

UNIVERSITY OF RUHUNA

Bachelor of Science in Fisheries and Marine Sciences degree,

Level III Semester I – 2016 July/August

LIM3122 Ecological and Human Health risk of Pollutants

Answer all questions

Time: 2hours

1. Cd concentrations of reservoir water, fish flesh, and polished rice were determined for five replicates of each and the readings are given in the following table.

Replicate number	Cd concentration of water (mg/l)	Cd concentration in polished rice ($\mu\text{g/g}$ dry weight)	Cd concentration in fish flesh ($\mu\text{g/g}$ dry weight)
1	0.05	0.092	0.09
2	0.03	0.087	0.08
3	0.04	0.093	0.08
4	0.05	0.092	0.07
5	0.02	0.086	0.09

- i). Taking average daily rice consumption as 0.38 kg and average daily fish consumption as 0.14 kg calculate the Hazzard Index (HI) for Cd in food and water in a population of age group 30-39 years and average body weight of 57.8 kg.
- ii). Explain HI values for the considered population.

Use following standards given in the following table for your calculation,

Standard	Value
Maximum Contamination Level (MCL)	0.003 mg/l
Maximum Permissible Level (MPL) of Cd recommended for polished rice	0.4 mg/kg dry weight
Maximum Permissible Level (MPL) of Cd recommended for fish flesh	0.2 mg/kg dry weight
Recommended Provisional Tolerable Weekly Intake (PTWI)	0.007 mg/kg bw

2. Environmental risk of a pesticide was estimated using *Lemna minor*. Five tanks were used for the experiment and the concentrations used for the tanks were 0.0ppm (control), 0.5 ppm, 1.0 ppm, 1.5 ppm and 2.0 ppm respectively. After 48 hours exposure Chlorophyl concentrations and number of roots in *Lemna minor* in five experimental tanks were measured as given in the following table.

Factor	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5
Average chlorophyll concentration (mg/g)	1.25 ± 0.01	0.75 ± 0.01	0.55 ± 0.01	0.35 ± 0.01	0.30 ± 0.01
Mean number of roots in a plant	5 ± 1	4 ± 1	3 ± 1	2 ± 1	0 ± 0

- (i) Estimate the environmental risk of the pesticide using the information provided in the above table.

Use the risk criteria as EC_{50}/PEC for your calculation where,

EC_{50} = Effective Concentration,

PEC = Predicted Environmental Concentration.