

**Thesis Title**            Tablet Disintegration Properties of Modified Tapioca Starch  
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### ABSTRACT

Crosslinked tapioca starches were prepared at several concentrations of crosslinking agent and reaction times, all were esterified to produce cold water swelling ability. Disintegration properties were evaluated at 2.0% level in hydrochlorothiazide (HCTZ) tablets using Emcompress<sup>®</sup> as direct compression filler and at 4.0% level using dicalcium phosphate dihydrate (DCP) as wet granulation filler, and PVP K90 as binder. Corn starch, tapioca starch, Explotab<sup>®</sup> and Starch 1500<sup>®</sup> were also studied and compared in direct compression tablets. It was found that non-crosslinked tapioca starch phosphate (TSP) and crosslinked tapioca starch phosphate (CL-TSPs i.e., CL0.5/6hr, CL1/6hr, CL2/6hr, CL4/6hr) produced satisfactory tablet properties, i.e., weight variation, friability and crushing strength. Disintegration times of HCTZ/Emcompress<sup>®</sup> tablets containing modified tapioca starches were found to be superior to corn starch, tapioca starch and Starch<sup>®</sup>1500, and comparable to Explotab<sup>®</sup>. Among modified tapioca starches, disintegration times of the tablets in decreasing order were CL4/6hr<CL2/6hr<CL1/6hr<CL0.5/6hr<TSP. The increase in crosslinking degree improves the disintegration time by reducing the viscosity of the swollen starch granules. Dissolution profiles of HCTZ tablets containing modified starches were found to be similar to those containing Explotab<sup>®</sup>, T<sub>60%</sub> values were not more than 20 min. Stability test was carried out at 75% RH/45°C. Starch<sup>®</sup> 1500

seemed to be most affected in disintegration time and dissolution. TSP, CL-TSPs and Explotab<sup>®</sup> exhibited satisfactory characteristics in crushing strength, disintegration time and dissolution. The disintegration time of wet granulated tablets appeared to be longer than those of direct compressed tablets. The difference could be due to method of tablet manufacturing and nature of disintegrants. However, dissolution of the tablets containing Explotab<sup>®</sup>, Ac-di-sol<sup>®</sup> and CL2/6hr easily met USP requirement.