Standards of Tea for Ensuring Market Requirement

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Standards of Tea

Related to:

- Black Tea
- Green Tea
- White Tea

- TRI recommendations on Pesticides (Issue of MRLs)
- Adulterations

ISO Standards

Definition for Black Tea

Tea derived solely and exclusively, and produced by acceptable processes, notably withering, leaf maceration, aeration and drying, from the tender shoots of varieties of the species *Camellia sinensis* (Linnaeus) O. Kuntze known to be suitable for making tea for consumption as a beverage.

ISO 3720:2011

ISO Standards

Definition for Green Tea

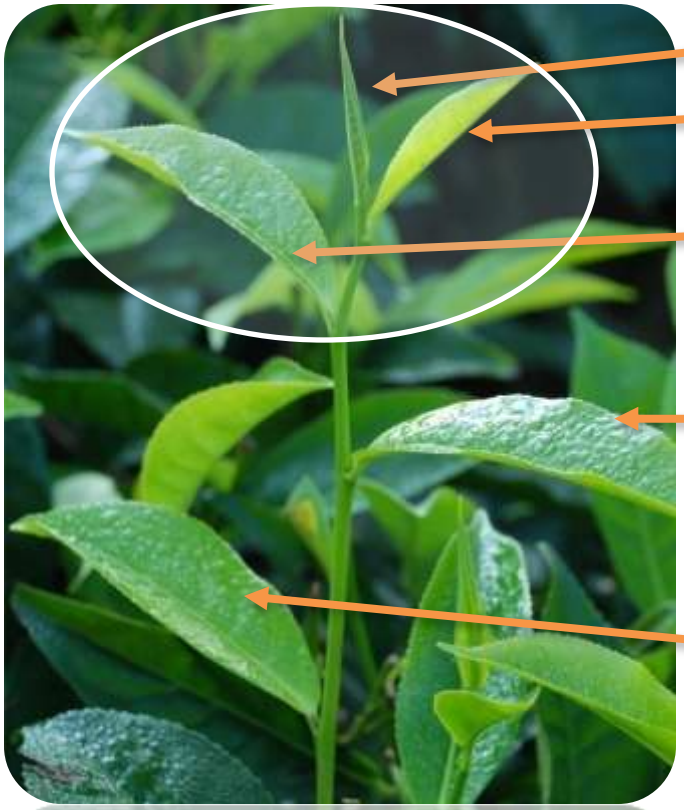
Tea derived solely and exclusively, and produced by acceptable processes, notably enzyme inactivation and commonly rolling or comminution, followed by drying, from the tender leaves, buds and shoots of varieties the species *Camellia sinensis* (Linnaeus) O.Kuntze, known to be suitable for making Tea for consumption as a beverage.

ISO 11287:2011

Chemical Composition – Fresh Tea Leaf

Constituent	% by dry weight
Flavanols (Catechins)	17-30
Flavonols and flavonol glycosides	3-4
Leucoanthoyanins/Proanthocyanins	2-3
Phenolic acid and depsides	~5
Caffeine	3-4
Amino acids	~4
Simple carbohydrates	~4
Organic acids	~0.5
Polysaccharides	~13
Proteins	~15
Ash	~ 5
Cellulose	~ 7
Lignin	~ 6
Lipids	~ 3
Pigments	~ 0.5
Volatile substances	0.01 -0.02

Total Polyphenol Content in tea leaves



35.8% (Bud)

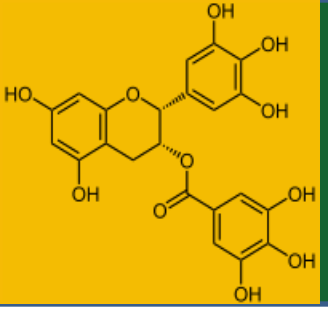
35 % (1st Leaf)

27.9 (2nd Leaf)

Ideal for Manufacture of Black Tea

23.1% (3rd Leaf)

15.0% (Stem)



Polyphenol Composition Fresh Tea Leaf

Component	g/100 g dry weight
Epigallocatechin gallate (EGCG)	9 - 13
Epigallocatechin (EGC)	3 - 6
Epicatechin gallate (ECG)	3 - 6
Epicatechin (EC)	1 - 3
Gallocatechin (GC)	1 - 2
Catechin (C)	1 – 2
Flavonols and their glycosides	3 – 4
Leucoanthocyanins/Proanthocyanidins	2 – 4
Phenolic acids	4
Total polyphenols	27 – 40

TOTAL CATS

TOTAL POLYPHENOLS

ISO Standards for Black Tea / Green Tea

Parameter	Test Method	Requirement	
		Black Tea	Green Tea
Water Extract %	ISO 9768	32 min.	32 min.
Total ash %	ISO 1575	4-8	4-8
Water soluble ash %	ISO 1576	45	45
Alkalinity of total ash %	ISO 1578	1-3	1-3
Acid soluble ash %	ISO 1577	1.0 max.	1.0 max.
Crude fibre %	ISO 5498	16.5 max.	16.5 max.
Total Polyphenol %	ISO 14502-1	9 min.	11 min.
Total Catechins %	ISO 14502-2	-	7 min.
Ratio of TC/TP		-	0.5 min.

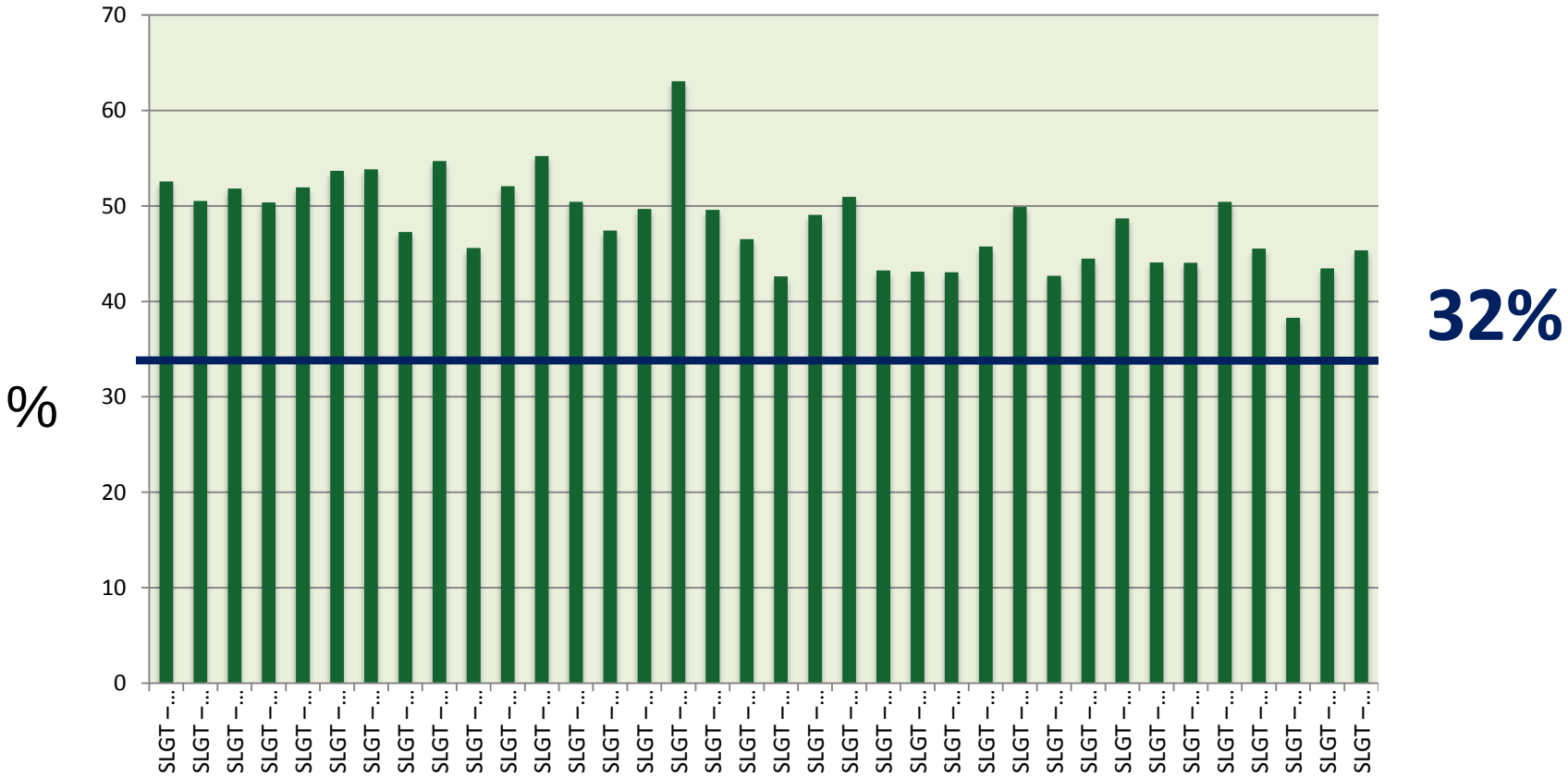
Pathway to ISO Standards

- ISO appoints special committee
- ISO collects the data from all producers
- Worldwide inter-laboratory testing
- TRI already contributed the data and ideas
- The process of formulating a standard – approx. 15 years

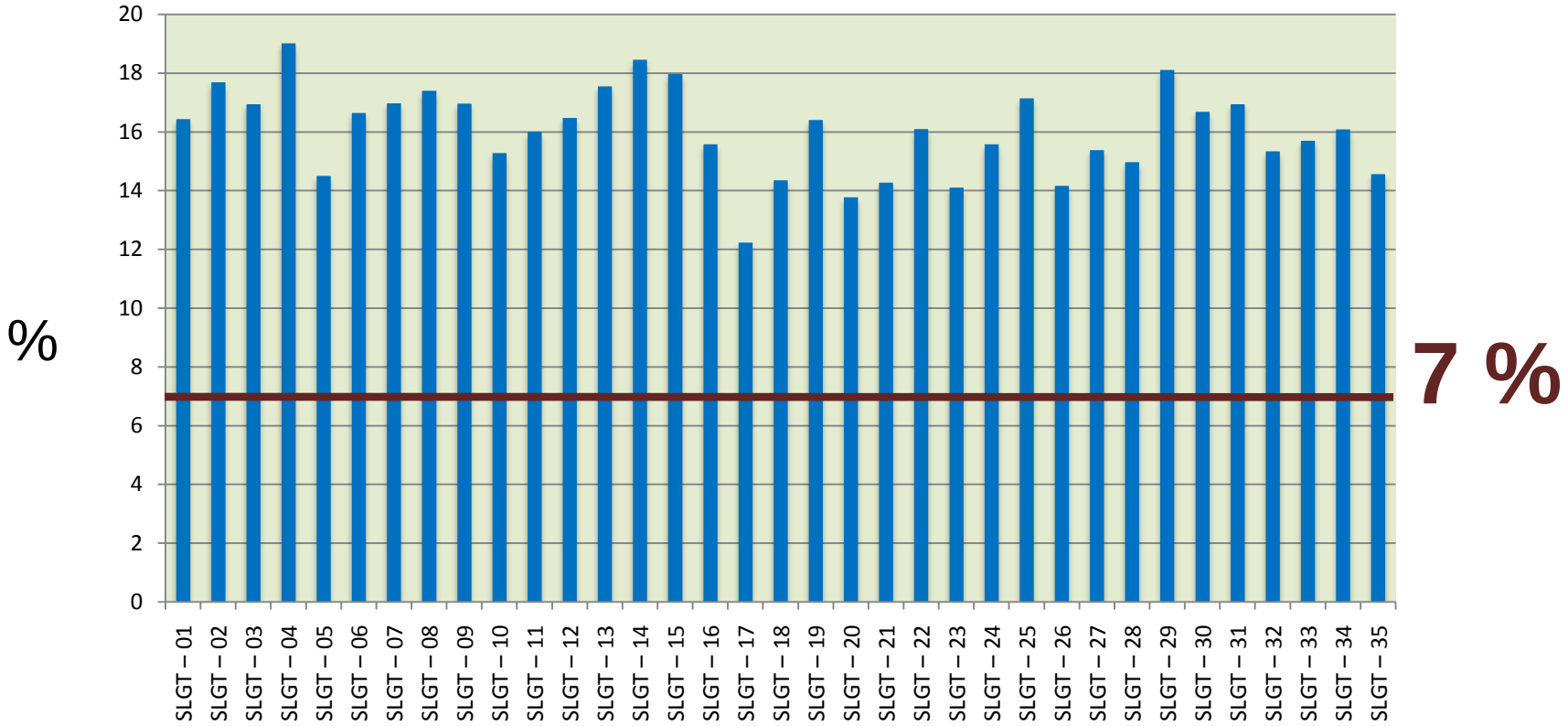
Contribution of the TRI

Parameters	Standard	Technique
Total Polyphenols	ISO 14502-1	Spectrophotometry
Individual catechins	ISO 14502-2	HPLC
Water extract (TS)	ISO 9768	Gravimetry

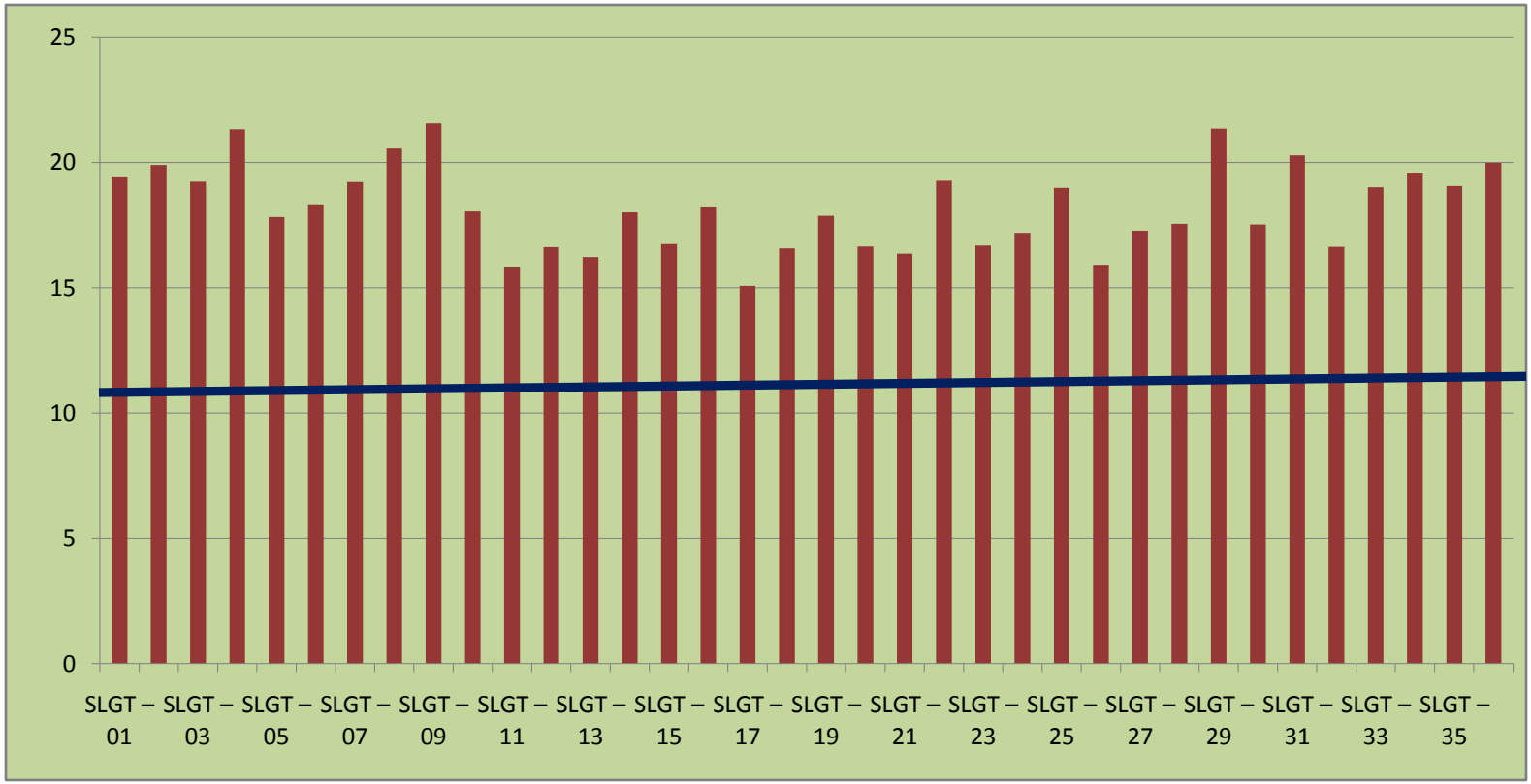
Water Extract in SL Green Tea



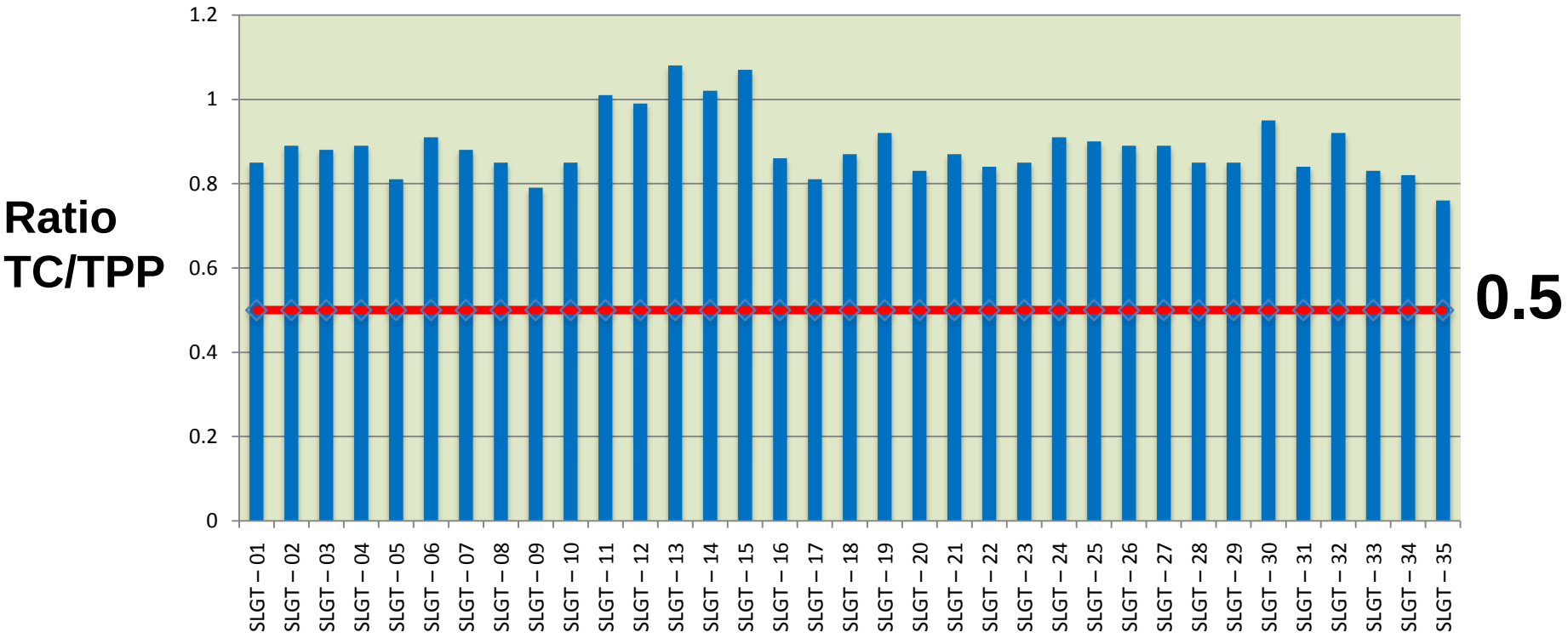
Total Catechins



Total Polyphenols



Ratio of TC / TPP



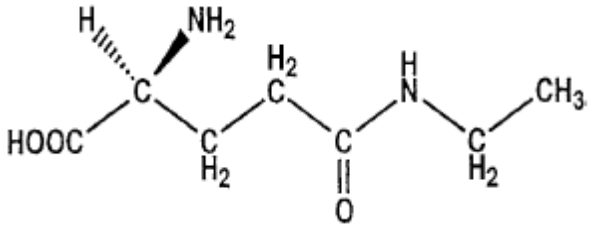
New parameter to be added
L-Theanine

TRI has already established the levels in Sri Lankan GT and BT

The L-theanine content in Sri Lankan black tea ranged from 0.91 – 1.29 %
and
in green tea ranged from 0.26 – 1.49 % on dry weight basis

Theanine
(gamma –ethyl amino L-glutamic acid)

This unique Amino Acid was discovered in 1949 by Sakato from tea leaves. (latest research shows that Theanine (Thea) is found in 21 spp from theaceae family, Ashihara *et al.*, 2010)

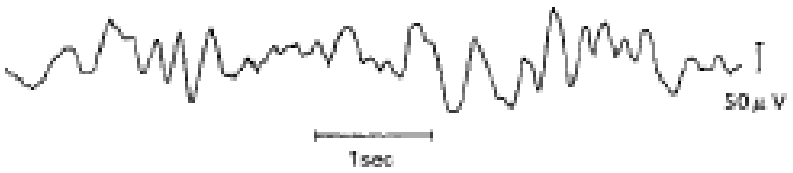


It is known to be a neurotransmitter in the brain and

Imparts mind relaxation-inducing effect in humans

Improved memory

Brain Waves

Brain Waves	Frequency	Mental Condition
δ-wave	0.5~3Hz 	Sound sleep
θ-wave	4~7Hz 	Doze sleep
α-wave	8~13Hz 	Awake, relaxation
β-wave	14Hz~ 	Awake, excitation

ISO Standards
White Tea (Draft)

DEFINITION

Tea derived solely and exclusively, and produced by acceptable processes, by harvesting and a single withering/drying stage from the bud and tender shoots or 1-2 leaves of varieties of the species *Camellia sinensis* (Linnaeus) O. Kuntze known to be suitable for making tea for consumption as a beverage

Sri Lanka - Proposal to ISO

The above definition would exclude teas such as Ceylon silver Tips, silver needles from the classification " White Tea ".

Sri Lanka has proposed ISO to include Ceylon Silver Tips into a separate category and treat as Special Tea

This would pave the way to protect the unique identity of silver tips and produce a new type of tea in Sri Lanka " White Tea"

TRI Recommended Pesticides and their MRLs





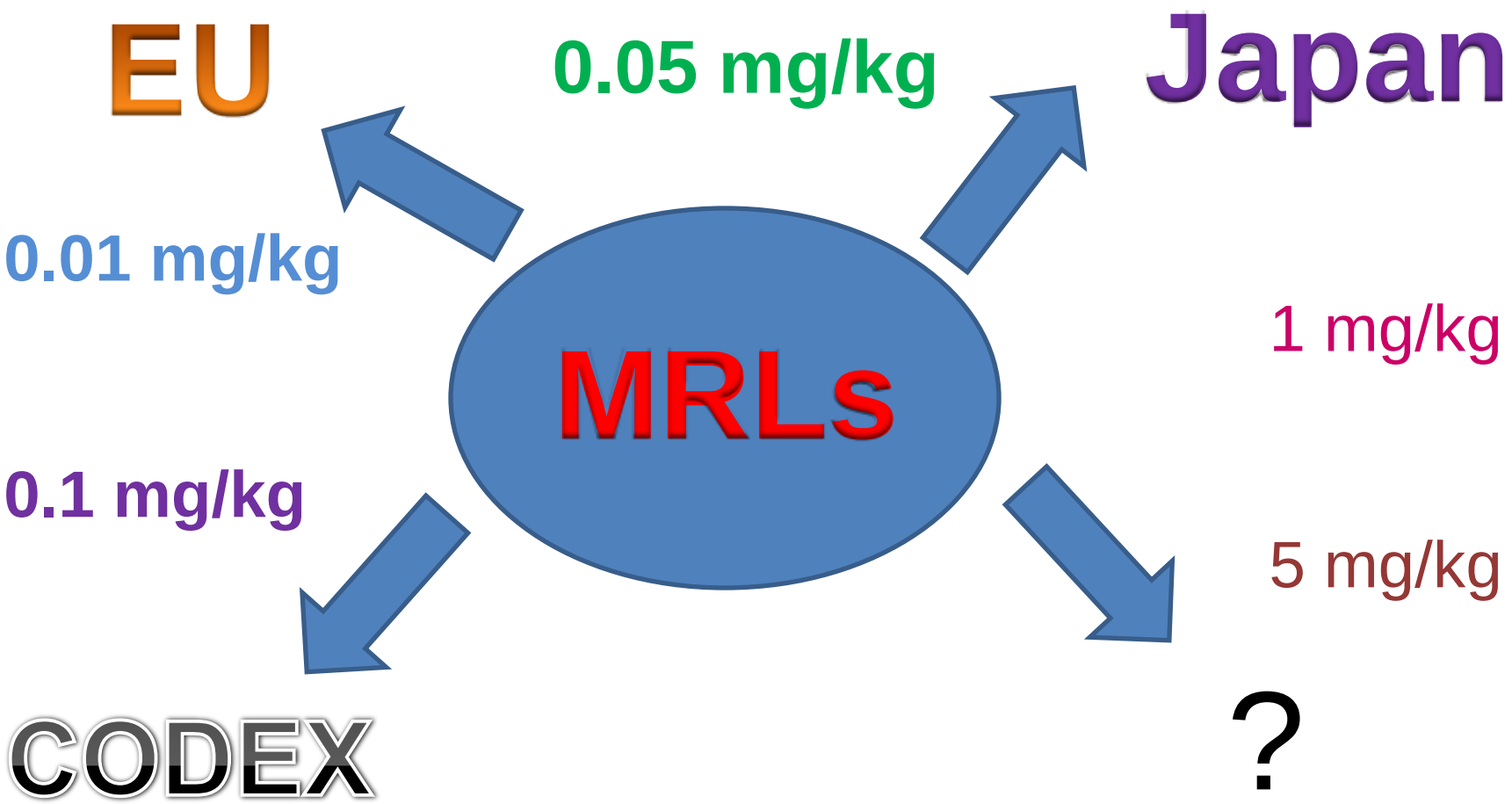



MRL….

CODEX Maximum Limit for Pesticide Residues (MRL) is the maximum concentration of a pesticide residue (expressed as mg/kg), recommended by the CODEX Alimentarius Commission to be legally permitted in or on food commodities and animal feeds. MRLs are based on GAP data and foods derived from commodities that comply with the respective MRLs are intended to be toxicologically acceptable

Codex website at: http://www.codexalimentarius.net

MRL



MRLs of TRI Recommended Pesticides (mg/kg)

Pesticide	Japanese MRL	EU MRL
2,4-D	0.01	0.1
Azadirachtin	Exempted	0.01
Bitertanol	0.1	0.1
Carbofuran	0.2	0.05
Carbosulfan	0.1	0.1
Chlorfluazuron	10	Exempted
Copper salts	Exempted	40 as Cu
Dazomet	0.1	0.02
Diazinon	0.1	0.02
Diuron	1	0.1
Fenthion	0.01	0.05
Glufosinate am.	0.5	0.1
Glyphosate	1.0	2.0

MRLs of TRI Recommended Pesticides (mg/kg) contd.

Pesticide	Japanese MRL	EU MRL
Hexaconazole	0.05	0.05
Imidachlorprid	10	0.05
MCPA	0.01	0.1
Metam Sodium	0.1	0.02
Oxyfluorfen	0.01	0.05
Paraquat	0.3	0.05
Phenamiphos	0.05	0.05
Propargite	5.0	5.0
Propiconazole	0.1	0.1
Sulfur	Exempted	Exempted
Tebuconazole	30	0.05
Tebufenozide	25	0.1

JMPR/GAP/FAO

Supervised field trials for 17 pesticides used in tea have been already carried out.

When the MRLs are not achievable. TRI files application to EU/JAPAN with experimental evidence

Analysis is done only by an accredited lab in Germany

Expensive exercise

Analytical Contribution of TRI

Methods developed by TRI

1. Hexaconazole
2. Propiconazole
3. Bitertanol
4. Tebuconazole

GC-MS

5. Pyraclostrobin (to be recommended)

6.MCPA — Derivatization followed by GCMS

Heavy Metals – SLTB Standard

Heavy Metal	Accepted Limit mg/kg	Test Method
Iron	max 500	AOAC:975:03
Copper	max 100	AOAC:971:20
Lead	max 2	AOAC: 972:25
Zinc	max 100	AOAC:969:32
Cadmium	max 0.2	AOAC:973:34

Microbiological Requirements
SLTB Standard

Standard	Accepted Limit	Test Method
Aerobic Plate Count	Max . 10,000 cfu/g	ISO 4833:2003
Yeast & mould	Max. 1000 cfu/g	ISO 21527-2-2008
Total *Coliforms*	Max. 10 MPN/g	ISO 4831:2006
E.coli	Absent/g	ISO 7251:2005
Salmonella	Absent/25 g	ISO 6579:2002

Food Adulteration

A substance has been added or mixed or packed with it to increase its bulk or weight, or reduce its quality or strength, or make it appear better or of greater value than it is.

Classic Examples of Food Adulteration

Black Pepper

Papaya seeds

Chili powder

Powdered bricks /Sudan dye

Coconut oil

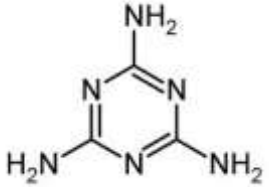
Palm oil

Milk fat

Animal fat

Milk protein

Melamine



Importance of Prevention of Adulteration

Authentication of food products is of primary importance for both consumers and industries, at all levels of the production process, from raw materials to finished products.

From the legislative point of view, quality standards have been established through the requirement of quality labels that specify the chemical composition of each product.

Detected Adulterations

28 Suspensions/Compounding of the offence / Cancellation – 2011 (up to May)

Made by SLTB*

*** Source – Tea Commissioner**

Ultimate Goal

CEYLON TEA
Symbol of Quality

OUR RESPONSIBILITY