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SIGMA®

ProductInformation

ANTIFOAMS

Product Numbers
A6426 Antifoam 204
A8311 Antifoam 204 (autoclaved)
A5551 Antifoam 289
A8436 Antifoam 289 (autoclaved)
A5633 Antifoam A Concentrate
A5758 Antifoam A Emulsion
A5757 Antifoam B Emulsion
A8011 Antifoam C Emulsion
A6207 Antifoam 204 (molecular biology grade)
A6332 Antifoam 289 (molecular biology grade)
A6582 Antifoam A Concentrate (molecular biology grade)
A6457 Antifoam A Emulsion (molecular biology grade)
A6707 Antifoam B Emulsion (molecular biology grade)
A6832 Antifoam C Emulsion (molecular biology grade)
A8207 Antifoam O-10 (molecular biology grade)
A8082 Antifoam O-30 (molecular biology grade)
A7957 Antifoam O-60 (molecular biology grade)
A7207 Antifoam SO-25 (molecular biology grade)
A8582 Antifoam SE-15 (molecular biology grade)
A8707 Antifoam SE-35 (molecular biology grade)

Storage: RT

Product Description
Antifoams are supplied as two basic types of composition or mixtures of the two. Organic antifoams are of synthetic origin. Silicone-based antifoams are generally considered to be siloxane polymers and are also synthetic. Our suppliers generally consider the exact composition to be proprietary.
A6207, A6332, A6582, A6457, A6707, A6832, A8207, A8082, A7957, A7207, A8582, and A8707 are listed in the Molecular Biology section of the Sigma catalog and have been function - tested for use in bacterial fermentation. No significant inhibition when E. coli or B. subtilis is grown in Terrific Broth supplemented with effective concentrations of antifoams. These products have individual data sheets available upon request.

ORGANIC ANTIFOAMS

A6426 and A8311 Antifoam 204
Antifoam 204 contains 100% active components and is a mixture of organic non - silicone polypropylene based polyether dispersions. It does not contain mineral oil. Antifoam 204 can itself be considered a surfactant, but it contains no other surfactants. This product is synthetic, and not derived from animal or plant sources. Antifoam 204 can be sterilized repeatedly. The flow properties of Antifoam 204 are such that it can be pumped to a fermentor on an as-needed basis. For use in microbiological media Sigma recommends a starting concentration of between 0.005% and 0.01%. The optimal amount of antifoam required for various applications will need to be determined. Antifoam 204 is soluble in methanol, ethanol, toluene, xylene, perchloroethylene and cold water at temperatures below 15°C. It is insoluble in warm water and ethyleneglycol.

Appearance: Clear colorless viscous liquid
Density: 1.01 g/ml
Viscosity: 400 cps
Cloud Point: 18.0-21.0°C in 1% aqueous solution

A3311 is supplied autoclaved for aseptic conditions.

A8207 Antifoam O-10
Antifoam O-10 is completely organic antifoam which is dispersible in water. It can be repeatedly sterilized by autoclaving. The flow properties of Antifoam O-10 are such that it can be pumped to a fermentor on an as-needed basis.

Appearance: Amber-colored, clear liquid
Density: 0.85g/ml

A8082 Antifoam O-30
Antifoam O-30 is completely organic, fatty acid ester-type antifoam which is dispersible in water. It can be repeatedly sterilized by autoclaving. The flow properties of Antifoam O-30 are such that it can be pumped to a fermentor on an as-needed basis.

Appearance: Amber-colored, clear liquid
Density: 0.98g/ml

A7957 Antifoam O-60
Antifoam O-60 is completely organic antifoam which is insoluble in water but soluble in mineral oil, vegetable oils, alcohol, or alcohol blends. It can be repeatedly sterilized by autoclaving. The flow properties of Antifoam O-60 are such that it can be pumped to a fermentor on an as-needed basis

Appearance: Amber-colored, clear liquid
Density: 0.99 g/ml

SILICONE ANTIFOAMS

The active ingredient of the antifoams is a silicone based polymer.
These products consist of particles ranging in size from 10 to 40 microns, and can be removed by filtration.
The active compound has a molecular weight range of 3,200 to 16,500.
The silicone-type antifoams are suspensions and should be agitated before a sample is taken from the container to insure representative sampling. In order to remove traces of these types of antifoam from glassware, wash the glassware in hot soapy water followed by an alcohol (isopropanol) wash or bleach.
Autoclaving may result in phase separation, and may require remixing the emulsion.
A different emulsifier is present in each of the Antifoam emulsions. Antifoam emulsions A,B and C contain preservatives to guard against microbial growth. Long-term storage of diluted material may diminish this antimicrobial effect.

A5633 and A6582 Antifoam A Concentrate
Antifoam A concentrate is an extremely effective foam suppressor for aqueous and non-aqueous systems. It is 100 % active silicone polymer. No emulsifiers are present. Antifoam A concentrate is typically effective at 1-100 ppm. Antifoam A concentrate should be diluted with 3-10 parts of propylene glycol (aqueous) or vegetable oil (nonaqueous) with slow mixing.
The product will be stable in the pH range of about 5 to pH 9. Antifoam A Concentrate can be added directly to a fermentation medium, but it is not recommended that it be pumped to a fermentor on an as-needed basis.

Appearance: Grey Liquid
Density: 0.97 g/ml at 25 Deg. C

A5758 and a6457 Antifoam A Emulsion
A5758 is a 30% aqueous emulsion of Antifoam A concentrate. It contains non-ionic emulsifiers different from those in Antifoam emulsions B and C. Antifoam B Emulsion can be prediluted with 3-10 parts cool water to aid in dispersion. Prediluted suspensions should be used immediately. Antifoam A emulsion is typically effective at 1-100 ppm. The flow properties of Antifoam A emulsion are such that it can be pumped to a fermentor on an as-needed basis.

Appearance: White Emulsion
PH: Approx. 3
Density: 1.0 at 25 deg C

A5757 Antifoam B Emulsion
A5757 is a 10% aqueous emulsion of Antifoam A concentrate. It contains non-ionic emulsifiers different from those in Antifoam Emulsions A and C. Antifoam B Emulsion can be prediluted with 3-10 parts cool water to aid in dispersion. Prediluted suspensions should be used immediately. Antifoam B emulsion is typically effective at 1-100 ppm. The flow properties of Antifoam B are such that it can be pumped to a fermentor on an as-needed basis.

Appearance: White Emulsion
PH: Approx. 6.5
Density: 1.0 at 25 deg C

A8011 Antifoam C Emulsion
A8011 is a 30% aqueous emulsion of Antifoam A concentrate. It contains non-ionic emulsifiers different from those in Antifoam Emulsions A and B.
30% Antifoam A emulsion can be prediluted with 3-10 parts cool water to aid in dispersion. Prediluted suspensions should be used immediately. Antifoam C contains about 0.075% benzoic acid and 0.0075% sulfuric acid as preservatives.
Antifoam C 30% emulsion is typically effective at 1-10 ppm. The flow properties of Antifoam C are such that it can be pumped to a fermentor on an as-needed basis.

Appearance: White emulsion
pH: 2.1-3.5
Density: 1.0 at 25 deg C

A7207 Antifoam SO-25
Antifoam SO-25 is a complex of a polyhydric alcohol:silicone polymer. It can be repeatedly sterilized by autoclaving. The flow properties of Antifoam SO-25 are such that it can only be pumped to a fermentor on an as-needed basis if it is pre-dispersed in water.

Appearance: Milky-white liquid
Density: 0.99 g/ml
Viscosity: 4150 cps

A-8582 Antifoam SE-15

Antifoam SE-15 is a 10% emulsion of active silicone polymer and non-ionic emulsifiers. This antifoam is water-dilutable and effective in both hot and cold systems. It can be repeatedly sterilized by autoclaving. The flow properties of Antifoam SE-15 are such that it can be pumped to a fermentor on an as-needed basis.

Appearance: Milky-white liquid
Density: 1.0 g/ml
Viscosity: 2000 cps

A8707 Antifoam SE-35

Antifoam SE-35 is a 10% emulsion of active silicone polymer and non-ionic emulsifiers. This antifoam is water-dilutable and can be repeatedly sterilized by autoclaving. The flow properties of Antifoam SE-35 are such that it can be pumped to a fermenter on an as-needed basis.

Appearance: Milky-white liquid
Density: 1.0 g/ml
Viscosity: 1000 cps

ORGANIC – SILICONE ANTIFOAM MIXTURES

A5551 and A6332 Antifoam 289
Antifoam 289 contains 100% active ingredients containing silicone and non - silicone (organic) defoamers. The organic component is the same as that contained in Antifoam 204. Antifoam 289 is considered to have better dispersibility than Antifoam 204.
Antifoam 289 is used in our laboratories for gram +, gram - , yeast and fungal fermentations.
Antifoam 289 can be sterilized repeatedly.
The flow properties of Antifoam 289 are such that it can be pumped to a fermentor on an as-needed basis. For use in microbiological media Sigma recommends a starting concentration of between 0.005% and 0.01%.
Antifoam 289 is soluble in mineral oil, methanol, ethanol, toluene, xylene, perchloroethylene and in cold water at temperatures below 15 deg C. It is insoluble in warm water and ethyleneglycol.

Appearance: Clear colorless viscous liquid
Density: 1.03 g/ml
Viscosity: 500 cps.

A8436 is supplied autoclaved for aseptic conditions.

Storage/Stability
The recommended storage temperature for antifoams is room temperature.

General Procedure
Antifoams should be added prior to the point where foaming occurs. Alternatively, it can be used as supplied, by wiping on filling nozzles, rims of processing vats or on a screen suspended above the foaming system. One of the most common applications for antifoams is in microbiological fermentation.
Since one cannot predict the effectiveness or usefulness of an antifoam for a particular application, antifoams should also be tested to ensure adequate defoaming effectiveness under representative culture conditions. The microorganism, medium composition, temperature, pH, mixing, aeration, etc. anticipated for the final experimental or fermentation conditions should be used. If the antifoam is not effective under these test conditions either a higher amount of antifoam can be added or a different type of antifoam can be selected and tested.

Applications

The application of antifoam silicones in the microbiological fermentation technique.[1]

Foam formation and the subsequent cell damage/losses in the foam layer were found to be the major problems affecting cell growth and monoclonal antibody (MAb) production in stirred and sparged bioreactors for both serum-supplemented and serum-free media. Surfactants in the culture media had a profound effect on cell growth by changing both the properties of bubbles and the qualities of foam formed.[2]

Addition of high concentrations of silicone antifoam to a suspension of hybridoma cells in a bubble column reduces the death rate when using medium without a protective component.[3]

The mechanism of antifoaming in a nonionic Triton X-100 surfactant solution with silicone polyethers the so-called "cloud point antifoams," was investigated. The cloud point (CP) studies showed that the CP of a Triton X-100/silicone polyether mixed system is between the CP of the foaming and the antifoam surfactants, due to mixed micelle formation.[4]

Supercritical carbon dioxide was used for the direct extraction of drugs from plasma prior to analysis. The supercritical fluid was directly passed through plasma samples spiked with either a neutral (flavone) or an acidic (ketorolac) drug. The addition of an antifoam agent to the plasma prior to extraction was required to avoid restrictor plugging caused by denaturation of the plasma proteins by the supercritical fluid.[5]

References

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3) van der Pol LA, Bonarius D, van de Wouw G, Tramper J., Biotechnol Prog., 9, 504-9 (1993).
4) Nemeth Z, Racz G, Koczo K., J Colloid Interface Sci, 207, 386-394 (1998).
5) Liu H, Wehmeyer KR., Chromatogr B Biomed Appl., 657 206-13 (1994).

Physical properties of antifoams are provided by our suppliers.

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