Analysis of Glyphosate in Food and Beverage Samples by ELISA and Lateral Flow Immunoassay

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Results & Discussion

One hundred and twelve (112) domestic and imported beers and thirty (30) wine bottles were purchased around the Philadelphia area. The wine samples consisted of whites such as chardonnays, pinot grigios and reds such as cabernets, merlots, tempranillos, and others. The beer samples consisted of pilsners, mai bocks, IPAs, stouts, and porters. The wine samples were analyzed by ELISA to determine the concentration of glyphosate in wine and beer samples. The beer samples were grouped by type to determine if there were any differences in glyphosate concentration between different types of beer.

Introduction

Glyphosate, the most widely-used herbicide in the world, is a key component of many weed management programs. It is a non-selective herbicide that inhibits the enzyme 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS), which is essential for the synthesis of aromatic amino acids (tyrosine, tryptophan, phenylalanine) which are essential for the plant’s growth. Glyphosate tends to be ubiquitous in the environment and our food supply, accounting for about 25% of the global herbicide market. It is an organophosphorous compound (phosphonate). It was first discovered by Monsanto and was introduced to the market in 1974. It is now the most widely used herbicide in the world, with over 1.7 million tons produced annually.

Sample preparation

1. HCl: 2 mL of wine sample to a micro-centrifuge tube containing 50 mg of “Clean-Up Reagent” and vortex for 30 sec.
2. HCl: 2 mL of wine sample to a micro-centrifuge tube containing 50 mg of “Clean-Up Reagent” and vortex for 30 sec.
3. HCl: 2 mL of wine sample to a micro-centrifuge tube containing 50 mg of “Clean-Up Reagent” and vortex for 30 sec.
4. HCl: 2 mL of wine sample to a micro-centrifuge tube containing 50 mg of “Clean-Up Reagent” and vortex for 30 sec.
5. HCl: 2 mL of wine sample to a micro-centrifuge tube containing 50 mg of “Clean-Up Reagent” and vortex for 30 sec.
6. HCl: 2 mL of wine sample to a micro-centrifuge tube containing 50 mg of “Clean-Up Reagent” and vortex for 30 sec.
7. HCl: 2 mL of wine sample to a micro-centrifuge tube containing 50 mg of “Clean-Up Reagent” and vortex for 30 sec.
8. HCl: 2 mL of wine sample to a micro-centrifuge tube containing 50 mg of “Clean-Up Reagent” and vortex for 30 sec.
9. HCl: 2 mL of wine sample to a micro-centrifuge tube containing 50 mg of “Clean-Up Reagent” and vortex for 30 sec.
10. HCl: 2 mL of wine sample to a micro-centrifuge tube containing 50 mg of “Clean-Up Reagent” and vortex for 30 sec.
11. HCl: 2 mL of wine sample to a micro-centrifuge tube containing 50 mg of “Clean-Up Reagent” and vortex for 30 sec.
12. HCl: 2 mL of wine sample to a micro-centrifuge tube containing 50 mg of “Clean-Up Reagent” and vortex for 30 sec.
13. HCl: 2 mL of wine sample to a micro-centrifuge tube containing 50 mg of “Clean-Up Reagent” and vortex for 30 sec.
14. HCl: 2 mL of wine sample to a micro-centrifuge tube containing 50 mg of “Clean-Up Reagent” and vortex for 30 sec.
15. HCl: 2 mL of wine sample to a micro-centrifuge tube containing 50 mg of “Clean-Up Reagent” and vortex for 30 sec.