CHAPTER VII

GENERAL CONCLUSIONS

Composite particles of rice starch and microcrystalline cellulose in this study was produced by spray drying technique for the purpose to be used as a newly directly compressible diluent in direct tabletting process. From this research, the conclusion can be drawn as follows.

The composite particles of rice grains and MCC could be successfully fabricated via spray drying technique for the purpose to be used as directly compressible diluent. Both rice flour (RF) and rice starch (RS) could form the composite particles with MCC. But RS provided more compressible particles. Though an increase in MCC proportion would impart higher compressibility, the shape of particles became more irregular. Particle size of MCC affected the sphericity of composite particles. To gain the spherical particles, size of starting MCC should be in the same size range with starch grain. Because the prime objective of this work is to develop a rice starch based coprocessed excipient and abundant supply of this type of starch with cheaper price. The composite particles of rice starch (RS) and MCC at 7 : 3 ratio was chosen and compared the powder and tabletting properties with other marketed DC diluents. Flowability of composite particles was good and likely to that of Eratab® while Vivapur®gave the poorest flowability. Although the compressibility of composite particles was lower than that of Vivapur®, its compressibility was superior to Eratab®, Cellactose®, and Tablettose®.

Concentration of feed suspension, feed rate, an atomizing pressure also affected percent yield. To get high yield, these three factors should be set at high level. Percent LOD depended on concentration and feed rate, at the high concentration of feed suspension and feed rate would decrease and increase in moisture content of powder, respectively. Only atomizing pressure influenced on flowability index with the higher atomizing pressure was, the lower flowability index was obtained. Hardness of prepared tablets was affected by feed rate which might be an increase in percent LOD hence the strength of the compact. For reduction of spray drying time, the concentration and feed rate should be set at high level. Following processing factors: concentration = 20%w/w,

feed rate = 30 g/min., inlet air temperature = 130°C, and atomizing pressure = 1 bar which provided suitable hardness of compacts and flowability index of the powder were chosen for production in larger scale. Composite particles could be scaled up and different lots of preparation showed consistency in powder and tabletting property.

The application of the composite particles in manufacture of tablets was carried out. It showed higher binding properties than Eratab®, Tablettose®, and Cellactose® but lower than Vivapur®. Like other DC diluent, negative effect of lubricant on strength of tablets was observed but did not alter the disintegration times when magnesium stearate in the range of 0.25 to 1.5 % w/w was added. Moreover, the variation in compression force did not affect its disintegration time. Dilution potential was determined by using low compressible drug (paracetamol). Composite particles exhibited dilution potential higher than Eratab®, Tablettose®, and Cellactose® but lower than Vivapur®. In production of drug products, composite particles needed lower compression force in the preparing tablets to have the same hardness than Eratab®, Tablettose®, and Cellactose®. Tablets containing isoniazid or hydrochlorothiazide as active substance made from composite particles possessed fast disintegration time and dissolution that met the requirement. Volume reduction mechanism of composite particles was less fragmentation but higher plastic deformation than that of lactose-base fillers. When compare with Vivapur®, RS/MCC and Eratab® that are starch-based fillers gave higher elastic expansion than Vivapur®, therefore lower compact strength was obtained.