Measurement of stone fruit pesticide residual levels and the effect of seed weight

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Abstract:

Stone fruits such as cherry, ume (Japanese apricot), sumomo (Japanese plum), nectarine, and peach had their flesh and seeds weighed in order to calculate the levels of pesticide residue that would be examined using both the Japanese and global standards. For ume and sumomo, the computed correction factors ranged from 0.88 to 0.96. The mathematical process to convert to a whole commodity basis has a greater impact on small fruit commodities like cherry and ume. These findings show that estimated levels of pesticide residue in whole foods (according to the international standard) are marginally lower than real values without seeds (current Japanese regulations). Japan's Pesticide Science Society

Keywords:, seed, pesticide residue , stone fruits,

Introduction :

One of the most crucial objectives for international trade and the efficient use of residue data is the international standardisation of sample processing for pesticide residue analysis. Codex maximum residue limits (MRLs) are usually expressed as percentages of a particular, whole, raw agricultural commodity that is traded internationally. 1) Whole stone, using the FAO manual from 2009 When the stems and stones have been removed, fruit commodities should be examined. Following that, residues should be determined and expressed for the entire commodity sans stems. The residual content of the seed is therefore disregarded. The same method has been used to test stone fruit residue levels in Japan, although, under the country's existing rules, values are not given for the entire raw product[2].) Residue concentrations for current Japanese regulations are expressed as the level in the whole edible portion (peelflesh) without seeds. The Japanese guideline for residue studies in crops was further refined very recently to recommend the measurement of seed weight in stone fruits.3) This modification enables calculation of residue levels based on the international method from the levels in the peel and flesh

without seeds. The purpose of this study was to compare residue level calculations determined utilizing both the Japanese and international definitions of stone fruit portions to be analyzed. As described above, whole-peach commodity samples should be analyzed after removal of stems and stones under the international standard procedure.1) In contrast, according to the sample preparation of current Japanese guidelines for residue study, the peel is analyzed separately for reference as an inedible portion of peaches, and yet is considered edible in nectarines.3) As residue levels in the flesh have been previously referenced for establishing and executing MRLs in Japanese peaches, additional investigations were conducted regarding the proportion of peach peel weight.

Methodology :

From a Japanese residue trial database kept in our lab, sample flesh and seed weights of stone fruits including cherry, ume (Japanese apricot), sumomo (Japanese plum), nectarine, and peach were obtained. In this study, the effect of seed weight on pesticide residue levels was estimated using 228 stone fruit units. According to the best agricultural techniques in Japan, field trials were conducted at 55 locations in Japanese orchards. 3) Peach and nectarine sample weights were over 2 kg, and other fruit unit weights were over 1 kg. 4) From the obtained analytical values, correction factors were derived for computing residue levels expressed for whole commodities without seeds, as shown in the formula below.

Results and Discussion

It is evident from the quantity of sample units and field trials, the weights of the stone fruit samples, and the estimated correction factors. Cherry was the smallest sample examined in this investigation. Whole cherry sample mean weights varied from 4.67 g to 8.85 g and averaged 6.86 g. Weight ratios of cherry sample wholes to seed sections ranged from 5% to 10%. The largest sample examined in this study was peaches, one of the main agricultural products in Japan. The average weight of entire peach samples was 229 g, with mean weights ranging from 143 g to 391 g. About 3% to 8% of the weight of the samples of whole peaches was made up of seed pieces.

Sample displays scatter plots of the stone fruit sample weights versus weight ratios of edible portions (flesh without seed) to the entire product (fleshseed). For sumomo (R2 0.980), the weight ratios of edible substances tended to strongly increase with the weights of complete goods, while this association was weak for other stone fruits. Variations in the weight ratios of the edible sections were seen in the slopes of the regression lines for each stone fruit. Compared to other stone fruits, the weight ratios of the edible sections in small stone fruits like cherry and ume vary.

Conclusion

The computed correction factor ranged from 0.88 for ume to 0.96 for sumomo and was used to convert analytical values into residue levels expressed for entire commodities without seeds. The mathematical process to convert to a whole commodity basis has a greater impact on small fruit commodities like cherry and ume. These findings suggest that predicted residue levels in whole foods (according to the international standard) are marginally lower than the actual concentrations without seeds (current Japanese regulations). As a result, there is no impact on the use of the residue data for MRL estimate because the correction factors calculated in this study for stone fruits were near to 1.

Reference:

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