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ASSESSMENT OF MRLS FOR PESTICIDES IN TEA

(Prepared by the Working Group on MRL of the FAO Intergovernmental Group on Tea)

INTRODUCTION

1. The FAO Intergovernmental Group (IGG) on Tea is a Subsidiary Body of the Committee on Commodity Problems. It represents a forum for intergovernmental consultation on tea, studies of all problems connected with tea, including trends in production, consumption, trade and prices of tea and maximum residue levels. The Group, under FAO auspices, considers changes in national policies and examines their international effects as pertaining to the current and prospective market situation. Membership in the Group is open to all Member Nations, Member Organizations and Associate Members of FAO, including Observers from international organizations and institutions. Nearly all importing and exporting countries of tea are members of the IGG on Tea.

2. The IGG on Tea was established by the Committee of Commodity Problems (CCP) at its Forty-fourth Session (1969) as the Consultative Committee on Tea, following a series of *ad hoc* intergovernmental consultations under FAO auspices beginning in 1965 and an emergency meeting of tea-exporting countries in 1969 which agreed on an informal export quota arrangement for 1970. The title of this Body was changed in 1971 to that above.

BACKGROUND

3. Outside of water tea is the most consumed beverage in the world. It is also one of the safest and more economic beverages available to people in our planet. Many people, particularly in developing countries, tea represents an even better and safer option than drinking plain water as its proper preparation includes using the boiling water which effectively kills any germs or bacteria that may be present.

4. Besides the safe consideration, recent scientific research during the past 20 years discovered associated tea consumption with great healthy benefits. This provides even more reason why the tea industry and global health authorities should promote increased tea consumption. Encouraging consumers to drink more tea may have significant implications for improving overall health for people on earth.

5. It is commonly held that preventing disease is far easier and more cost efficient than treating disease. Adopting a lifestyle including the ingestion of nutritional and clean foods and beverages, avoiding smoking, limiting alcohol consumption, drinking more tea, reducing stress and getting sufficient exercise will help to achieve a healthier state and avoid the onset of disease.

6. In encouraging to increase the tea consumption for achieving improved health, some potential barriers in tea drinking, such as anything that conflicts with the image of tea as a healthy product should be considered. For example, the presence of excessive amounts of agrochemicals is of increasing concern for many consumers.

7. Tea plant (*Camellia sinensis*) is a pretty tough species with natural resistance to many insect pests and diseases. In certain countries, there is a little need for the use of agrochemicals, while in other countries the application of agrochemicals is necessary. However, in comparing with other vegetables and food crops, the consumptive style is quite different between them. In the ordinary situation, it is eaten in their entirety, but tea, with very few exceptions, is not eaten as opposed to used to make an infusion in water. Thus, consumers are not eating the tea leaves instead of drink the infusion of tea leaves. Of primary concern from the viewpoint of safety for consumers, how many amounts of agrochemicals in the tea infusion are taken in via tea drinking, not the amounts of agrochemicals in tea leaf.

8. As pointed out by the experiment, the amounts of agrochemicals in the infusion are not directly related with the residue level of different agrochemicals in tea leaf, but it is closely related with the water solubility of agrochemicals (Table 1).

9. Therefore, if a tea sample contains one ppm of residue of four pesticides with different water solubility, let's make the tea infusion with traditional method, then the difference of pesticide residue in the infusion will be more than 327 times (Table 2).

TAB LE 1
Relation between percentage extraction of some pesticides in tea infusion
from processed tea and water solubility of pesticides

Pesticide	Water solubility (mg/ l)	Extractability of pesticide during infusion process (%)
pp – DDT	0.001	1
Cyhalothrin	0.005	2.9
Permethrin	0.040	2.9
Cyperme thrin	0.041	1.8
Deltamethrin	0.1	1.2
Dicofol	0.1	2.2
gamma-BHC	7.0	6.5
Quinalphos	22.0	40.4
Fenitrothion	30.0	70.9
Malathion	150	86.3
Dimethoate	25000	98.3

TABLE 2 Pesticide residues in tea infusion infused from dry tea

Pesticide	Residue level in dry tea (mg/kg)	Water solubility of pesticide (mg/l)	Residue level in tea infusion (ng/l)	Extracting rate of pesticide (%)
DDT	1	0.001	9.5	<1
Endosulfan	1	0.3	54.2	1.6-2.05
Chlorpyrifos	1	2.0	273.6	9.1
Malathion	1	150.0	2327.0	74.9-86.3
Dimethoate	1	25000.0	2949.0	93.4-98.3

10. Nowadays, the determination of residues in food and beverages are determined on the basis of an analysis of the raw materials regardless of whether they are eaten or not. In the FAO working Group on tea, it is the opinion that the basis in the establishment of MRL of pesticide in tea and the analytical methods used to identify the presence of pesticides in tea needs to be revised, so to provide a more clearer understanding on the potential risk of different pesticides in tea and a more rational MRL standard for different pesticides. The FAO Working Group considered that the analysis on the tea brew will give the consumers more correct and direct information on a little risk on chemical in tea brew via the tea drinking instead of the vague information get from the dry tea.

11. In the current procedure for establishing MRLs in tea by CCPR/JMPR, first the Theoretical Maximum Daily Intake (TMDI) is computed from the Highest Residues (HR) or Supervised Trial Median Residues (STMR) from field trial data and the daily consumption of dry tea leaves. The TMDI so computed is then compared with the Acceptable Daily Intake (ADI) per person, for a particular compound. If the TMDI value does not exceed the ADI per person, the MRL is fixed at the HR / STMR. However, this comparison of TMDI (so obtained) with ADI is actually a gross overestimation of potential risk to consumers as the raw dry tea leaves are never consumed. In addition, the consequence of such overestimation of risk will unduly eliminate a number of otherwise useful pesticides that could have been used for effective management of pests in the tea industry. The FAO working group feels that the residues in the tea liquor should actually be used for estimating risk in fixing MRLs.

Objective of this Paper:

12. The objective of this Policy Statement is to encourage the world's standard setting agencies and authorities such as JMPR, CCPR, CAC and the regulatory agencies of individual countries to change the way on tea, from the leaf to brew, or pay equal attention on both the leaf and brew. Some tea producing countries have obtained a lot of information by using the analytical method to compare the residue of various pesticides in dry tea and tea brew. The most important thing is to get the exact amounts of pesticide in the tea brew.

13. If this idea could be admitted by the World's standard setting agencies and authorities, the FAO Working Group will guide the world tea producing countries to investigate and encourage the world tea growers to increase their reliance on those pesticides with low water solubility. FAO Working Group regards it will be an important step to minimize the pesticide residue and rationalize the application of pesticide in tea industry.

14. The Working Group on MRL of the FAO Intergovernmental Group on Tea, respectfully request the CCPR, JMPR and CAC will consider this proposal. FAO Working Group will answer your questions that you may have and glad to provide the further information in this field and also glad to conduct the necessary investigation. We thank you for your consideration.