Technology™ Media



Prep with Dry Powder Media



Prep with Liquid Media Concentrates



# Sometimes simplification is the best innovation.

Since the early 1960s, the GIBCO™ brand has been associated with breakthrough technologies for cell culture. Several of these include novel media formats that have been critical to the evolution of the process: Dry Powder Media (DPM) in 1963, Liquid Media Concentrates (LMCs) in 1992, and now—in our 40th anniversary year—innovative Advanced Granulation Technology™ (AGT™) Media.

Invitrogen's patented AGT™ process produces a new format of dry media that can streamline your process from R&D and Process Development through Production.

## **AGT™ media help speed your process and reduce total cycle cost.**

Advanced Granulation Technology™ produces media in a new, easy-to-use granular format. The technology enables the production of dry media for many complex formulations, providing a complete single-component configuration that is easy to use and scale up from research through production.

Optimally, for large-scale production, process development engineers prefer a scalable, serum-free medium in a dry format requiring minimum supplementation. AGT™ media can meet these requirements.

In addition to offering AGT™ media in a growing variety of GIBCO™ catalog formulations, we can also apply our AGT™ process to your complex custom formulation.

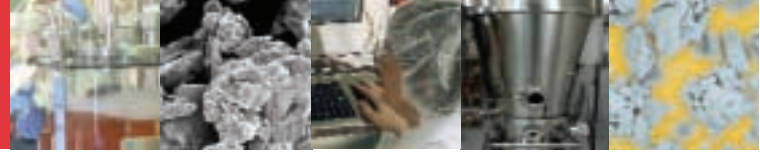
## **An alternative to liquid and powder.**

Compared to other cell culture media formats, the AGT™ format offers those involved in process development and manufacturing many advantages.

AGT™ media are complete and require no supplementation or pH adjustment. They eliminate additional procurement, dispensing, and process steps, and improve set-up in large-scale media operations.

These media can help reduce total cycle cost. The essential benefit of a complete AGT™ medium is that it provides one raw material for the user, which can decrease costs and time involved in raw material planning, procurement, and testing. Medium preparation time is also lessened, because an AGT™ medium requires no supplementation and is pH pre-adjusted. Additionally, because the granules dissolve instantly for faster mixing and produce less dust, overall medium preparation and clean up time is reduced.

AGT™ media offer significant advantages, both technical and operational, over other cell culture media formats to meet the needs and requirements of the large-scale production user.



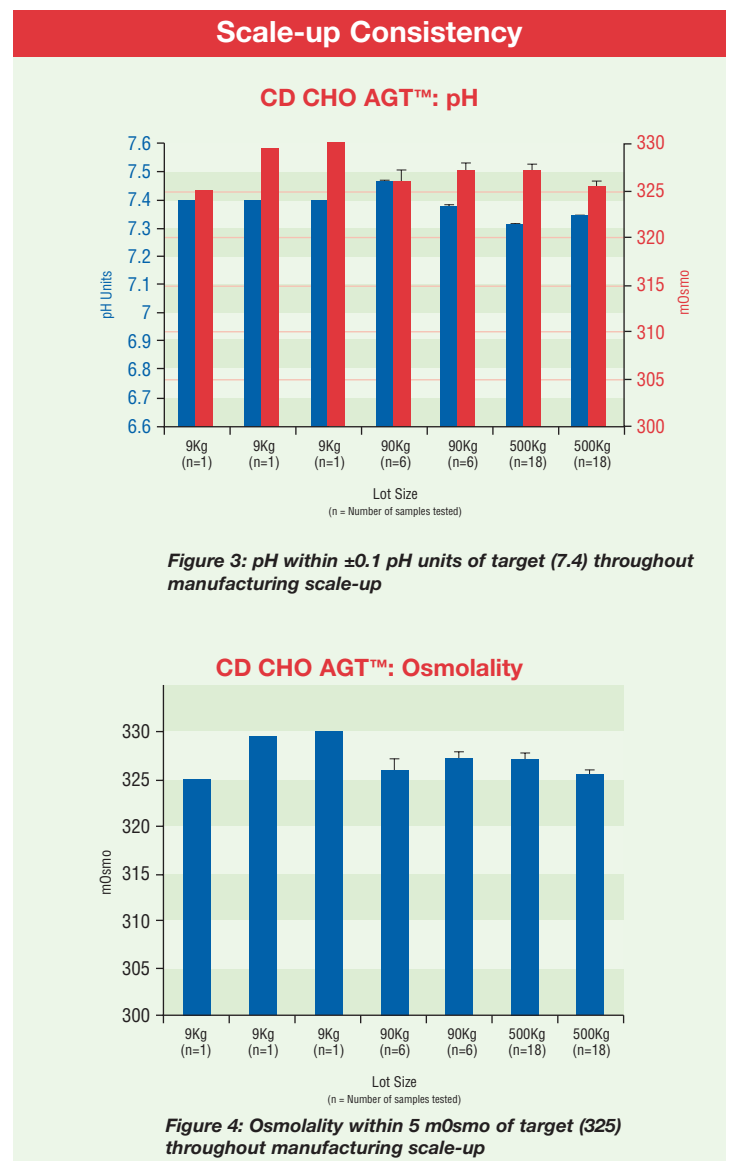
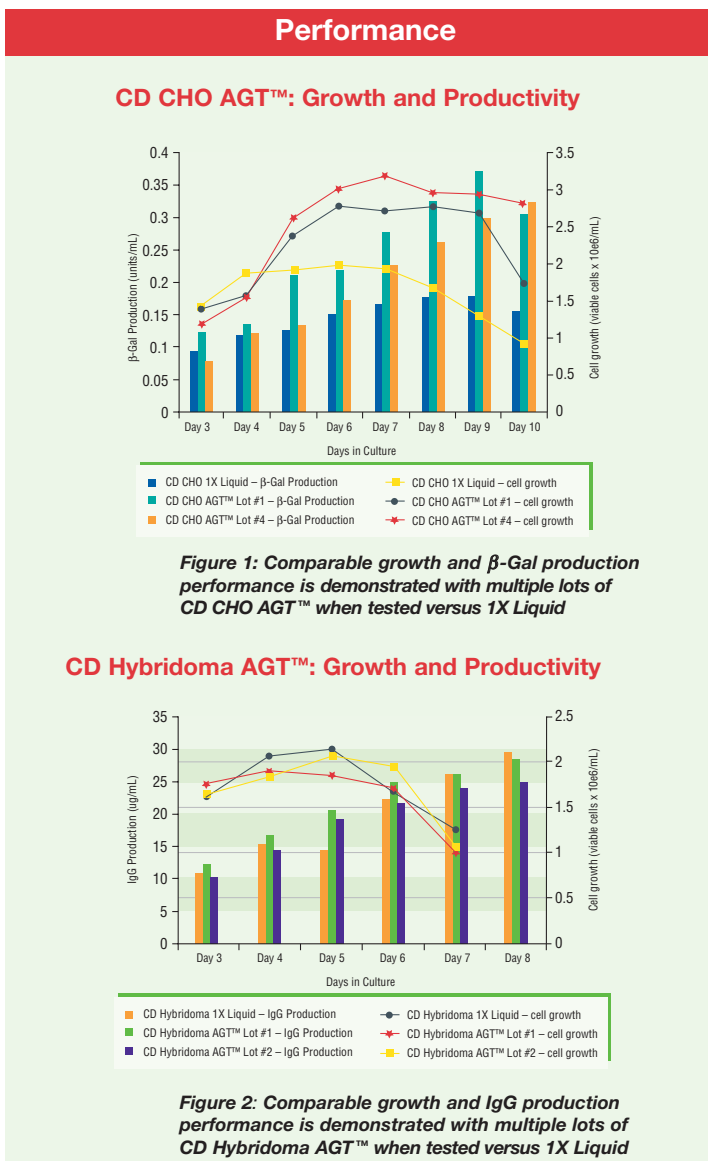
## Performance-Tested for Growth and Yield

In cell culture growth and biological production studies of Hybridomas, CHO, VERO, and HEK 293 cells, GIBCO™ specialty media derived from the AGT™ process supported equivalent performance to identical formulations produced by traditional liquid and powder processes. (See figures 1 and 2.)

## Evaluated for Scalability

AGT™ media are optimally suited to industrial-scale applications. They demonstrate scalability in characterization studies that include pH, osmolality, and homogeneity (through HPLC analysis of amino acids, vitamins, and other components). (See figures 3 through 9.)

Additionally, data from ongoing real-time stability studies demonstrate stability of serum-free media made by AGT™ to be equivalent to conventional preparation formats.



## Homogeneity

### CD CHO AGT™: Vitamins

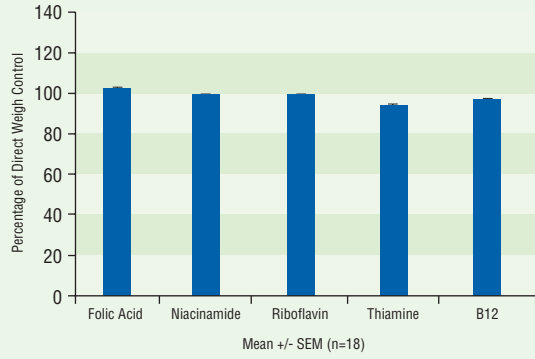


Figure 5: Vitamin concentrations were found to be within 10% of direct weigh control

### CD CHO AGT™: Amino Acids

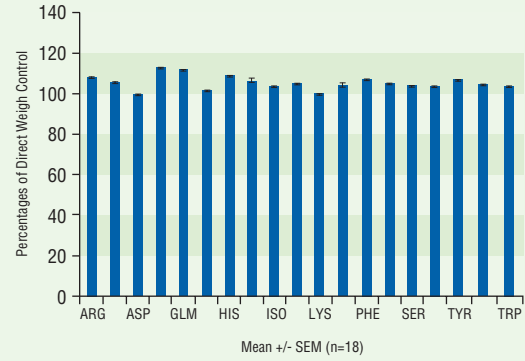


Figure 6: Amino acid concentrations from multiple intra-lot samples were found to be within 10% of direct weigh control

### Scale-up of CD CHO AGT™

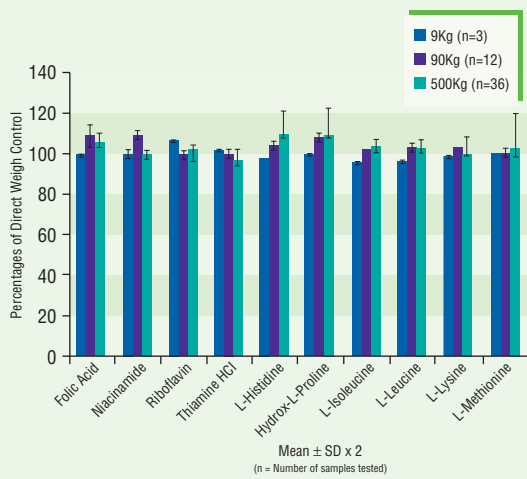


Figure 7: Vitamin and amino acid concentrations were found to be within 10% of direct weigh control throughout batch scale-up

### CD CHO AGT™: Growth

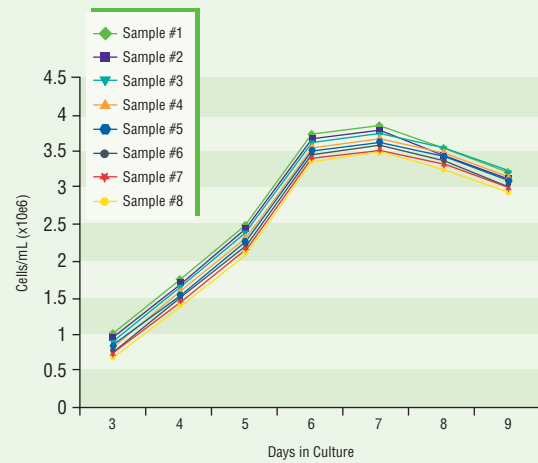


Figure 8: Multiple intra-lot samples demonstrated identical growth characteristics

### CD CHO AGT™: Productivity

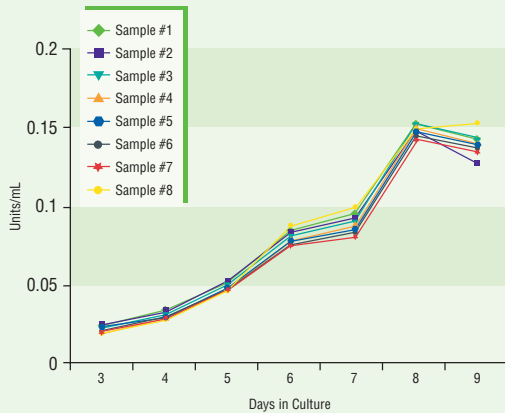
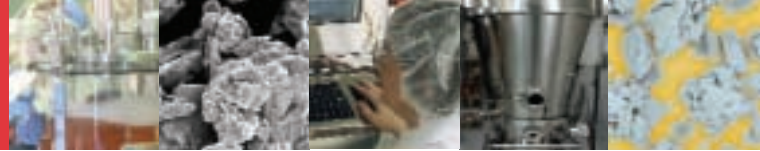


Figure 9: Multiple intra-lot samples demonstrated identical beta-Gal productivity

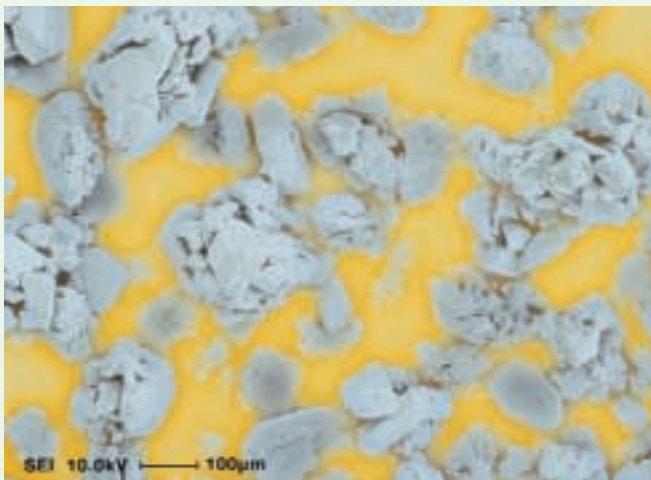


## A New Application for Fluid Bed Granulation

We use the pharmaceutical manufacturing technology of fluid bed granulation to manufacture AGT™ media. The gentle nature of fluid bed processing does not affect delicate, biologically active ingredients. This allows us to do what has never been done before: manufacture complex, serum-free, protein-free, and chemically-defined media in a dry format.

In cGMP manufacturing facilities, dry biochemicals are transferred to a fluid bed processor that suspends the powder on a column of conditioned air. The suspended powder is sprayed with a fine mist of aqueous solutions, distributing trace components homogeneously. As water is evaporated from the moistened particles, they fuse together into porous granules—a new form of free-flowing dry media, ready for hydration and immediate use.

### A Novel Granular Format with Unique Properties



**Scanning electron micrograph of GIBCO™ CD CHO AGT™ granules**  
The granules produced by the AGT™ process dissolve instantly and generate minimal dust. They comprise a free flowing dry medium that is complete and pH pre-adjusted. Reconstitution with water produces ready to use media, at target pH and osmolality.

## GIBCO™ Media Available in AGT™ Format

**Chemically-Defined (CD) Media** contain no proteins, hydrolysates, or components of unknown composition. All components have a known chemical structure, resulting in consistent product performance and the elimination of lot-to-lot performance variability.

**Protein-Free Media (PFM)** are a step closer to defined formulation as compared to serum-free. A protein-free medium may still contain undefined components of animal or plant origin (e.g., various hydrolysates that contribute low molecular weight peptides).

**Serum-Free Media (SFM)** do not require supplementation with serum, but may contain discrete proteins or bulk protein fractions. In most cases, the protein has been kept to a minimum and the medium has been optimized for a specific cell type.

**To learn how innovative AGT™ Media will improve your process, contact your Invitrogen representative for a detailed process consultation.**

*Several GIBCO™ media formulations, including those listed below, are available in the AGT™ format as standard catalog items.*

*Others are available on a make-to-order basis.*

### Ordering Information

Description	Cat. No.	Size
CD CHO AGT™	12490-017	1 X 1 L
(Add L-glutamine if required)	12490-025	1 X 10 L
CD Hybridoma AGT™	12372-025	1 X 1 L
(Add L-glutamine if required)	12372-017	1 X 10 L
VP-SFM AGT™	12559-027	1 X 1 L
(Add L-glutamine if required)	12559-019	1 X 10 L
CD 293 AGT™	12529-020	1 X 1 L
(Add L-glutamine if required)	12529-012	1 X 10 L

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*For 40 years, one name has been synonymous with quality and reliability in cell culture media, sera, and reagents worldwide.*



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These products are for research use, and where appropriate, as raw material components in further cell culture manufacturing applications. They are not intended for human or animal diagnostic, therapeutic, or other clinical uses, unless otherwise stated.

Photograph of fluid bed processor courtesy of Glatt Air Technologies, Inc., Ramsey, N.J.; electron micrograph of AGT™ granules courtesy of McGill University, Montreal, Quebec.