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Popular Polymers used for Fabricating fast Dissolving Tablets to treat Arthritis: A Technical Review

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A B S T R A C T

A wide range of drugs have been studied in the form of fast dissolving tablets to treat arthritis. Many polymers were tried in single, combination of two and more for fabricating fast dissolving tablets to treat arthritis. An attempt has been made in gathering the information regarding which are the drugs and polymers have been tried in recent years. More than 100 articles published in journals were studied and the polymers combinations used were represented as pie diagrams. The study concludes that 42% fast dissolving tablets were prepared by using microcrystalline sodium. On the other hand the second polymer tried and succeeded was croscarmellose sodium. The34% fast dissolving tablets were prepared by using croscarmellose sodium with microcrystalline cellulose were used in combinations of two polymers category. The 22 % fast dissolving tablets were prepared by using croscarmellose sodium with sodium starch glycolate and microcrystalline cellulose was used in combinations of three polymers category.The 55% fast dissolving tablets were prepared by using microcrystalline cellulose with sodium starch glycolate, crosscarmellose sodium and crospovidone were used in combinations of four and above polymers category.

Keywords: Fast dissolving tablets, Arthritis, polymers, survey

A R T I C L E I N F O

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1. Introduction

Typically, pain, aching, stiffness and swelling in and around one or more joints characterize rheumatic conditions. The symptoms can develop gradually or suddenly. Certain rheumatic conditions can also involve the

immune system and various internal organs of the body. There are around 200 types of arthritis - or musculoskeletal conditions viz., Inflammatory arthritis, Degenerative arthritis, Soft tissue muscle skeletal pain, Back pain, Connective tissue disease, Infectious arthritis and Metabolic arthritis etc. [1-2]. Fast Dissolving Drug Delivery System (FDDDS) were first came into existence in 1970 as an alternative to tablets, syrups and capsules, for pediatric and geriatric patients which rapidly disintegrate and dissolve in saliva and then easily swallowed without need of water which is a major benefit over conventional dosage form [3]. Fast dissolving drug delivery system have acquired great importance in the pharmaceutical industry due to their unique properties and advantages like availability of larger surface area that leads to rapid disintegrating and dissolution in the oral cavity, no need of water, accurate dosing, rapid onset of action, ease of transportability, ease of handling, pleasant taste and improved patient compliance especially for pediatrics and geriatric [4].

2. Materials and Methods

In this study past work done on fast dissolving tablets of arthritis disease were collected by referred reviewed research journals of pharmaceutics during the year 1998-2015. The objective of this work is which are the polymers tried to formulate fast dissolving tablets. The objective of this work is which are the polymers tried to formulate fast dissolving tablets to treat arthritis. It is necessary to fix time period for the study for research and for this period will be collected. In this study the polymers used for fabricating fast dissolving tablets to treat arthritis were showed in the figures for the year 1998 to 2015. The objective of this work is which are the polymers tried to formulate the fast dissolving tablets to treat arthritis.

Methods:

The review of literature has been collected from the reputed international and national research and review articles to study the various parameters of drugs and polymers.

Drugs studied:

The various drugs studied by fast dissolving drug delivery system methodology are as follows [5]: Methotrexate, Azathioprine, Cyclosporine, Sulfasalazine, Chloroquine, Etanercept, Infliximab, Adalimumab, Anakinra, Prednisolone, Aspirin, Ibuprofen, Naproxen, Ketoprofen, Flurbiprofen, Mephenamic acid, Piroxicam, Tenoxicam, Ketrolac,Indomethacin, Phenylbutazone, Oxyphenbutazone, Nimesulide, Diclofenac, Aceclofenac, Meloxicam, Etodolac, Celecoxib, Etoricoxib, Parecoxib, Paracetamol, Metmizol, Nefopam were studied.

Polymers studied:

Single polymers:

Past work done by using single polymers viz. Microcrystalline cellulose, croscarmellose sodium, crospovidone, polyvinyl pyrrolidone and Kyron T- 314 were studied [6-10]

Combination of two polymers:

Past work done by using a combination of two polymers viz., croscarmellose sodium with microcrystalline cellulose; hydroxy propyl methyl cellulose with sodium starch glycolate; sodium starch glycolate with crospovidone; microcrystalline cellulose with L–hydroxy propyl methyl cellulose; polyvinyl pyrrolidone with sodium carboxy methyl cellulose; croscarmellose sodium with polyvinyl pyrolidone; guar gum with microcrystalline cellulose; lecithin with eudragit; polymethacrylate with eudragit; sodium starch glycolate with microcrystalline cellulose; microcrystalline cellulose with carrageenan; croscarmellose sodium with hydroxy propyl cellulose; polyvinyl pyrrolidone with polyethylene glycol; Kyron T-314 with crospovidone; crospovidone with sodium starch glycolate; gellan gum with xanthan gum were studied [11-13].

Combination of three polymers:

Past work done by using a combination of three polymers viz., croscarmellose sodium with sodium starch glycolate and microcrystalline cellulose; hydroxy propyl methyl cellulose with sodium starch glycolate and microcrystalline cellulose; polyethylene glycol with sodium starch glycolate and crospovidone; polyvinyl pyrrolidone with microcrystalline cellulose and crospovidone; L–hydroxy propyl cellulose with microcrystalline cellulose and croscarmellose sodium; hydroxy propyl methyl cellulose with hydroxy propyl cellulose and sodium carboxy methyl cellulose; croscarmellose sodium with crospovidone and sodium starch glycolate; polyethylene glycol with polyvinyl pyrrolidone and crospovidone; microcrystalline cellulose with croscarmellose sodium and sodium starch glycolate; Kyron T-314 with crospovidone and sodium starch glycolate; Cyclodextrin with *Lepidiumsativum* mucilage and microcrystalline cellulose were studied [14-16].

Combination of four and above polymers:

Past work done by using a combination of four and above polymers viz.,microcrystalline cellulose with sodium starch glycolate, croscarmellose sodium and crospovidone; croscarmellose Sodium with crospovidone, sodium starch glycolate and polyethylene glycol; eudragit with hydroxy propyl cellulose, crospovidone, croscarmellose sodium and sodium starch glycolate; crospovidone with croscarmellose sodium, polyvinyl pyrrolidone and acacia; croscarmellose sodium with crospovidone, sodium starch glycolate and polyvinyl pyrrolidone; microcrystalline cellulose with sodium starch glycolate, croscarmellose sodium and polyvinyl pyrrolidone [17-20].

3. Results and Discussion

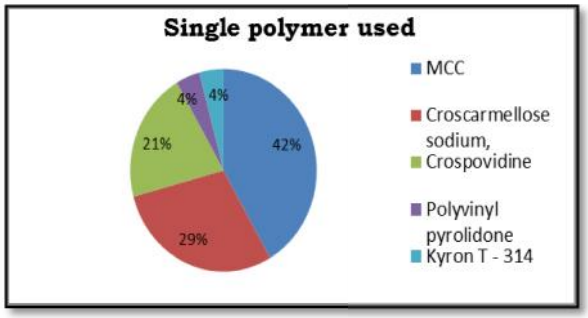

Figure 3.1: Pie diagram showing single polymers used in preparing fast dissolving tablets

Pie diagram of combination of two polymers used for fabricating fast dissolving tablets to treat arthritis was shown in fig. 3.2.

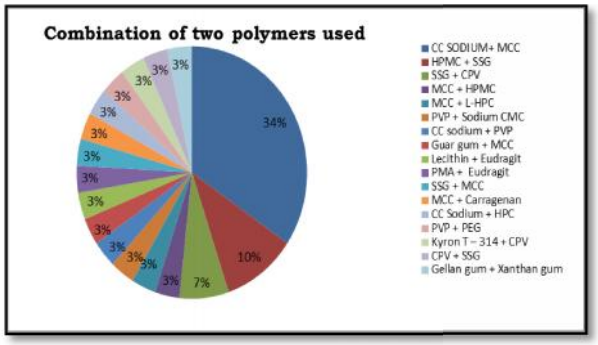

Figure 3.2: Pie diagram showing combination of two polymers used in preparing fast dissolving tablets

Pie diagram of combination of three polymers used for fabricating fast dissolving tablets to treat arthritis was shown in fig. 3.3.

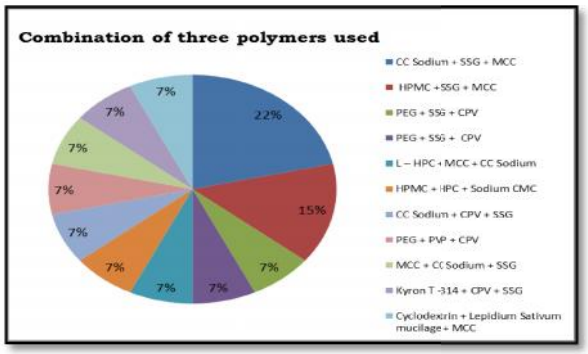

Figure 3.3: Pie diagram showing combination of three polymers used in preparing fast dissolving tablets

Pie diagram of combination of four and above polymers used in preparing fast dissolving tablets was shown in fig.3.4.

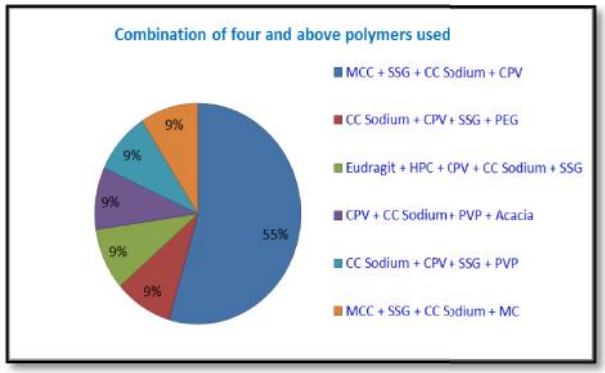

Figure 3.4: Pie diagram showing combination of four and above polymers used in preparing fast dissolving tablets

4. Conclusion

A wide range of drugs viz., anti-arthritis and non-steroidal anti-inflammatory drugs etc., were studied by fast dissolving drug delivery system technology using various polymers (single and in combinations). Primarily microcrystalline cellulose and secondary croscarmellose sodium were tried by many researchers for preparing fast dissolving tablets under single polymer category. On the other hand the combination of croscarmellose sodium with microcrystalline cellulose and the second combination was hydroxy propyl methyl cellulose with sodium starch glycolate. On the other hand combination of croscarmellose sodium with sodium starch glycolate and microcrystalline cellulose; and the other combination is hydroxy propyl methyl cellulose with sodium starch glycolate and microcrystalline cellulose were used in three polymers combinations category. On the other hand combination of microcrystalline cellulose with sodium starch glycolate, crosscarmellose sodium and crospovidone were used in combination of four and above polymers.

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