Contrast on Types of Super disintegrants and their Blends

Reshma KJ[1]
Assistant Professor, Department of Pharmaceutics, The Dale View College of Pharmacy and Research Centre Trivandrum, Kerala

***Abstract*—This study aimed to convey the actions of different types of superdisintegrants. And how their actions differ from other. It also measures the variations in time for the actions. The blends of superdisintegrants were also prepared for checking their action. The method followed for the preparation of co-processed superdisintegrants is the solvent evaporation method. An emphasize was given based on the action of natural, synthetic and co-processed superdisintegrants.**

Keywords : **Co-processed, superdisintegrants, synthetic, solvent evaporation**

I. INTRODUCTION

The process of combining two or more established excipients through any appropriate process is the Coprocessing. The coprocessing of excipients, lead to the formation of excipients with superior qualities and actions. Different methods can be employed for the preparation of co-processed Superdisintegrants. They can be widely used in the preparation of tablets as well a in films or patches[1]. The vital role of Superdisintegrants can be portraited through some tests like invitro dispersion method, disintegration method etc. Superdisintegrants primarily affect the rate of disintegration, but when used at high levels it can also affect mouth feel, tablet hardness and friability[2,3]. The changes in the effects of their action were analysed by the preparation of blends of Superdisintegrants. They providing a great impact in the action of particular drugs. Some disease conditions need ambulatory care, which can be easily achieved by the application of Superdisintegrants. The inclusion of a right superdisintegrant agent improve the efficacy of certain solid dosage form. They helps to disintegrate the tablets within 15 seconds to 3 minutes. These ingredient in turn act as a bridge to increase the patient compliance[4].

II. MATERIALS AND METHODS

Guar gum and agar were the pharmaceutical grade product of Nice chemicals, Cochin (India); Crospovidone, Croscarmellose sodium and Sodium starch glycolate were pharmaceutical grade, obtained as gift samples from Yarrow chem products, Mumbai (India).

III. PREPARATION OF CO-PROCESSED SUPERDISINTEGRANTS[5, 6, 7]

Solvent evaporation method can be employed in the preparation co-processed superdisintegrants. The volatile solvent used for the purpose was Chloroform. Superdisintegrants which has to be made as co-processed blend were taken in varying ratios (1:1 & 1:2) were mixed together by the addition of 10-15ml of chloroform. The temperature was maintained at 65-70°C. The solutions were stirred thoroughly till almost all chloroform evaporated. The wet coherent mass was then granulated through sieve #60. The wet granules were dried in a hot air oven at 60°C for 30min. The dried granules were again passed through sieve # 60 in order to break lumps and then stored in an airtight container for further use.

Orodispersible tablets were prepared using different blends of Superdisintegrants.

IV. Evaluation of blends of Superdisintegrants

1. Angle of repose[8, 9, 10]

Angle of repose was determined using funnel method. The blend was poured through funnel that can be raised vertically until a maximum cone height (h) was obtained. Radius of the heap (r) was measured and angle of repose

2. Invitro dispersion time[11, 12]

In vitro dispersion time was measured by using 10ml of phosphate buffer of pH 6.8 in 25ml beaker at 37°C ± 0.5°C temperature. Time required for dispersion of the tablets was noted. Three tablets were tested (n=3). Invitro dispersion time was found and expressed in seconds.

Figure. 1

3. Wetting time[13, 14]

The method was used to measure tablet wetting time. A piece of tissue paper folded twice was placed in a small petridish (i.d.= 6.5cm) containing 6ml of water, a tablet was placed on the paper, and the time for complete wetting was measured.

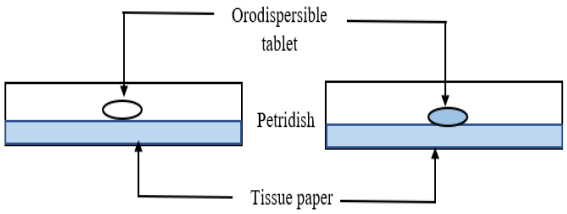
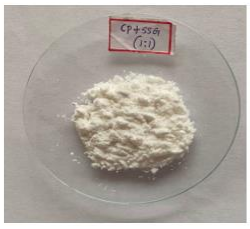


Figure 2.Wetting time of ODT

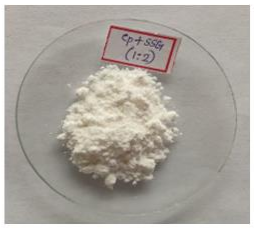
V. SOLVENT EVAPORATION FOR CO-PROCESSED SUPERDISINTEGRANTS

Solvent evaporation method was followed for the preparation of co-processed superdisintegrants. Blend of superdisintegrants were prepared by using crospovidone: sodium starch glycolate, crospovidone: guar gum, sodium starch glycolate: croscarmellose sodium and guar gum: agar in different ratios (1:1 and 1:2).

The prepared co-processed superdisintegrants are shown in **Figure 3-6**

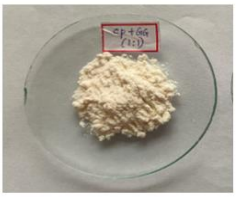


A

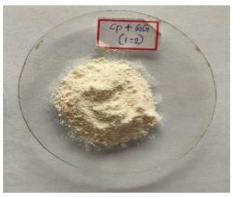


B

Figure 3: Co-processed blend of A) Crospovidone and Sodium starch glycolate (1:1) B) Crospovidone and Sodium starch glycolate (1:2)

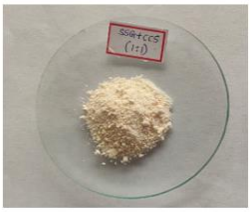


C

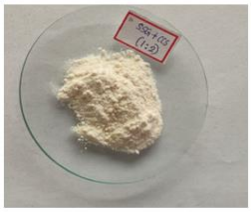


D

Figure 4: Co-processed blend of C) Crospovidone and Guar gum (1:1) D) Crospovidone and Guar gum (1:2)

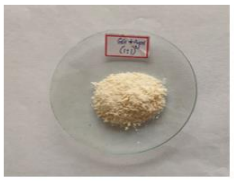


E

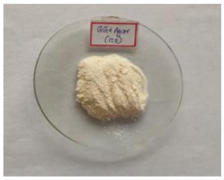


F

Figure 5: Co-processed blend of E) Sodium starch glycolate and Croscarmellose sodium(1:1) F) Sodium starch glycolate and Croscarmellose sodium(1:2)



G



H

Figure 6: Co-processed blend of G) Guar gum and Agar (1:1) H) Guar gum and Agar(1:2)

VI. RESULTS

Invitro dispersion time

The invitro dispersion time for the ODT were studied. The ODT containing synthetic superdisintegrants, crospovidone showed lesser invitro dispersion time. And formulation containing natural superdisintegrants with agar shows lesser dispersion time. And formulation with crospovidone: guar gum showed lesser dispersion time.

So the results reveals that the tablets prepared with co-processed blend of crospovidone and guar gum (1:1) ratio showed less than 30sec of dispersion time.

And the dispersion time was observed to be better in co-processed and natural superdisintegrants and found to be satisfactory with synthetic superdisintegrants.

And from the results it was clear that, as concentration of superdisintegrants increases, the invitro dispersion time also increases. Then the order of dispersion time according to different superdisintegrants can be shown in the order;

Crospovidone <Agar <Crospovidone: Guar gum(1:1)

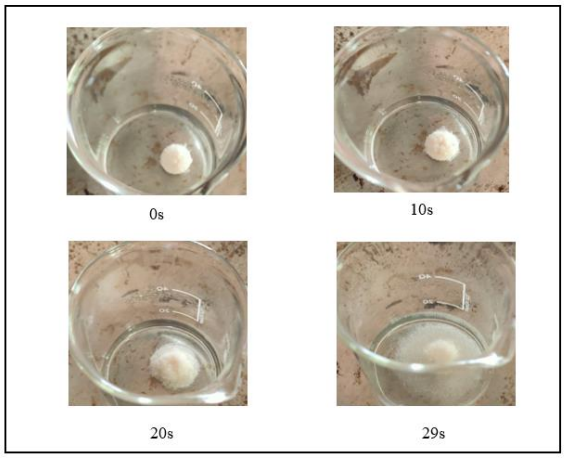


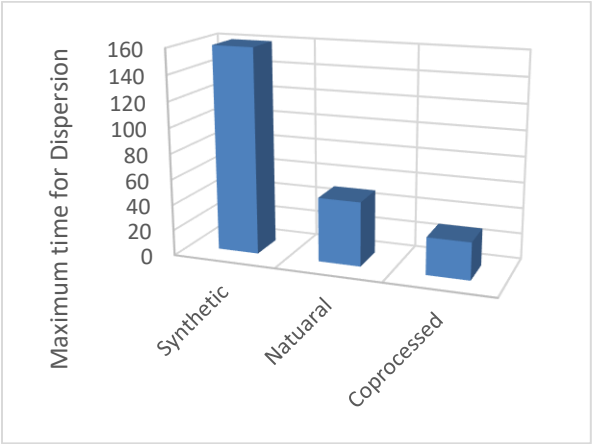
Figure 7 : Invitro dispersion time of ODT

Wetting time

The prepared ODTs were evaluated for wetting time. The wetting time of formulation containing 6% crospovidone: guar gum(1:1) showed faster wetting time.

VI. CONTRAST ON THE ACTION OF SUPERDISINTEGRANTS

From the observations it was found out that, the co-processed superdisintegrants possess a much better action than others. By following the solvent evaporation technique, the different superdisintegrants are combining. So an amalgamate action of the disintegrants can be achieved.



VII. CONCLUSION

From this study it can be concluded that, co-processed superdisintegrant of crospovidone and guar gum could be applied effectively in the preparation of ODTs with excellent invitro dispersion time and less wetting time. And the same showed better maximum drug release within short span of time. So the application of solvent evaporation method results in the formation of highly acting co-processed superdisintegrants.

VIII. REFERENCE

1. Sastry SV, Nyshdham JR, Fix JA. Recent technological advances in oral drug delivery: *A review. Pharmaceutical Science and Technology Today*. 2000;3(4):138–145.
2. Konapure AS, Chaudhari PS, Oswal RJ, Kshirsagar SS, Antre RV, Chorage TV. Mouth dissolving tablets-an innovative technology. *International Journal of Applied Biology and Pharmaceutical Technology*. 2011; 2(1): 496-503.
3. Pahwa R, Gupta N, Superdisintegrants in the development of orally disintegrating tablets: a review. *International journal of pharmaceutical sciences and research* 2011; 2(11):2767-2780.
4. Gupta G.D et al, A Mouth dissolving Tablet: A Review. *International journal of Current Pharmaceutical Research* 2011; ISSN-0975-7066.
5. Ankit A, Kiran Kumar G. B, Madhu B. K. Formulation and evaluation of orodispersible tablets of dimenhydrinate by using co-processed Superdisintegrants. *Journal of science, Engineering and technology*. 2016;12(1): 23-33.
6. Shally Sharma, Nimrata Seth, Naresh Singh Gill. Formulation and evaluation of fast dissolving tablets of buspirone using co-processed Superdisintegrants. *International Journal of Current Pharmaceutical Research.* 2019;11(5):31-37.
7. Radha Rani Earle, Lakshmi Usha. Ayalasomayajula, P. Venkatesh, P. Ganapathi Naidu, S. Vidya Sagar, Bhagya Sree Vani. Formulation and evaluation of atenolol orodispersible tablets by co-processed super-disintegration process. *International Journal of Advances in Pharmaceutics*. 2016;5(2):46-51.

8. Meghawati R. Badwar, sandhya Borse, Manish S. Junagade, Anil G. Jadhav. Formulation and evaluation of mouth dissolving tablet of Amlodipine besylate. *International Journal of Applied Pharmaceutics.* 2019;11(4):132-139.
9. T.Y. Puttewar, M.D. Kshirsagar, A.V. Chandewar , R.V. Chikhale. Formulation and evaluation of orodispersible tablet of taste masked doxylamine succinate using ion exchange resin. *Journal of King Saud University*. 2010; 22:229–240.
10. Madhuri Malang, Nidhi Jain, Ashok Koshta, Sapna Malviya and Anil Kharia. Formulation and evaluation of fast dissolving tablet of Paracetamol and Chlorpheniramine maleate. *International journal of pharmaceutical sciences and research 2020.*11(3): 1232-1242.
11. S.B Shirsand, M.S para, R.G Ramani, P.V. Swamy, D. Nagendra Kumar, M.V Rampure. Novel co-processed superdisintegrants in the design of fast dissolving tablets. *International Journal of Pharm Tech Research*. 2010;2(1):222-227.
12. Gamal Mohamed Mahrous, Mohamed Gabr Kassem, Mohamed Abbas Ibrahim, Sayed Hassan Auda. Formulation and evaluation of orally disintegrating clopidogrel tablets. *Brazilian Journal of Pharmaceutical Sciences*. 2016;52(2): 309-317.
13. T. Mamatha, Md. Zubair, N. Sarah Nasreen and Md. Ahmeduddin. Formulation and Evaluation of Oro dispersible Tablets of Fosinopril Sodium. Journal of Pharmaceutical Sciences. 14(1): 11-16.
14. P. V. Kamala Kumari, Y. Srinivasa Rao. Formulation and evaluation of orodispersible tablets of Donepezil hydrochloride. International Journal of Current Pharmaceutical Research. 2020;12(4):45-51.