



## Residual Traces of Glyphosate in Urine

### Introduction

A paper published in the scientific literature in 2013 reported that glyphosate was present in the urine of Danish dairy cows<sup>1</sup> and was associated with kidney damage. The German risk assessment authority BfR published its initial assessment of the study, concluding that “the reported results do not prove a causal link between glyphosate exposure of the animals and their observed changes of enzyme activities and other laboratory parameters.”<sup>2</sup>

Glyphosate, or *N*-(phosphonomethyl) glycine, the active substance in a range of widely used herbicidal products, has limited toxicity for man, animals and the environment. It is not neurotoxic, carcinogenic or mutagenic, nor is it toxic to reproduction or development. Multiple studies have demonstrated a lack of endocrine disrupting properties.

### Absorption, distribution, metabolism and excretion of glyphosate

The many studies conducted in accordance with methodologies specified by the regulatory authorities, subjected to independent audit, and subsequently evaluated by European and other regulatory authorities have consistently shown that following oral ingestion: -

- glyphosate is rapidly absorbed from the gastro-intestinal tract but only to a limited extent;
- ingested glyphosate is eliminated *via* faeces and systemically available glyphosate (20%) *via* urine;
- elimination is rapid being virtually complete within 72 to 168 hours, with the major part being excreted in the first 48 hours; and
- most glyphosate is eliminated unchanged, with only a small amount (< 1% of the applied dose) being transformed to aminomethylphosphonic acid (AMPA). The occurrence of AMPA is thought to result from gastro-intestinal micro-floral activity rather than mammalian metabolic pathways.

Thus, neither glyphosate nor AMPA bio-accumulate. Glyphosate is poorly absorbed following dermal exposure, absorbed glyphosate being excreted unchanged *via* urine.

### Residual Traces in Livestock Animals

Exposure of livestock occurs through ingestion of feedstuffs containing residual traces of glyphosate. Residual traces found are mostly unchanged glyphosate. Corresponding to the main route of



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excretion, most residual traces (> 90%) were found in the kidney. Muscle, fat and milk contained very low residue levels (less than the analytical limit of quantification).

The exposure of bovine livestock to residues of glyphosate, even if all feedstuff contained residues at the maximum permitted levels (a most unlikely occurrence) represents a low percentage of the dose judged to be without adverse effects on livestock health.

## Residues in Food and Consumer Risks

The maximum potential exposure of consumers to residual traces of glyphosate, even if all food and drinking water contained residues at the maximum permitted levels (a most unlikely occurrence), has been shown to represent no more than 4.4% of the daily dose that if ingested daily over a lifetime is judged to be without appreciable health risk to consumers (ADI). In practice, actual intake is likely to be much lower than the maximum potential exposure.

## Concluding Observations

The finding of residual traces of glyphosate in the urine of Danish dairy cows is not a new observation. It occurs following ingestion of feedstuffs containing residual traces of glyphosate. It has been well documented in the scientific literature that glyphosate does not bio-accumulate but is rapidly excreted. Excretion is virtually complete with 72 to 168 hours, most being excreted within 48 hours of ingestion. The German risk assessment authority BfR has rejected the conclusions of the authors that there is a causal link with possible kidney damage.

Please refer to [www.glyphosate.eu](http://www.glyphosate.eu) for further information

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<sup>1</sup> Krüger M, W Schrödi *et al*, Field investigations of glyphosate in urine of Danish Dairy Cows. *J Environ Anal Toxicol* 3: 1896. Doi: 10.4172/2161-0525.1000186

<sup>2</sup> Official statement of the BfR "First assessment of glyphosate residues in the urine of dairy cattle" from 20<sup>th</sup> September 2013: [Stellungnahme Nr. 026/2013 des BfR](#) (in German only)