

# European Chemistry Congress

June 16-18, 2016 Rome, Italy

## Protein-specific approach to osteopontin purification from *Chlamydomonas reinhardtii*

**Zivko Nikolov**

Texas A&amp;M University College Station, USA

Microalgae in recent years have gained interest as a potential protein expression platform. Eukaryotic microalgae - *Chlamydomonas reinhardtii*, having a GRAS status, exemplifies the potential of this expression system to produce a variety of therapeutic proteins including vaccines and monoclonal antibodies. Our study focuses on osteopontin (OPN), a versatile extracellular structural protein, cancer biomarker, promoter of cell-mediated immunity, and potential therapeutic protein. OPN is an acidic intrinsically disordered extracellular glycoprotein found in many human tissues and body fluids including bone, skin, urine, milk and blood. The chloroplast of *C. reinhardtii* has the ability to phosphorylate proteins – a crucial post-translational modification for in-vivo biomineralization and presumably functional integrity of osteopontin. This study describes the development of a purification process leveraging the unique properties of the target recombinant protein. Osteopontin being a highly acidic protein, much like the majority of host protein in *C. reinhardtii*, combined with the susceptibility to proteolytic degradation makes the purification development both challenging and intriguing. In an attempt to stabilize and partially purify osteopontin in the algal lysate, we screened several extract pretreatment methods. The impact of pretreatments on osteopontin yield, proteolytic stability and removal of host cell impurities will be presented. We also report and compare capture chromatography of OPN on anion exchange, hydroxyapatite, and Fe- and Ga- immobilized metal affinity resins that were selected to leverage osteopontin's unique biochemical and structural properties.

### Biography

Zivko Nikolov received his PhD degree in Chemical Engineering from the Iowa State University and is currently Dow Professor in Bioprocess Engineering at Texas A&M University. He is Associate Director of the National Center for Therapeutic Manufacturing at Texas A&M. Before joining Texas A&M in 2003, he was Vice President of Bioprocess Development with ProdiGene Inc. He has published more than 90 scientific articles and book chapters in the area of bioprocess engineering and protein recovery. He is a recognized expert in bioprocessing of transgenic plants for production of high-value protein products and therapeutic proteins.

[znikolov@tamu.edu](mailto:znikolov@tamu.edu)

### Notes: