CESIUM- 134 AND CESIUM- 137 RADIOACTIVITY LEVELS IN SRI LANKAN SEA WATER AFTER RECENT NUCLEAR POWER PLANT ACCIDENT IN FUKUSHIMA, JAPAN.

P.L. Wickramasooriya

Postgraduate Institute of Science

University of Peradeniya

Peradeniya

Sri Lanka.

The major radioactive contaminants released to the Pacific Ocean as a result of the recent nuclear power plant accident took place in Fukushima Japan in March 2011 were ^{134}Cs, ^{137}Cs and ^{131}I. It is important to estimate the levels of ^{137}Cs in seawater because of its long half life. This particular research was conducted to check whether there was an impact of Fukushima Nuclear Power Plant (FNPP) accident on marine water of Sri Lankan Sea and to choose the most efficient and effective method to determine the radioactive cesium in sea water.

Ion-exchange method and co-precipitation with Ammonium Molybdophosphate (AMP) method were used to pre-concentrate sea water samples and to compare the effectiveness of technique. About 100 L-150 L samples were brought to the laboratory and they were pre-concentrated using the AMP co-precipitation technique. Sampling was done from September 2011 to April 2013. The co-precipitates were measured for 72,000 seconds (20 hours) using a hyper pure germanium detector system (HPGe). The radioactive isotopes of ^{137}Cs was detected in trace levels whereas ^{134}Cs isotopes was not found in detectable levels in all sea water samples analyzed. The levels of ^{137}Cs ranged from 0.76 ± 0.12 to 1.72 ± 0.15 mBq/L (MDA, Minimum Detectable Activity was 0.42 mBq/L). The recovery of AMP co-precipitation method was 86%.

The recovery of ^{137}Cs in AMP method was much larger than in ion-exchange chromatography method. Therefore co-precipitation with AMP found to be the most effective method of analysis for cesium isotopes in sea water for us. Non-detection of ^{134}Cs by this preliminary study reveals that the ocean around Sri Lanka has not been contaminated by radioactive traces released due to FNPP accident. However all the samples analyzed had shown the presence of a trace amount of radioactive ^{137}Cs suggesting the occurrence of background levels of ^{137}Cs in sea water. This could possibly be due to the different inputs of ^{137}Cs into the environment that had occurred in the past such as nuclear-weapon testing and nuclear power plant accidents. However, the finding of this study will definitely be of immense use in the future as no such recorded data available for ^{137}Cs and ^{134}Cs in sea water of Sri Lanka. Therefore the present data could be utilized as baseline values

immense use in the future as no such recorded data available for ^{137}Cs and ^{134}Cs in sea water of Sri Lanka. Therefore, the present data could be utilized as baseline values to estimate whether there is any increase of radioactive Cesium in seawater due to an accidental release into the environment in future.