

BIOLOGICAL TOXICOLOGY RESEARCH DIVISION

Deputy Director & Head	...	Dr. Theingi Win Myat MBBS(IM2), MMedSc(Microbiology)(IM1), PhD(Medical Microbiology)(UM2)
Research Scientist	...	Dr. Khin Hnin Pwint MBBS(IM2), MMedSc(Pharmacology)(UM2)
Research Officer	...	Dr. Lai Lai San MBBS(IM2), MMedSc(Microbiology)(UM2)
	...	Daw Thin Thin Wah BSc(Hons)(Zoology), MSc(Zoology)(YU)
	...	Dr. Kyi Kyi Nyein Win MBBS(IM1), MMedSc (Microbiology)(UM1)
Research Assistant (2)	...	Daw Tin Tin Htwe BSc(Zoology)(YU)
	...	Daw May Than Htay BSc(Hons)(Zoology), MSc(Zoology)(YU)
	...	Daw Zin Mi Thein BSc(Mathematics)(YU)
Research Assistant (3)	...	Daw Nilar BSc(Zoology)(YU)
	...	Daw Wai Lwin Oo
	...	Daw Myo Myo Kyaw BSc(Chemistry)(YU)
Research Assistant (4)	...	U Kyaw Kyaw San BSc(Zoology)(YU)
Laboratory Attendant	...	Daw Tin Htet Htet Aung BSc(Chemistry)(DU)

Under the National Poison Control Centre (NPCC), Biological Toxicology Research Division is mainly involved in the research area of Environmental Health and conducting research on toxins produced by the living organisms. During 2015, projects relating to food safety were undertaken.

RESEARCH PROJECTS

1. ENVIRONMENTAL HEALTH

1.1. Evaluation on the Medical Waste Disposal practices in different sectors at Yangon area

This research work was done in Yangon Region during the period between 2015 and 2016. Private clinics conducting general practice, small scale laboratory services and some poly-clinics were included in this study. Practical and actual means of disposing medical wastes were investigated visually; starting from the generation of waste to final disposal at waste destination sites. People operating in these areas were also asked with structured pretested questionnaire focusing on their knowledge, attitude and practice on the waste disposal means. Findings revealed that almost all the personnel related in waste generation, handling, segregation, packaging and conveying steps obey the rules and regulations set by the authorities concerned. They use proper color bags to separate infectious materials, recyclables and reusable objects. By this way final disposing party can easily evacuate the wastes and the relationship between the waste generators and cleaners becomes smooth leading to smoothness of the disposal pathways. Manpower development and increasing financial allowance for waste disposing were the key factors for improving better environmental hygiene and diminishing hazards occurring from the wastes generated by the medical professions.

1.2. Detection of *Vibrio parahaemolyticus* from Oysters and Clams in Yangon

Seafood is a nutrient-rich part of a healthful diet. Nowadays, oysters and clams consumption are popular in public together with increasing seafood related illnesses in Myanmar. This study was conducted to study the occurrence of *Vibrio parahaemolyticus* from oysters and clams from some selected markets in Yangon Region. A total of 124 samples (60 oysters and 64 clams) were tested from January to August 2015. *Vibrio parahaemolyticus* was isolated from 5.6% of samples (7/124); 6.7% of oysters (4/60) and 4.7% of clams (3/64). All 3 isolates from clams were detected during summer months, one isolate in March and 2 isolates in May. The serological identification of pandemic O3:K6 serotype was done but only 2 isolates showed agglutination with O3 antisera and no isolate showed agglutination with K6 antisera. It showed that identified serotype in this study was not the same as globally spreading serotype. Concerning the antibiotic susceptibility, all of the isolates were sensitive to Norfloxacin, Chloramphenicol, Co-trimoxazole and Doxycycline but all isolates were resistant to Ampicillin, 2 isolates were resistant to Gentamicin and one isolate was resistant to Cefotaxime. This study revealed that although seafood consumption was health tips, raw seafood consumption pointed out some health hazards. Therefore, thorough cooking of shellfish and preventing raw seafood from cross-contaminating other foods are effective measures for consumers to reduce risk.

1.3. Determination of Aflatoxin B1 in commercially available chilli and turmeric powder from four Townships in Yangon

Aflatoxin B1, a prototype of the aflatoxin produced by *Aspergillus* species is widely recognized as the most potent hepatocarcinogenic compound. A total of 120 samples, 60 chilli powder and 60 turmeric powder were collected from commercial outlets of 4 townships in Yangon and estimation of aflatoxin B1 was done by indirect competitive ELISA. The results showed that almost all of the samples were contaminated with aflatoxin B1 (i.e., 96.7% of chilli powder and 98.3% of turmeric powder), ranging from 0.59 to 7.39 µg/kg and 0.60 to 7.98 µg/kg respectively. There were 8(13.3%) chilli powder samples and 6(10%) turmeric powder samples containing aflatoxin B1 levels exceeding the maximum level specified by European Commission (i.e., 5µg/kg). Aflatoxin B1 contamination was significantly increased in summer and rainy seasons as aflatoxin B1 levels of greater than 5µg/kg were found in both chilli and turmeric powder samples collected in these 2 seasons (6 in summer and 8 in rainy season). In comparing the packed and unpacked samples, all the packed samples were contaminated with aflatoxin B1 and 94.4% of unpacked chilli and 97.2% of unpacked turmeric contaminated with aflatoxin B1. Therefore, there is a need to have regulations for aflatoxin B1 contamination and regular monitoring of food and feed commodities in Myanmar.

1.4. Identification of drugs dispensed by private drug shops to common cold and acute diarrhoea patients in Yangon Region

In developing countries, people seek care in private drugstores for minor ailments as well as serious diseases. Concerns have been raised low quality of practice, insufficient drug-seller training and knowledge as well as regulatory infringements in these stores. The aim of the present study was to identify drugs dispensed by private drug shops to customers with the complaint of common cold and acute diarrhoea in Yangon Region. A cross-sectional descriptive study was done. Mystery clients went to 8 drug shops in Kyee Myin Daing and South Okkalapa townships asking to sell drugs for their symptoms. Purchased drugs were identified by FTIR (fourier transformed infrared spectrophotometer). For scenario of an adult

with common cold, drug shops gave 3 to 5 drugs. All drug shops sold acetaminophen (8/8; 100%) where 62.5% of drug shops included antibiotic, vitamin C, antacid (5/8). Three out of 8 drug shops gave antihistamine, anti-inflammatory (3/8; 37.5%) and one shop sold steroid (1/8; 12.5%). For scenario of a child with common cold, drugs given were Mixaflu (a combination of acetaminophen, dextromethophen, phenylpropanolamine, chlorpheniramine) (3/8; 37.5%), antibiotic (3/8; 37.5%), vitamin C (3/8; 37.5%), antacid (3/8; 37.5%), anti-inflammatory, steroid, and Terco D (a combination of dextromethophan, terpin hydrate, guaiphenesin) (1/8, 12.5%). For scenario of an adult with acute diarrhoea, types of drug were antibiotic (5/8; 62.5%), loperamide (3/8; 37.5%), probiotic (2/8; 25%), antacid (2/8; 25%), Disento (a combination of di-iodohydroxyquin, furazolidone, neomycin, phthalyl-sulfathiazole, light kaolin) (1/8; 12.5%) and ORS (1/8; 12.5%). For scenario of a child with acute diarrhoea, drugs dispensed were antibiotic (4/8; 50%), ORS (4/8; 50%), loperamide (3/8; 37.5%), probiotic (2/8; 25%), domperidone (1/8; 12.5%), and Disento (1/8; 12.5%). The results showed inappropriate practice of drug sellers selling antibiotic and steroid over the counter and highlighted a need of strict regulation in licensing drug shops and regular monitoring of their practices.

1.5. Determination of Tricothecene T-2 Mycotoxin in Junk foods sold in food stalls located inside the compounds of some selected Basic Education Primary Schools in Yangon Region

T-2 mycotoxin (Tricothecene type A) is natural toxic secondary metabolite produced by certain *Fusarium* species, which grow on various agricultural commodities in field, and or during post harvest period (transport, processing and storage). T-2 toxin is toxic to humans as well as animals and can penetrate or permeate through the human skin. The cellular effects of T-2 toxin are inhibition of DNA and RNA synthesis, apoptosis, effects on membranes and lipid peroxidation. The aim of the study is to find out the T-2 mycotoxin in cereal-based junk food from food stalls. A cross-sectional laboratory based analytical study was conducted during July to September 2015. Wheat, rice, corn, wheat and corn mixed, wheat, rice and corn mixed and wheat and rice mixed based food samples, 55, 5, 4, 5, 7 and 6 respectively were collected from ten food stalls at the vicinity of primary schools in Yangon region. A total of 82 samples were tested by using commercially available T-2 toxin ELISA test kit (Max signal). Forty six samples (56.1%): 30 in wheat (54.55%), 2 in rice (40%), 2 in corn (50%), 5 in wheat+corn (100%), 5 in wheat+rice+corn (71.43%) and 2 in wheat+rice (33.33%) were contaminated with T-2 toxin. The contaminated levels of T-2 mycotoxin are shown in following table.

Table. Analyzed cereal based food samples and concentration of T-2 Mycotoxin

Types of Cereal based food samples	Positive		T-2 Mycotoxin contamination ($\mu\text{g}/\text{kg}$)			
	Quantity	%	Minimum	Maximum	Mean \pm SD	Median
Wheat (n=55)	30	54.55	1.38	52.42	17.49 \pm 15.9	11.26
Rice (n=5)	2	40	0.74	2.13	1.44 \pm 0.99	-
Corn (n=4)	2	50	2.55	21.59	12.07 \pm 13.47	-
Wheat +Corn (n=5)	5	100	1.82	12.67	7.05 \pm 4.25	6.37
Wheat+Rice+Corn (n=7)	5	71.43	1.17	19.08	7.48 \pm 7.63	4.33
Rice + Wheat (n=6)	2	33.33	15.12	19.08	17.10 \pm 2.8	-
Total (n=82)	46	56.10	0.74	52.42	14.32 \pm 14.03	8.86

SERVICES PROVIDED

1. ACADEMIC

Sr.	Name	Designation	Course	Responsibility
1.	Dr. Theingi Win Myat	Deputy Director & Head	Workshop on Research Methodology (2015) Bioterrorism and Forensic Microbiology MMedSc (Medical Jurisprudence) Students Biological Toxins and its analytical methods MMedTech (Medical Laboratory Technology) Students	Presenter & Facilitator Training and Practical Demonstration Training and Practical Demonstration
2.	Daw Thin Thin Wah	Research Officer	Biological Toxins and its analytical methods MMedTech (Medical Laboratory Technology) Students	Training and Practical Demonstration

2. POISON INFORMATION SERVICE

Biological Toxicology Research Division is actively involved in poison information service to provide appropriate informative answers to the clinicians and the public throughout the country. It includes diagnostic strategies and therapeutic suggestions concerned with biological toxins. The answers are given by Line Telephone (01379480) and CDMA mobile telephone (0973155342). Line telephone is used during office hours and mobile phone for out of office hours.