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A risk-based pesticide residue monitoring tool to prioritize the sampling of fresh produce

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6 **ABSTRACT**

7 Pesticide residues remain a key issue in food safety for consumers. Accordingly, pesticide
8 residue monitoring at all stages of the food chain gains importance. In Europe, fresh produce
9 processing and trading companies are requested to have a company-specific sampling plan
10 that covers all on-site food safety risk issues. In settings where the prevalence of
11 contamination is known and there are a limited number of suppliers, statistical sampling
12 plans are easily designed based on theoretical calculations. Unfortunately, this is not the
13 case in the current setting of fresh produce. In order to provide a workable alternative,
14 empirical guidelines for the design of a risk-based sampling plan, applicable in a broad range
15 of realistic scenarios, are established. These guidelines are based on the opinions of experts
16 regarding the relative importance with respect to risk regarding five criteria related to
17 products and suppliers. These criteria are: supplier guarantee, country of origin, cross-
18 contamination, and processing and product risk. The opinions of the experts are aggregated
19 in order to yield a weighted-sum-based risk indicator. This can facilitate the risk assessment
20 of new scenarios and sample size calculations. While these guidelines for the design of a risk-
21 based sampling plan do not provide guarantees for a statistically demonstrated level of
22 safety, the plan has been proven to be a useable tool during validation. Finally, the use of
23 this tool is demonstrated in a case study.

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