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PREFORMULATION STUDIES AND COMPACTION PROPERTIES OF A NEW STARCH-BASED PHARMACEUTICAL AID

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Pregelatinized starches (PGS), as thermal modifications of starches, have improved flow and disintegrant properties in tablet formulations. The drawback of pregelatinized starch preparations is that it takes longer time to dry, even in an air oven, hence requiring enormous energy consumption. Acetone precipitation of the gelatinized starch was found to preclude this limitation. Two methods were used - cold and hot precipitations and the physical, compaction and disintegration characteristics studied. The results revealed that the acetone treated pregelatinized starch (APGS_{(cold), (hot)}) did not only retain the good powder properties of PGS but improved on them. The DSC and FTIR results were similar; indicating that the observed improved properties were not due to chemical changes in the starch granules. The SEM pictures show no observable morphological differences. The compaction characteristics showed that the mean yield pressure values calculated from the linear region of the Heckel plots as well as area under the Heckel curves values indicated APGS_{(cold), (hot)} to be the more ductile materials. The tensile strengths of APGS_{(cold), (hot)} compacts increased linearly with increasing applied pressures and indicate that the APGS_{(cold), (hot)} formed stronger compacts. The compacts of the APGS_{(cold), (hot)} were intact in water after 4 h and swelled considerably, while the PGS compacts disintegrated within 10 min. Consequently, it was concluded that the APGS_{(cold), (hot)} are superior dry binders and potential controlled release matrixing agents to PGS.

Keywords: Modified pregelatinized starch; Preformulation; Compaction; Disintegration properties; Pharmaceutical aid