

IN VITRO SELECTION OF DNA APTAMERS THAT BIND AMITROLE Zhu Jie and Balazs Siminszky, Department of Agronomy, University of Kentucky, Plant Science Building Room 433, Lexington, KY 40546-0312

We have applied SELEX (Systematic Evolution of Ligands by Exponential enrichment), a combinatorial method for isolating biopolymers that selectively bind to a target. Our objective was to identify single-stranded DNA sequences able to bind amitrole, a widely used herbicide that is difficult to isolate from environmental samples. SELEX selection was performed using an amitrole-derivatized affinity chromatography column. Single-stranded DNA aptamers were eluted from the affinity column with a free amitrole-containing buffer. Amitrole-binding ssDNA molecules were PCR amplified, and the dsDNA was used as a template for asymmetric PCR to generate ssDNA. The cycle then was repeated. As expected, aptamer yield increased with each cycle of selection indicating an increase in the binding-affinity of the selected ssDNA molecules to amitrole. The final product of SELEX, a ssDNA aptamer characterized by high amitrole affinity, could constitute the basis for the development of highly selective solid-phase extraction sorbents, sensitive detectors and other ligand binding-based applications, providing new tools for monitoring herbicides in the environment.