Product Information

Trace Elements Ready-Made Solution

For bacterial culture, 100x

MBD0056

Product Description

Minerals and vitamins are broadly used to supplement growth media in order to support growth of a variety of different bacteria. The growth media mimics the natural environment of the bacteria thus providing an optimal setting for high throughput cultures. Trace elements ready-made solution, MBD0056, is comprised of vital minerals to support critical bacterial development. The solution is based on Wolin and Wolfe's recipe, which is especially suitable for culturing anaerobic bacteria of the human microbiome.[1-4]

Product Benefits

- 0.2 µm filtered
- Saves time in preparation of media
- Improved accuracy: composition and concentrations are analyzed and established by inductively coupled plasma (ICP)
- Ready-made liquid mixture containing all ingredients
- Decreases exposure to chemical and toxic risks associated with the powder form of the trace elements

Reagent Composition

50 mL Trace elements solution	**mg/L**
EDTA	500
$CuSO_4 \cdot 5H_2O$	10
$AlK(SO_4)_2 \cdot 12H_2O$	20
H_3BO_3	10
$Na_2MoO_4 \cdot 2H_2O$	10
Na_2SeO_3	1
$Na_2WO_4 \cdot 2H_2O$	10
$NiCl_2 \cdot 6H_2O$	20

50 mL Trace elements solution	**mg/L**
$MgSO_4 \cdot 7H_2O$	3000
$MnSO_4 \cdot H_2O$	500
NaCl	1000
$NH_4Fe(SO_4)_2 \cdot 12H_2O$	170
$Co(NO_3)_2 \cdot 6H_2O$	100
$CaCl_2$	100
$ZnSO_4 \cdot 7H_2O$	100

Storage/Stability

Store this product at 2-8 °C.

Preparation Instructions

Add to pre-sterilized and cooled growth media. Concentration 100x.

Application Data

Clostridium kluyveri

C. kluyveri was grown in a minimal synthetic media, with or without the addition of MBD0056 Trace Elements Ready-made solution. The cultures were grown in the anaerobic chamber at 37 °C for 13 days, and OD600 was measured. Treatments performed in triplicate.

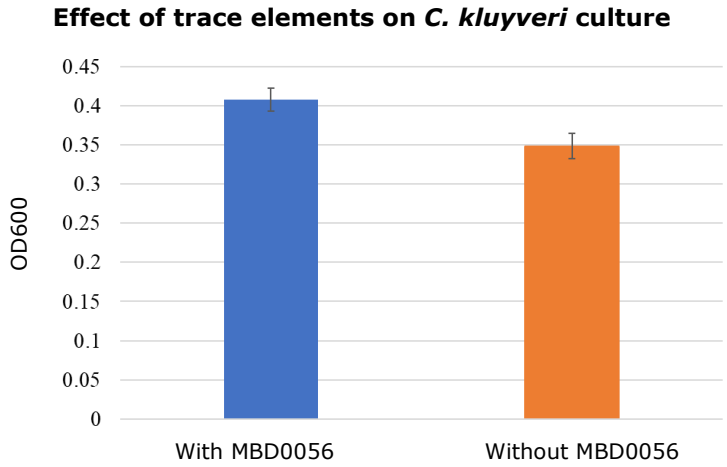


Figure 1. Effect of MBD0056 Trace Elements Ready-made solution on *C. kluyveri* culture. The addition of MBD0056 Trace Elements Ready-made solution to *C. kluyveri* minimal culture media increases the overall growth of this species.

Streptomyces hygroscopicus

S. hygroscopicus was grown for 7 days in synthetic fermentation media with or without the addition of MBD0056 Trace Elements Ready-made solution. The cultures were grown at 30 °C with 250 rpm shaking. Total biomass and nigericin yield was determined for each culture. Treatments performed in triplicate.

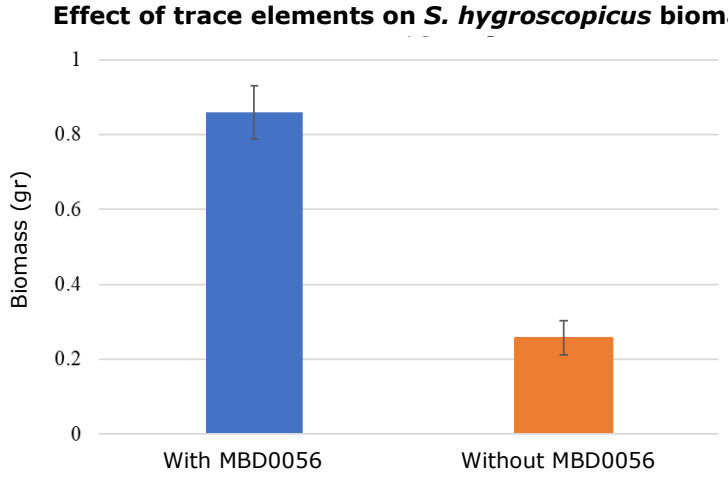


Figure 2. Effect of MBD0056 Trace Elements Ready-made solution on *S. hygroscopicus* biomass. The addition of MBD0056 Trace Elements Ready-made solution to *S. hygroscopicus* synthetic culture media increases the overall biomass yield of this species.

Effect of trace elements on average nigericin yield (mg/L) of *S. hygroscopicus*

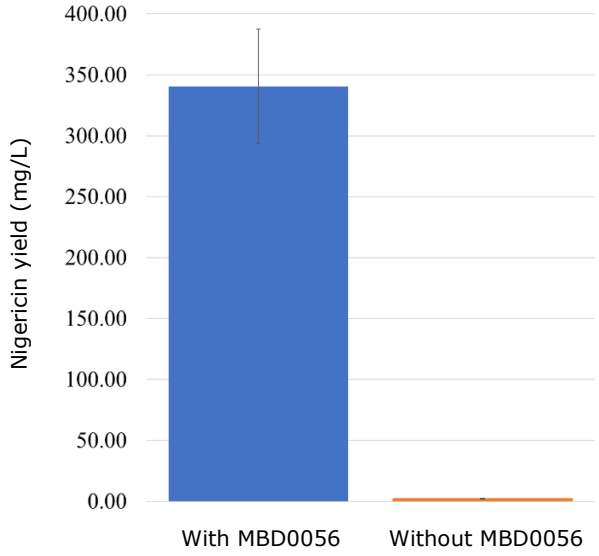


Figure 3. Effect of MBD0056 Trace Elements Ready-made solution on average nigericin yield (mg/L) of *S. hygroscopicus*. The addition of MBD0056 Trace Elements Ready-made solution to *S. hygroscopicus* synthetic culture media increases the nigericin yield of this species. Culture samples from each treatment group (n=3) were extracted in ethyl acetate for HPLC analysis.

Methylophaga frappieri

M. frappieri was grown for 3 days in minimal media with or without the addition of MBD0056 Trace Elements Ready-made solution. The cultures were grown at 30 °C with 200 rpm shaking and OD600 was measured. Treatments performed in triplicate.

Effect of trace elements on *M. frappieri* culture

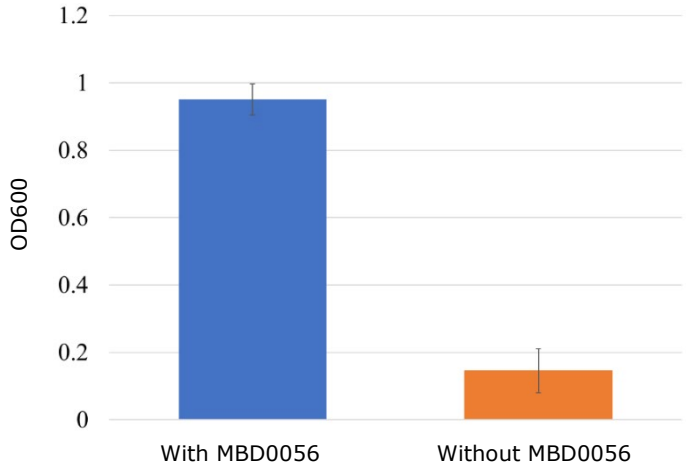


Figure 4. Effect of MBD0056 Trace Elements Ready-made solution on *M. frappieri* culture. The addition of MBD0056 Trace Elements Ready-made solution to *M. frappieri* minimal culture media increases the overall growth of this species.

Aspergillus niger

A. niger was grown for 24 hours in minimal media with or without the addition of MBD0056 Trace Elements Ready-made solution. The cultures were grown at 30°C with 200 rpm shaking, and the biomass was harvested by filtration and weighed. Treatments performed in triplicate.

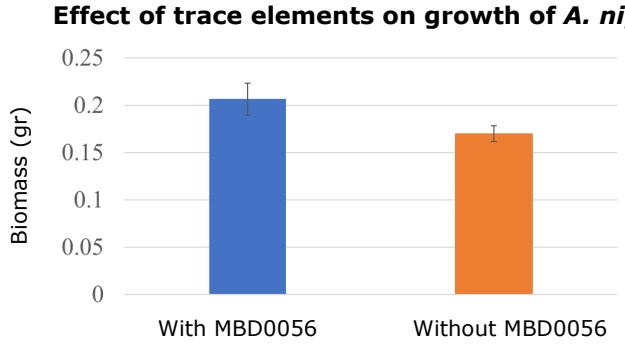


Figure 5. Effect of MBD0056 Trace Elements Ready-made solution on *A. niger* culture. The addition of MBD0056 Trace Elements Ready-made solution to *A. niger* minimal culture media slightly increases the overall growth of this species (ns).

Lactobacillus acidophilus, Lactobacillus delbrueckii

Lactobacilli strains were grown in a modified chemically defied media (CDM with nucleobases) with or without the addition of MBD0056 Trace Elements Ready-made solution. The cultures were grown in an anaerobic jar at 35 °C, OD600 was measured at day 7. Treatments were performed in triplicates.

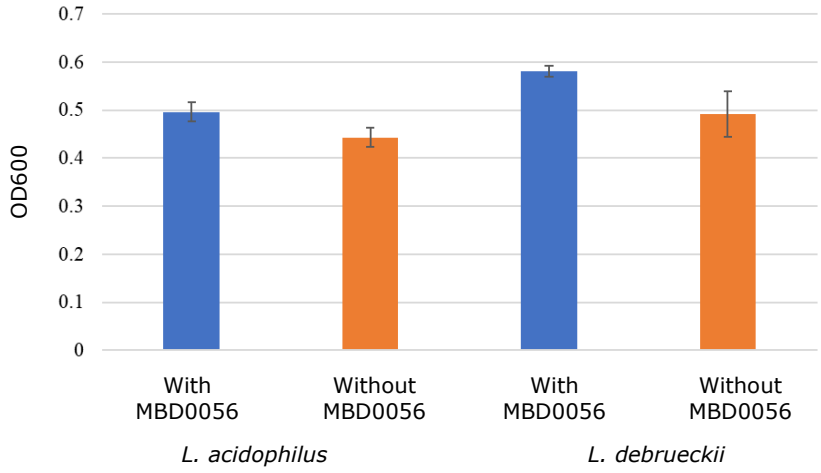
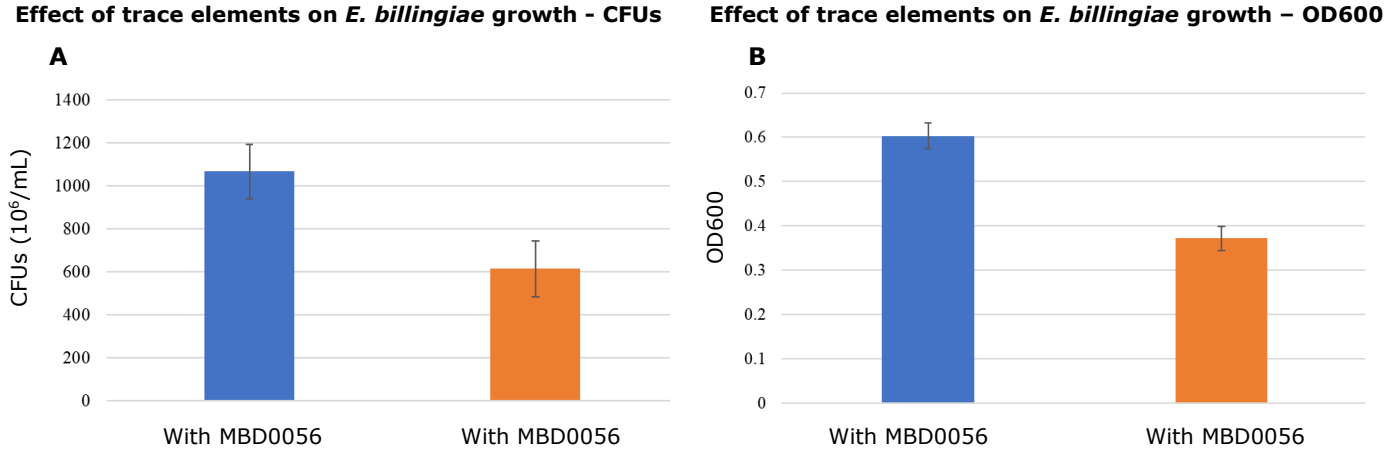


Figure 6 Effect of MBD0056 Trace Elements Ready-made solution on *Lactobacilli* growth. The addition of MBD0056 Trace Elements Ready-made solution to *Lactobacilli* minimal culture media increases the overall growth of these species.

Erwinia billingiae

Erwinia billingiae was grown in M9 based minimal media, with or without the addition of MBD0056 Trace Elements Ready-made solution. The cultures were grown at 28 °C under stationary aerobic conditions. CFUs (left panel) and OD600 (right panel) were measured at day 8. Treatments were performed in triplicates.



Erwinia billingiae was grown in M9 based minimal media, with or without the addition of MBD0056 Trace Elements Ready-made solution. The cultures were grown in at 28°C under stationary aerobic conditions for 9 days. OD600 was examined at days 1-3 and 7-9. Treatments were performed in triplicates.

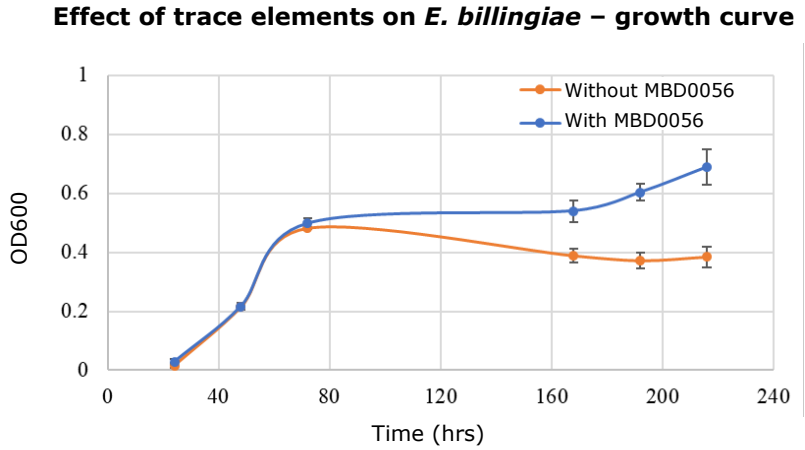


Figure 7. Effect of MBD0056 Trace Elements Ready-made solution on *E. billingiae*- growth curve. The addition of MBD0056 Trace Elements Ready-made solution to *E. billingiae* minimal culture media increases the overall growth of these species.

References

1. Balch, W. E., et al. "Methanogens: reevaluation of a unique biological group." *Microbiological reviews* 43.2 (1979): 260-296.
2. Wolin, E. A., R. S. Wolfe, and M. J. Wolin. "Viologen dye inhibition of methane formation by Methanobacillus omelianskii." *Journal of Bacteriology* 87.5 (1964): 993-998.
3. Goodman, Andrew L., et al. "Extensive personal human gut microbiota culture collections characterized and manipulated in gnotobiotic mice." *Proceedings of the National Academy of Sciences* 108.15 (2011): 6252-6257.
4. Ito, Tamaki, et al. "Conventional culture methods with commercially available media unveil the presence of novel culturable bacteria." *Gut Microbes* 10.1 (2019): 77-91.

Notice

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.

The information in this document is subject to change without notice and should not be construed as a commitment by the manufacturing or selling entity, or an affiliate. We assume no responsibility for any errors that may appear in this document.

Technical Assistance

Visit the tech service page at SigmaAldrich.com/techservice.

Terms and Conditions of Sale

Warranty, use restrictions, and other conditions of sale may be found at SigmaAldrich.com/terms.

Contact Information

For the location of the office nearest you, go to SigmaAldrich.com/offices.

00129647 Rev 02/25