

**LEACHING OF ALUMINIUM AND ITS  
INCORPORATION INTO RICE DURING  
COOKING UNDER DIFFERENT FLUORIDE  
CONCENTRATIONS IN WATER**

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## ABSTRACT

Majority of the people in Sri Lanka use aluminum cooking utensils for cooking rice and other types of food. Aluminum is toxic to human if injected in excessive concentrations. Leaching of aluminum from cooking utensils has been reported by several investigations. Since fluoride in water has an affinity to make complex ions with aluminum. Fluoride in cooking water can enhance attraction of aluminum in to the cooking medium and hence to the cooked food. Under the present study natural aluminum level and leaching of aluminum and its incorporation in to rice during cooking under different fluoride stresses were studied. Aluminum was determined using a UV Spectrophotometric method. The experiment was done in the laboratory where rice was cooked in a glass beaker with an aluminum plate in it under different fluoride concentrated water. Samples were then digested so that aluminum could be determined by spectrophotometrically.

Natural aluminum level of the raw rice (*Oryza sativa*) was significantly large. It was observed a concentration of 0.2038 mg/g aluminum in rice. Rice cooked at the present of aluminum plate but without fluoride water shows an addition of 0.0065 mg/g aluminum to rice. An addition of 0.1367 mg/g aluminum was noted at a fluoride concentration of 6 mg/l in water which is comparative to highest fluoride levels of Sri Lankan ground water. Total aluminum was found to be high in the rice cooked under normal water as well as in the fluoride rich water. Aluminum in cooked rice increased with the increasing fluoride concentration in the water. It was found that total aluminum level in cooked rice was 0.2135 mg/g when cooked in fluoride free water and it was 0.3438 mg/g at 6 mg/l fluoride in water.

The maximum allowed aluminum intake per normal person is 0.1428 mg/kg body weight per day. Based on the assumption that one person who eat 250 g rice per day, the aluminum intake according to present experiment is greater than 0.1428 mg/kg and hence risky. Present study shows that Sri Lankan community in areas of fluoride rich ground water are vulnerable to inject of high aluminum at toxic levels through aluminum cooking utensils alone. The risk can be much higher when substandard aluminum pots that are easily dissolved in cooking medium.