

Production of antibodies in the genetically engineered *E. coli*, Shuffle

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In the current research the effects of fluid inoculum of *Brevibacillus* sp B65, a plant growth promoting microorganism (PGPM), on growth of *V. unguiculata* subsp. *sesquipedalis* cultivated in organoponic conditions were evaluated in comparison with traditional inorganic and organic fertilizers. Plant growth promotion of Yardlong bean was assessed through the effects of four different treatments on plant growth and development traits, as well as on crop yield. The four treatments were NPK – inorganic fertilizer (T1), organic matter alone (T2), fluid inoculum of B65 alone (T3) and inoculum supplemented with organic matter (T4). The inoculum of B65 supplemented with organic matter improved different traits of plant growth and development such as seed germination, root development, plant and leaves growth, flowering, as well as crop yield. The main impact of the inoculation mixture was on seed emergence. In the present research it was demonstrated that biostimulation of *Vigna unguiculata* subsp. *sesquipedalis* through inoculation of PGPM *Brevibacillus* sp. B65 supplemented with organic matter, may replace traditional organic and inorganic fertilization strategies. The nature of the positive influence of strain B65 on the legume is not well understood yet; however, it could be attributed to bacterial phyto-stimulation through auxin and ethylene production, as well as P mobilization. Additionally, organic matter supplementation demonstrated a stimulating effect on B65 traits. This is of utmost importance and will have a main impact on the sustainable development of agronomical practice.

Recent Publications

1. Production of antibodies in SHuffle *E. coli* strains. (2021) Eaglesham B.J., Garcia A. and Berkmen M. *Methods in Enzymology*.
2. Improved production of Humira antibody in the genetically engineered *Escherichia coli* SHuffle, by co-expression of human PDI-GPx7 fusions (2020) Lénon M., Ke N., Szady C., Sakhtah H., Ren G., Manta B., Causey B. and Berkmen M. *Applied genetics and molecular biotechnology*.
3. Characterization of the internal translation initiation region in monoclonal antibodies expressed in *Escherichia coli*. (2019) Leith E.M., O'Dell W.B., Ke N., McClung C., Berkmen M., Bergonzo C., Brinson R.G., Kelman Z. *JBC*.
4. Platform Development for Expression and Purification of Labeled Monoclonal Antibodies in *Escherichia coli*. (2018) Reddy T. P., Brinson G. R., Hoopes T. J., McClung C., Ke N., Kashi L., Berkmen M. and Kelman Z.. *MABs*.

5. Efficient expression of full-length antibodies in the cytoplasm of engineered bacteria. (2015) M-P Robinson, Ke N., Lobstein J., Szkodny A., Mansell T. J., Tuckey C., Riggs P., Colussi P., Noren C., Taron C., DeLisa M. P. and Berkmen M. Nature Communication.

Biography

Dr. Mehmet Berkmen's laboratory at New England Biolabs has been conducting research on improving protein expression for the past 15 years. The focus of the lab has been on understand the molecular mechanism of disulfide bond formation in vivo. The research resulted in the engineering of novel protein expression strain, SHuffle, capable of forming disulfide bonds within proteins in its cytoplasm. This presentation will give a brief introduction of SHuffle strains and focus on its ability to produce full length antibodies.