WEEKLY EPIDEMIOLOGICAL REPORT

A publication of the Epidemiology Unit
Ministry of Health

231, de Saram Place, Colombo 01000, Sri Lanka
Tele: + 94 11 2695112, Fax: +94 11 2696583, E mail: epidunit@sltnet.lk
Epidemiologist: +94 11 2681548, E mail: chepid@sltnet.lk
Web: http://www.epid.gov.lk

Vol. 40 No.40 **28th September – 04th October 2013**

VER SRI LANKA - 2013

TEA

Background

Tea is one of the most commonly consumed beverages in the world. It is an infusion of the dried leaves of *Camellia sinesis*, a member of Theaceae family. Tea is cultivated in at least 30 countries around the world and it is an evergreen shrub or tree that can grow to a height of 30 feet, but is usually clipped to a height of 2.5 feet in cultivation. Older leaves are considered to be inferior in quality and freshly harvested young tea leaves are processed differently in different parts of the world to give Oolong tea (2%), Green tea (20%) and Black tea (78%).

Green tea is prepared from the fresh tea leaves and widely consumed in Japan and China. Western cultures favour black tea which is prepared through the oxidation, a curing process of maceration and exposure to atmospheric oxygen. The consumption of oolong tea is mostly confined to China and Taiwan and roasted tea is consumed mostly in Japan. Green and roasted teas are steamed to avoid enzymatic oxidation; oolong tea is semi-fermented to permit a moderate level of enzymatic oxidation during processing.

'Healthy Foods' containing active scavengers of free radicals are very popular nowadays. It is widely accepted that phenolic compounds contained in certain foods have potential health benefits. Tea leaves as well as the resulting beverage tea are known to possess high amounts of polyphenols, especially flavanols, including catechins. Many in vitro and in vivo effects of tea polyphenols have been reported including antioxidant, anticarcinogenic and hypolipidemic properties.

Chemical composition of tea

All varieties of tea are rich in polyphenolic compounds which are also present in red wine, fruit and vegetables. Fresh tea leaf is rich in water soluble polyphenols, particularly flavanols such as flavanol gallate and flavanol glycosides. The major tea catechins [α-epigallocatechin-3-gallate (EGCG), α-epigallocatechin (EGC), αepicatechin-3-gallate(ECG), α-epicatechin (EC), α-epicatechin-3-gallate (ECG), α-epicatechin (EC), α-gallocatechin and β-catechin] constitutes 30% to 42% of the green tea solids by weight. Caffeine accounts for 3% to 6%. The composition varies with the cultivation conditions and subsequent processing of the tea.

The process of making Black tea comprises of oxidation of the flavanols and flavanol gallates and to a lesser extent, the flavanol glycosides (especially myricetin) and the non-flavanoid theagallin. These transformations produce a unique range of pigments including the brownish thearubigins and the red-orange theaflavins, theaflavic acids and theaflavins. Theaflavins contribute to the taste, the bright red orange colour of black tea, and account for 2% to 6% of the dry weight of black tea extracts. Black tea contains greater proportion of the complex catechins such as epigallocatechin gallate and other phenols such as theaflavins and the rubigins generated by the oxidation processes used in tea production.

Tea with antioxidant property

In human body, different protection mechanisms are present to combat free radicals. Also, there is equilibrium between pro-oxidative and antioxidant process, and when this equilibrium is disturbed in favour of free radicals, oxidation stress results. The oxidation of lipoproteins I cell wall plays an important role in the development of atherosclerosis. These changes can result in the total closure of the artery, which could cause angina or vascular occlusion. It is well established that other pathological states such as cancer, rheumatoid arthritis, ischaemic reoxygenation injury of the liver and other organs are set off by oxidation processes.

The powerful antioxidant properties of the tea are

Contents	*Page*

generally attributed to its flavonoid components; theaflavins, bisflavanols and theaflavic acids. These compounds are all potent antioxidant in vitro and, when consumed, may act as the free radical scavengers which remove endogenously generated superoxide, peroxyl and hydroxyl radicals. The antioxidant property of tea is also associated with several other mechanisms e.g. depolarization of electrons, formation of intramolecular hydrogen bonds, rearrangement of the molecular structure. These compounds may also prevent oxidative reactions by chelating free copper and iron, which may catalyze the formation of reactive oxygen species in vitro.

The antioxidant flavanoids appear to be readily taken up by the human gastrointestinal tract. Five cups of tea consumed at 2-hours intervals was sufficient to elevate plasma catechin concentrations by up to 12-fold in a UK based study. Consumption of black tea with milk did not impair the bioavailability of tea catechins.

Tea with anticancer property

Many epidemiological, case-control and cohort studies have been conducted to investigate the effects of tea consumption on human cancer incidence. In a Japanese cohort study, a negative association was found between green tea consumption and total cancer incidence, especially among females drinking more than 10 cups per day. The effect of tea on stomach cancer has been the most extensively studied. Of 15 studies, five case-control studies showed a protective effect of tea on the risk of stomach cancer. Several studies have been done on tea drinking and colorectal cancer, with inconclusive or no evidence of an association. A recent study on middle-aged Finnish men indicated a positive association between increased green tea consumption and colon cancer risk. A large study of pancreatic, colon and rectal cancers indicated decreased incidents of these cancers with consumption of tea.

The results from the epidemiological studies regarding tea intake and lung cancer are unclear because smoking factor was not taken into account in the study design. There is also some evidence that green tea polyphenols have a chemopreventive effect against cancers in smokers. The frequency of sister-chromatid exchange in lung cells was lower in smokers who consumed green tea. In a seven-year follow-up study of patients with breast cancer, it was found that increased consumption of green tea was associated with decreased numbers of axillary lymph node metastases especially among premenopausal patients with stage I and II breast cancers. Early studies have linked tea drinking to both increased and decreased risks of esophageal cancers, but recent studies have shown that the positive association between tea and esophageal cancer was because of the high temperature at which the tea is consumed.
Findings from the largest study of esophageal cancer conducted in China suggested that, barring the effect of temperature, drinking green tea decreases the risk of esophageal cancer.

The anti-carcinogenic activities of tea polyphenols are generally believed to be related to their antioxidative properties. Tea may affect the metabolism of carcinogens by induction or inhibition of various cytochrome P450s, but the practical importance of this mechanism is not known. Among the phase II enzymes, tea increases glucuronyl transferase activity, which may facilitate the detoxification pathway of certain carcinogens. Inhibition of tumor promotion-related enzymes, such as lipoxygenase and cyclooxygenase, ornithine decarboxylase, protein kinase and 5α steroid reductase isoenzymes has been shown. The antiproliferative effect of tea polyphenols has been demonstrated at both the initiation stage and the progression stage of lung tumorigenesis. In cell lines, EGCG and other tea catechins have been shown to inhibit cell growth and transformation. Green tea polyphenols also enhance apoptosis, and this has been shown in many cancer cell lines. It is suggested that a prooxidative mechanism may be involved.

EGCG has also been shown to inhibit angiogenesis by inhibiting the growth of endothelial cells whereas green tea reduced significantly vascular endothelial growth factor induced corneal neovascularization.

Green tea and ethanol intoxication

The defence against long-term ethanol exposure is provided by both endogenously synthesized and exogenous antioxidants. The latter are derived from beverages and diet. The therapeutic effect of tea in alcoholism is associated with its catechins. These compounds possess the ability of preventing the formation of oxygen free radicals, by inhibiting the activity of the enzymes involved in their generation. The liver is the richest source of xanthine oxidase, a superoxide anion generator, especially during ethanol metabolism. Green tea extract inhibits the activity of xanthine oxidase in vitro, thus inhibiting superoxide anion generation.

Anticaries effect of tea

With respect to the effect of tea extracts on dental caries, Oolong tea extract (OTE) has been reported to contain substances, notably polyphenols, that have antibacterial properties against oral pathogens, such as Streptococcus mutans, the bacteria closely associated with dental caries. Some studies suggested that a diet supplemented with green tea may be beneficial in dental caries management.

Green tea and coffee contain varying amounts of fluoride. Cariostatic properties of fluoride in water supply, dentifrices and topical gels have been documented. However, most of the reports suggest that the anti-caries effect observed with green tea is due primarily to the antibacterial properties of the organic components (polyphenols, tannins) rather than the cariostatic effect of fluoride.

Conclusion

Most of the effects of tea are associated with flavonoids and their antioxidant potential. These manifest counter-acting power of body towards naturally generated or externally invaded oxidizing species. The polyphenols present in tea can also decrease the risk factor of specific type of cancers by inducing phase I and phase II metabolic enzymes that increase the formation and excretion of detoxified metabolites of carcinogens. The research interest based on tea components may provide an approach to decrease the incidence of and mortality from various diseases. Overall tea is an affordable beverage of natural origin compared to modern beverages such as soft drinks.

Source-Health Benefits of Tea Consumption-available from *www.ajol.info/index.php/tjpr/article/download/14660/59734*

Compiled by Dr. Madhava Gunasekera of the Epidemiology Unit

Table 4: Selected notifiable diseases reported by Medical Officers of Health 21st – 27th September (39th Week)

RDHS	Dengue Fever		Dysentery		Encephaliti		E Fever		F Poisoning		Leptospiro		T Fever		V Hepatitis		H Rabies		Chicken-		Meningitis		Leishmaniasis		WRCD %	
	A	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**A**	**B**	**T***	**C****
Colombo	108	7601	3	161	0	17	4	121	3	51	2	170	0	7	1	67	0	1	4	349	0	53	0	0	**85**	**15**
Gampaha	50	2873	3	168	0	14	1	44	0	29	12	318	0	16	5	161	0	0	3	134	2	79	0	5	**93**	**7**
Kalutara	25	1411	1	148	1	19	0	68	0	23	16	321	0	4	0	20	0	0	2	210	1	60	0	0	**69**	**31**
Kandy	16	1485	7	126	0	11	1	22	0	8	0	65	1	92	1	83	0	0	4	108	0	13	0	3	**83**	**17**
Matale	11	386	1	80	0	4	1	24	0	7	2	56	0	4	2	39	0	0	2	42	1	33	0	11	**92**	**8**
NuwaraEliya	4	206	1	134	0	2	0	9	5	217	0	23	0	57	1	20	0	0	1	100	0	12	0	0	**62**	**38**
Galle	16	727	3	96	0	18	0	4	1	80	6	187	2	49	1	13	1	2	5	269	0	43	0	0	**95**	**5**
Hambantota	4	273	0	46	0	3	1	15	0	32	2	159	0	61	0	79	0	0	0	86	0	44	2	272	**92**	**8**
Matara	7	395	3	68	1	11	1	28	0	27	2	129	3	77	3	134	0	2	5	227	2	66	3	77	**100**	**0**
Jaffna	7	579	21	271	2	10	4	294	8	96	0	8	0	326	3	17	0	1	2	131	0	51	0	0	**100**	**0**
Kilinochchi	1	57	1	28	0	0	0	14	0	5	0	9	0	16	0	0	0	1	0	2	0	7	1	11	**75**	**25**
Mannar	2	63	2	61	1	2	1	58	0	36	0	14	0	18	0	2	0	0	0	11	0	5	0	4	**40**	**60**
Vavuniya	2	63	5	46	0	12	0	10	1	19	0	50	0	2	0	3	0	2	1	22	0	32	0	8	**75**	**25**
Mullaitivu	0	107	0	16	0	2	0	8	0	35	0	37	0	6	0	1	0	2	0	8	0	5	0	14	**60**	**40**
Batticaloa	3	490	4	251	0	5	2	8	3	70	0	31	0	2	1	12	0	3	0	39	0	7	0	0	**100**	**0**
Ampara	8	157	5	128	0	1	0	4	1	10	2	33	0	1	1	7	0	0	1	76	0	16	0	3	**100**	**0**
Trincomalee	1	181	0	57	0	3	0	5	1	3	0	59	0	11	0	3	0	1	0	36	0	4	1	28	**50**	**50**
Kurunegala	31	2448	8	147	2	33	1	38	0	23	4	268	2	39	3	49	0	1	8	302	1	94	3	40	**96**	**4**
Puttalam	7	784	1	62	0	7	0	15	1	36	1	40	0	12	0	6	0	1	5	74	0	31	0	8	**77**	**23**
Anuradhapur	13	447	3	87	0	16	0	3	0	38	3	299	1	22	3	23	0	2	0	155	1	87	9	341	**79**	**21**
Polonnaruwa	6	365	6	63	0	1	0	14	1	62	1	153	0	3	1	28	0	2	0	115	0	16	3	140	**57**	**43**
Badulla	6	428	7	160	0	4	1	17	1	10	5	52	4	72	3	43	0	0	2	104	4	56	0	7	**82**	**18**
Monaragala	5	206	4	101	0	4	0	21	5	25	0	193	1	53	10	149	0	1	2	46	0	23	0	10	**73**	**27**
Ratnapura	18	1543	6	310	0	83	0	37	0	16	7	296	2	57	15	366	0	1	4	138	0	73	0	12	**78**	**22**
Kegalle	11	937	2	106	0	15	0	25	0	11	6	175	2	69	0	186	0	0	6	272	0	97	0	1	**73**	**27**
Kalmune	1	489	3	131	0	2	0	3	0	114	0	8	0	2	1	5	0	0	1	77	0	8	0	1	**62**	**38**
SRI LANKA	**363**	**24701**	**100**	**3052**	**07**	**299**	**18**	**909**	**31**	**1083**	**71**	**315**	**18**	**1078**	**55**	**1516**	**01**	**23**	**58**	**313**	**12**	**1015**	**22**	**996**	**82**	**18**

Source: Weekly Returns of Communicable Diseases (WRCD).

***T=**Timeliness refers to returns received on or before 27th September , 2013 Total number of reporting units 339. Number of reporting units data provided for the current week:276 C** Completeness

A = Cases reported during the current week. **B** = Cumulative cases for the year.**H Rabies***= Human Rabies, **E Fever***=Enteric Fever, **F Poison*** =Food Poisoning, **T Fever***=Typhus Fever, **V Hepatitis***=Viral Hepatitis

Table 1: Vaccine-Preventable Diseases & AFP 21st – 27th September 2013 (39th Week)

Disease	No. of Cases by Province									Number of cases during current week in 2013	Number of cases during same week in 2012	Total number of cases to date in 2013	Total number of cases to date in 2012	Difference between the number of cases to date in 2013 & 2012
	W	C	S	N	E	NW	NC	U	Sab					
AFP*	00	00	00	00	00	00	00	00	00	00	00	68	60	+ 125.0 %
Diphtheria	00	00	00	00	00	00	00	00	00	-	-	-	-	-
Mumps	01	01	01	03	03	04	05	00	01	19	46	1223	3721	- 67.1 %
Measles	21	01	15	00	04	13	03	01	28	96	00	2971	47	+ 6221.3 %
Rubella	00	00	00	00	00	00	00	01	00	01	-	25	-	-
CRS**	00	00	00	00	00	00	00	00	00	00	-	06	-	-
Tetanus	01	00	00	00	00	00	00	00	00	01	00	19	09	+ 111.1 %
Neonatal Tetanus	00	00	00	00	00	00	00	00	00	00	-	00	-	-
Japanese Encephalitis	00	00	00	00	00	00	00	00	00	00	-	66	-	-
Whooping Cough	00	00	01	00	00	00	00	00	00	01	05	66	81	- 18.5 %
Tuberculosis	36	00	08	01	06	00	00	09	38	98	11	6362	6414	- 0.8 %

Key to Table 1 & 2

Provinces: **W**: Western, **C**: Central, **S**: Southern, **N**: North, **E**: East, **NC**: North Central, **NW**: North Western, **U**: Uva, **Sab**: Sabaragamuwa.

RDHS Divisions: **CB**: Colombo, **GM**: Gampaha, **KL**: Kalutara, **KD**: Kandy, **ML**: Matale, **NE**: Nuwara Eliya, **GL**: Galle, **HB**: Hambantota, **MT**: Matara, **JF**: Jaffna, **KN**: Killinochchi, **MN**: Mannar, **VA**: Vavuniya, **MU**: Mullaitivu, **BT**: Batticaloa, **AM**: Ampara, **TR**: Trincomalee, **KM**: Kalmunai, **KR**: Kurunegala, **PU**: Puttalam, **AP**: Anuradhapura, **PO**: Polonnaruwa, **BD**: Badulla, **MO**: Moneragala, **RP**: Ratnapura, **KG**: Kegalle.

Data Sources:

Weekly Return of Communicable Diseases: Diphtheria, Measles, Tetanus, Neonatal Tetanus, Whooping Cough, Chickenpox, Meningitis, Mumps., Rubella, CRS,

Special Surveillance: AFP* (Acute Flaccid Paralysis), Japanese Encephalitis

CRS =**Congenital Rubella Syndrome

AFP and all clinically confirmed Vaccine Preventable Diseases except Tuberculosis and Mumps should be investigated by the MOH

Dengue Prevention and Control Health Messages

Look for plants such as bamboo, bohemia, rampe and banana in your surroundings and maintain them free of water collection.

PRINTING OF THIS PUBLICATION IS FUNDED BY THE WORLD HEALTH ORGANIZATION (WHO).

Comments and contributions for publication in the WER Sri Lanka are welcome. However, the editor reserves the right to accept or reject items for publication. All correspondence should be mailed to The Editor, WER Sri Lanka, Epidemiological Unit, P.O. Box 1567, Colombo or sent by E-mail to **chepid@sltnet.lk. Prior approval should be obtained from the Epidemiology Unit before publishing data in this publication**

ON STATE SERVICE

Dr. P. PALIHAWADANA
CHIEF EPIDEMIOLOGIST
EPIDEMIOLOGY UNIT
231, DE SARAM PLACE
COLOMBO 10