



Product Information Sheet

B1730

Bialaphos Solution (1 mg/mL)

Synonym: Bialaphos Sodium Salt, Bilanafos, Phosphinothricin Tripeptide (PTT), SF-1293
CAS: 71048-99-2
Formula: $C_{11}H_{21}N_3NaO_6P$
Molecular Wt: 345.27

Properties

Form: Liquid
Appearance: Yellow to Orange, Clear
Application: Antibiotic, Selection Agent, Plant Growth Regulator
Solubility: Miscible with Water
Typical Working Concentration: Generally 1-3 mg(mL)/L for selection media, 10 mg(mL)/L and higher concentrations may be used but results are highly dependent upon plant tissue type. Optimal concentrations should be determined by the end user.
Storage Temp: -20–0 °C
Other Notes: Sterile filtered. Plant tissue culture tested.

Application Notes

Bialaphos is a tripeptide antibiotic with herbicidal properties that is employed in transformation research in many plant species that contain the *bar* or *pat* gene for selection purposes.

Bialaphos has plant growth regulating properties at low concentrations and herbicidal properties at high concentrations. It was isolated from *Streptomyces viridochromogenes* (Kumada et al., 1988) and inhibits the function of the enzyme glutamine synthetase (GS) (Schwartz et al., 2005). Inhibition of GS leads to ammonia build up in plant cells and eventually death unless the *bar* or *pat* gene is present to confer resistance to bialaphos (Charudattan et al., 1996).

After bialaphos is taken into cells, it is converted into phosphinothricin through hydrolysis via the phosphinothricin acetyl transferase enzyme (Thompson et al., 1987).

References

- Arulselvi I, P. Michael, S. Umamaheswari and S. Krishnaveni (2010) Agrobacterium mediated Transformation of *Sorghum bicolor* for disease resistance. *International Journal of Pharma and Bio Sciences*. 1:4.
- Casas A.M., Andrzej K. Kononowicz, Usha B. Zehr, Dwight T. Tomes, John D. Axtell, Larry G. Butler, Ray A. Bressan and Paul M. Hasegawa (1993) Transgenic Sorghum plants via microprojectile bombardment. *Proceedings of the National Academy of Sciences of the United States of America*. 90:23, Pp. 11212-11216.

Life Technologies (India) Pvt Ltd.

306, Agarwal City Mall, Road 44, Pitampura, Delhi - 110034 (India)

Tel: +91-11-4220-8000; 4220-8111; 4220-8222 Fax: +91-11-4220-8444, Mobile: +91-98105-21400

Email - customerservice@lifetechindia.com | customerservice@atzlabs.com

Product Information Sheet

- Charudattan R., V. J. Prange, J. T. Devalerio (1996) Exploration of the use of the "bialaphos genes" for improving bioherbicide efficacy. *Weed Technology*, 10:3.
- De Block M, J. Botterman, M. Vandewiele, J. Dockx, C. Thoen, V. Gossele, N. Rao Movva, C. Thompson, M. Van Montagu and J. Leemans (1987) Engineering herbicide resistance in plants by expression of a detoxifying enzyme. *The EMBO Journal* 6:9 pp.2513-2518. Merck 13, 7425.
- Grootbroom AW, NL Mkhonza, MM O'Kennedy, E Chakauya, K Kunert and RK Chikwamba (2010) Biolistic Mediated Sorghum (*Sorghum bicolor* L. Moench) Transformation via Mannose and Bialaphose Based Selection Systems. *International Journal of Botany*, 6 (2): 89-94.
- Jube S. and Dulal Borthakur (2007) Expression of bacterial genes in transgenic tobacco: methods, applications and future prospects. *Electron J Biotechnol.* 10(3): 452–467.
- Kamo K And Joyce Van Eck (1997) Effect of bialaphos and phosphinothricin on plant regeneration from long- and short-term callus cultures of gladiolus. *In Vitro Cell. Dev. Biol.-Plant* 33:180-183.
- Kumada Y., H. Anzai, E. Takano, T. Murakami, O. Hara, R. Itoh, S. Ima, A. Satoh and K. Nagaoka (1988) The bialaphos resistance gene (*bar*) plays a role in both self-defense and bialaphos biosynthesis in *Streptomyces hygroscopicus*. *The Journal of Antibiotics*. Vol XLI, No. 12. Pp 1838-1845.
- Leung H., Pat Loomis, and Martin L. Pall. "Transformation of *Magnaporthe grisea* to phosphinothricin resistance using the *bar* gene from *Streptomyces hygroscopicus*." Department of Plant Pathology, Washington State University, Pullman, WA 99164-6430. <<http://www.fgsc.net/fgn42/leung.html>> Accessed: [10/31/2011 2:12:16 PM].
- Schwartz D, S. Berger, E. Heinzelmann, K. Muschko, K. Welzel, and W. Wohlleben (2004) Biosynthetic Gene Cluster of the Herbicide Phosphinothricin Tripeptide from *Streptomyces viridochromogenes* Tu494. *Applied And Environmental Microbiology* 70:12 Pp. 7093–7102
- Schwartz D, N. Grammel, E. Heinzelmann, U. Keller and W. Wohlleben (2005) Phosphinothricin Tripeptide Synthetases in *Streptomyces viridochromogenes* Tu494. *Antimicrobial Agents And Chemotherapy*, 49:11, Pp. 4598–4607.
- Thompson CJ, N.R. Movaa, R. Tizard, R. Crameri, J.E. Davies, Marc Lauwereys and Johan Botterman (1987) Characterization of the herbicide-resistance gene *bar* from *Streptomyces hygroscopicus*. *The EMBO Journal* 6:9 pp.2519-2523.

India Contact

Life Technologies (India) Pvt Ltd.

306, Agarwal City Mall, Road 44, Pitampura, Delhi - 110034 (India)
Tel: +91-11-4220-8000; 4220-8111; 4220-8222 Fax: +91-11-4220-8444, Mobile: +91-98105-21400
Email - customerservice@lifetechindia.com | customerservice@atzlabs.com