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OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

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Subject: To Be Presented To The Metabolism Committee At The Meeting Of August 19, 1992: Glyphosate Regulations and Codex Harmonization.

To: The Metabolism Committee

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INTRODUCTION

Glyphosate (N-phosphonomethyl glycine) is a nonselective herbicide and plant growth regulator that includes isopropylamine salt (Chemical Code 103601) and the sodium salt (Chemical Code 103603). It is registered for use on a large number of food and feed crops. Glyphosate is typically applied on these crops as postemergence spray to foliage of the vegetation controlled before planting, and after planting but prior to crop emergence, or as directed spray in established crops. In addition, glyphosate may be used in and around aquatic sites; treated water from aquatic sites may be used to irrigate crops

The tolerances listed in 40 CFR §180.364(a) are for the combined residues of glyphosate and its metabolite AMPA resulting from application of the isopropylamine salt of glyphosate and/or the monoammonium salt of glyphosate. The majority of these tolerances are set at 0.2 ppm.

The qualitative nature of the residue in plants is adequately understood. Studies with a variety of plants including corn, cotton, soybeans, and wheat indicate that the uptake of glyphosate or its metabolite AMPA from soil is limited, but the residues which are taken up are readily translocated. Foliarly applied glyphosate is readily absorbed and translocated throughout apples, coffee,

dwarf citrus (calamondin), grapes, and pears. Metabolism occurs via N-methylation and ultimately yields N-methylated glycines and phosphonic acids. The parent compound glyphosate and its metabolite AMPA are considered to be the residues of concern. For the most part the ratio of glyphosate to AMPA is 9 to 1 but it can approach 1 to 1 in a few cases (e.g., soybeans and carrots). Much of the residue data for crops reflects a detectable residue of parent (0.05 to ~ 0.15) along with a non-detectable residue of AMPA (<0.05 ppm).

The qualitative nature of the residue in animals is adequately understood. Studies involving lactating goats and laying hens indicate that the primary route of elimination was by excretion (urine and feces) and that the results are consistent with the metabolism studies in rats, rabbits, and cows. The terminal residues in eggs, milk, and animal tissues are glyphosate and its metabolite AMPA.

Structures for glyphosate and AMPA are attached at the end of this document.

CODEX HARMONIZATION

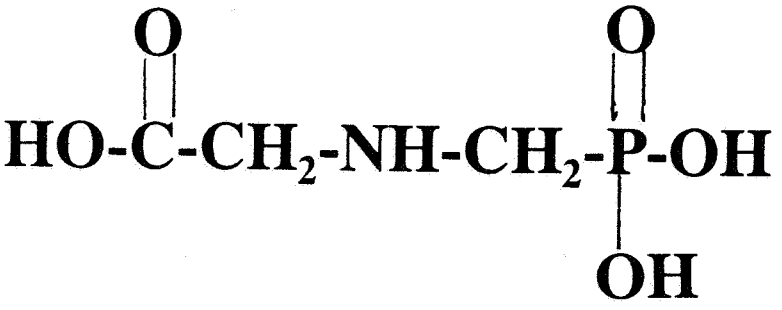
Several maximum residue limits (MRLs) for glyphosate have been established by Codex in various commodities. The Codex MRLs (expressed in terms of glyphosate per se) and applicable U.S. tolerances (expressed in terms of the combined residues of glyphosate and its metabolite AMPA) are listed below.

Commodity	MRL (Step) (mg/kg)	U.S. Tolerance (ppm)
Barley	20 (CXL)	0.1 (Grain crops)
Beans (dry)	2 (CXL)	0.2 (Seed and pod vegetables)
Cattle meat	0.1 (CXL)	
Cattle milk	0.1 (CXL)	
Cattle, edible offal	2 (CXL)	0.5 (Cattle, liver & kidney)
Cottonseed	0.5 (CXL)	15
Eggs	0.1 (CXL)	
Hay or fodder (dry) of grasses	50 (CXL)	0.2 (Forage grasses)
Kiwifruit	0.1 (CXL)	0.2
Maize	0.1 (CXL)	0.1 (Grain crops)
Oats	20 (CXL)	0.1 (Grain crops)
Peas (dry)	5 (CXL)	0.2 (Seed and pod vegetables)
Pig meat	0.1 (CXL)	
Pig, edible offal	1 (CXL)	0.5 (Hogs, liver & kidney)
Poultry meat	0.1 (CXL)	

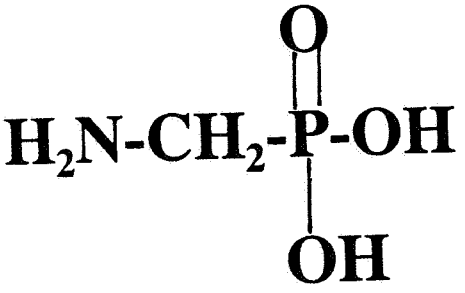
Commodity	MRL (Step) (mg/kg)	U.S. Tolerance (ppm)
Rape seed	10 (CXL)	
Rice	0.1 (CXL)	0.1 (Grain crops)
Sorghum	0.1 (CXL)	0.1 (Grain crops)
Soya bean fodder	20 (Step 8)	15 (Soybean hay)
Soya bean forage (green)	5 (Step 8)	15 (Soybean forage)
Soya bean (dry)	5 (Step 8)	6 (Soybeans)
Soya bean (immature seeds)	0.2 (CXL)	
Straw and fodder (dry) of cereal grains	100 (CXL)	0.2 (forage grasses)
Sweet corn (corn-on- the-cob)	0.1 (CXL)	0.1 (Grain crops)
Wheat	5 (CXL)	0.1 (Grain crops)
Wheat bran, unprocessed	40 (Step 6)	
Wheat flour	0.5 (Step 8)	
Wheat wholemeal	5 (Step 8)	

Question To The Committee

In order to harmonize the U.S. tolerances with Codex MRLs is it possible to regulate the present tolerances in terms of glyphosate per se (i.e. drop AMPA from the tolerance expression)?



GLYPHOSATE



AMINOMETHYL PHOSPHONIC ACID

(AMPA)