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Quantification of arsenic and phosphorus in calcium carbide treated mangoes

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In Sri Lanka, unripened mangoes are harvested before maturity and are ripened artificially by treating with CaC₂. A method of artificial ripening and the acceptable amount of CaC₂ has been recommended (2 g CaC₂ per 1 kg of fruit) but vendors do not adhere to these methods. This study reports the comparison of the arsenic and phosphorus contents present in CaC₂ treated "Kantha-colomban" mangoes of local market with that of untreated mangoes. Untreated mangoes were purchased from Kurunagala area and the treated mangoes were purchased from markets at Nugegoda, Borella, and Pettah areas.

Arsine liberation by the reaction of water with calcium arsenide present in calcium carbide as an impurity which react with water was qualitatively determined using Gutzeit test. In this test yellowish stain appeared on the mercuric chloride paper which confirmed the liberation of arsine from calcium carbide. Graphite furnace atomic absorption spectrophotometric method was used to determine the arsenic concentration and ammonium molybdovanadate method was used to determine the phosphorus concentration in the samples. The control sample contained 5.1 µg/100 g of arsenic in the peel and 3.4 µg/100 g of arsenic in the pulp of the fruit. These values were significantly lower ($p < 0.05$) when compared to all the other carbide treated samples. The average arsenic content in the pulp of the calcium carbide treated samples was 22 µg/100 g while the average arsenic level of the peel was 37 µg/100 g. The average phosphorus content in the peel of the control sample was 8.2 mg/100g while that in the carbide treated samples was 12 mg/100 g. The phosphorus content in the pulp for the control was 6.3 mg/100 g while that in the carbide treated sample was 9.2 mg/100 g.

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