

Estimated daily intake of residual agricultural chemicals across general Japanese people based on the total diet study from 2019 to 2021

(Received January 31, 2024)

(Accepted April 6, 2024)

Miki Takahashi^{a)}, Yoshinari Suzuki^{a)}, Mitsutoshi Aoyagi^{b)}, Eita Toda^{c)}, Koichi Ito^{c)}, Toru Fukumitsu^{d)}, Masahito Hagio^{d)}, Takako Hayashi^{d)}, Saori Shintaku^{e)}, Sayaka Ihara^{f)}, Akie Nakashima^{f)}, Tamaki Sato^{g)}, Fuyuki Okamoto^{g)}, Tsuguhide Hori^{g)}, Hiroshi Akiyama^{a, h)}, Tomoaki Tsutsumi^{a)}

a) Division of Foods, National Institute of Health Sciences

b) Hokkaido Institute of Public Health

c) Akita City Public Health Center

d) Kanagawa Prefectural Institute of Public Health

e) Wakayama Prefectural Research Center of Environment and Public Health

f) Hiroshima Prefectural Technology Research Institute, Public Health and Environment Center

g) Fukuoka Institute of Health and Environmental Sciences

h) School of Pharmacy and Pharmaceutical Sciences, Hoshi University

Abstract

Public perceptions are significantly more concerned about agricultural chemicals including pesticides, feed additives, and animal drugs than food safety experts. To address these perceptions, we estimated the mean daily intake of 28 agricultural chemicals across the entire Japanese population (≥ 1 year old) using the total diet samples based on the market basket method (14 food groups). The survey was conducted with the collaboration of six local government research institutes (Hokkaido, Tohoku, Kanto, Kansai, Chugoku, and Kyushu) from 2019 to 2021. The estimation of the mean daily intake of residual agricultural chemicals through the consumption of each food group was calculated by multiplying the concentration in the respective food group by the daily food consumption. The highest ratio of estimated daily intake over acceptable daily intake was observed for acephate (0.39%). The contribution rates from crops were higher than those from livestock and aquatic products for many agricultural chemicals. Our results show that all of agricultural chemicals evaluated in this study were far below the ADIs, and these findings considered to be useful to bridge the perception gap.

Keywords : residual agricultural chemicals, total diet study, estimated daily intake, acceptable daily intake

I Introduction

In a 2015 internet survey conducted by the Food Safety Commission of Japan, respondents ranked 19 items in order of significant health concern, up to the 10th place¹⁾. Residual agricultural chemicals ranked 5th among general consumers but 10th among food safety experts. This survey not only highlights a significant knowledge gap between general consumers and food safety experts but also suggests that general consumers

still have concerns about residual agricultural chemicals. Although some efforts have been made to bridge this gap^{2, 3)}, exposure to residual agricultural chemicals remains a widespread concern among general consumers.

To ensure the safety of food concerning agricultural chemicals including pesticides, feed additives, and veterinary drugs, the government needs to take several measures such as understanding the current status of agricultural-chemical use, establishing or revising new maximum residue limits