The purpose of the study was to evaluate the effect of calcium treatment methods on the fruit cracking phenomenon and quality of Rongrien rambutan (Nephelium lappaceum Linn). The experiment was carried out in My Khanh ward - Phong Dien district - Can Tho city on the five-year-old trees, in one orchard under the same care regime, in 2016 season. The amounts of inorganic fertilizer applied on all treatments were the same. Fertilizers were supplied for trees in 4 times. The first time was 0.32 kg N - 0.23 kg P\textsubscript{2}O\textsubscript{5} after harvesting, the second time was 0.1 kg N - 0.1 kg P\textsubscript{2}O\textsubscript{5} - 0.075 kg K\textsubscript{2}O 1 month before flowering, the third time was 0.1 kg N - 0.1 kg P\textsubscript{2}O\textsubscript{5} - 0.075 kg K\textsubscript{2}O at fruit set, and the final was 0.12 kg K\textsubscript{2}O after fruit set. The experiment was carried out in randomized complete block design, including four treatments with ten replications, each of which equal to one tree. Results showed that dipping directly fruits declined the proportion of fruit cracking 4.15 times and increased commercial yield 20.3%, spraying directly to fruit was 3.67 folds and 19.8%, spraying foliar and fruit was 1.93 times and 11.0% in contrast with the control (respective). All calcium supplement methods had a tendency to reduce °Brix of fruit-flesh.

**Keywords:** Calcium, ‘Rongrien’ rambutan (Nephelium lappaceum Linn), fruit cracking, ion leakage, Can Tho.