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Dissolution Enhancement of Mebendazole using by Hupugum

Kiran Kumar.S*, Prasanna Kumari.J[1], Ganesh Kumar.G[1], Rajesham.V.V[1],Yanadhaiah.J.P[2]

[1]Srikrupa Institute of Pharmaceutical Sciences, Siddipet, Medak (A.P)

[2]S.P.R.R.M College of Pharmacy,Kadapa (A.P)

Abstract:

Excipients plays a very important role in the design of dosage forms, because drugs cannot be administered in pure form though there are number of excipients available, need for new excipients with varied characteristics is growing tremendously. Hupugum, a natural polymer was available abundantly in Indian forests. The present investigation is aimed to evaluate the suitability of Hupugum as carrier in the dissolution enhancement of poorly water soluble drug Mebendazole (Anthelmentic). A comparative study on the effect of drug to carrier ratio on dissolution rate was investigated by preparing the solid mixtures containing low and high quantity of Hupugum. Solid mixtures of Mebendazole and Hupugum prepared by physical mixing, co-grinding and kneading methods in the ratio of 10:1,10:2, 1:1,1:5 and 1:7 (Mebendazole : Hupugum). Among the ratios used for the preparation, physical mixture showed maximum improvement in dissolution rate of Mebendazole at 1:5 (Mebendazole: Hupugum).

Key Words: *Mebendazole, Hupugum, Solid mixture, Kneading*

Introduction:

Every art of science has two faces, the scope and the future. The pharmaceutical technology is an ever changing science. The technological field involves the introduction of innovative concepts for its wider use. Procurement, application and derivation are the three most important aspects for the scope of work. Most of the drugs are poorly water soluble there by posing dissolution related bioavailability problems. In recent time's applicability of natural polymers as carrier for the improvement of dissolution rate of poorly water soluble drugs is on increasing side. Dissolution is the phenomenon which occurs in the GIT, each and every drug has its particular dissolution rate value. The aim of this work is to improve the dissolution rate of poorly water soluble drug Mebendazole. The dissolution rate can improved by combining the drug with different proportions of the gum. When the drug is combined with different ratios of the carrier, can improve the dissolution rate of the drug. The different techniques which are used for this phenomenon are kneading, co grinding and physical mixing.

Materiala and Methods:

Materials

Mebendazole obtained as gift sample from M/S cadila Health care, Ahmedabad. Hupugum obtained from local market of tirupati. Formic acid, isopropyl alcohol and other chemicals are obtained from S.D Fine chemicals.

Method

Preparation of solid mixture by physical mixing technique

For physical mixtures, the drug and carrier were weighed accurately and blended thoroughly with a spatula and finally sifted through a sieve # 100.

Preparation of solid mixture by co-grinding technique

The required quantities of drug and carrier were weighed and taken in a mortar and then co-grinding it for 20 minutes and finally sifted through a sieve # 100.

Preparation of solid mixture by kneading technique

The required quantities of drug and gum were weighed and taken in a mortar, then the mixture was kneaded with 1.5 times of their amount of 85% v/v formic acid for 20 minutes.

Table 1: Codes of solid mixtures containing Mebendazole and their drug content

Method	Drug:Carrier	Code	% of Drug content	% of Drug release
Physical Mixing	10:1	PM1	90.9	9.3
	10:2	PM2	83.3	12.2
	1:1	PM3	50.0	10.6
	1:2	PM4	33.3	34.9
	1:5	PM5	16.7	89.9
	1:7	PM6	12.5	89.2
Co-grinding	10:1	CM1	90.9	10.5
	10:2	CM2	83.3	11.6
	1:1	CM3	50.0	12.2
	1:2	CM4	33.3	45.0
	1:5	CM5	16.7	80.2
	1:7	CM6	12.5	67.6
Kneading	10:1	KM1	90.9	34.6
	10:2	KM2	83.3	36.5
	1:1	KM3	50.0	36.6
	1:2	KM4	33.3	40.3
	1:5	KM5	16.7	70.7
	1:7	KM6	12.5	49.3

The resultant mass was dried at 40^0C and pulverized and sifted through a sieve # 100.

Estimation of drug content

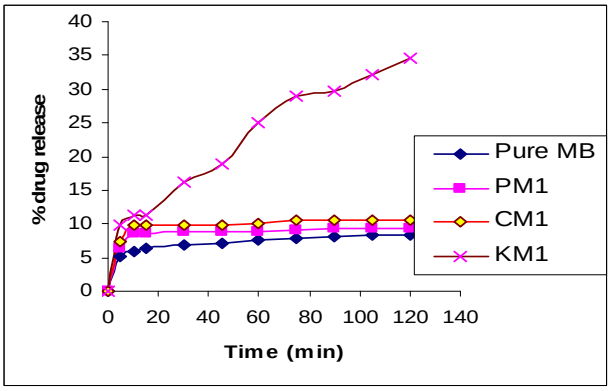
From each batch, 4 samples was taken and analyzed for Mebendazole Content. Solid mixture equivalent to 100mg of Mebendazole was weighed into a volumetric flask; formicacid was added and mixed the contents thoroughly to dissolve the drug from the solid mixture. The solution was made up to 100ml with isopropyl alcohol and assayed at 310 nm.

Dissolution rate studies

The dissolution rate of Mebendazole in pure form and from various solid mixtures was studied using the USP dissolution apparatus (paddle method) in 900ml of 1% sodium lauryl sulphate 0.1NHCl maintained at 37 ± 0.5^0C and rotated at 100rpm.The samples were withdrawn at predetermined time intervals and were assayed spectrophotometrically at 310nm using a ELICO spectrophotometer. The percentage of drug dissolved at various time intervals was calculated, and graph was plotted against time.

Results and Discussion:

Three different methods namely (i) Physical mixing method (ii) Co-grinding method and (iii) Kneading methods were used to assess the effect of method of preparation of solid mixtures on the dissolution characteristics of Mebendazole. Many researchers used the polymer in low quantity to prevent the processing problem. However, usage of polymer in low quantities also results in low dissolution rates of poorly water soluble drugs. It is also confirmed from the literature survey that there is no reports available on the comparison between high drug-carrier ratio and low drug-carrier ratio. Hence in the present investigation, comparative study on the effect of drug to carrier ratio on dissolution rate was investigated by preparing the solid mixtures of Mebendazole and Hupugum in six different ratios, (10:1,10:2,1:1,1:2,1:5,1:7 MB:HG) using physical mixing, co-grinding and kneading methods, in order to evaluate the effect of



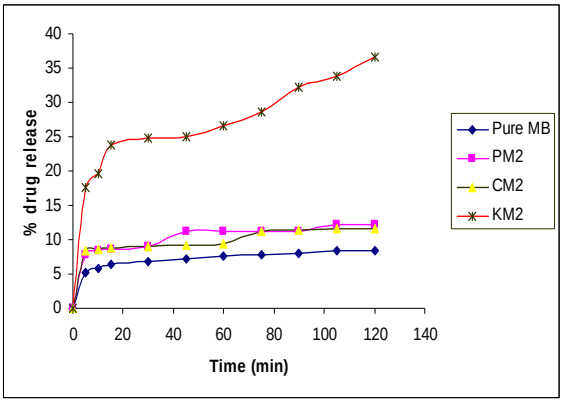
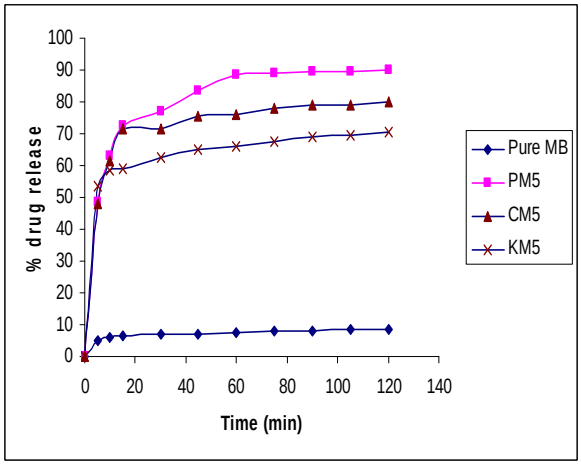


Fig 1: Dissolution profile of Mebendazole from Physical mixing, co-grinding and Kneading containg low quantity of Hupugum (10:1) and (10:2).



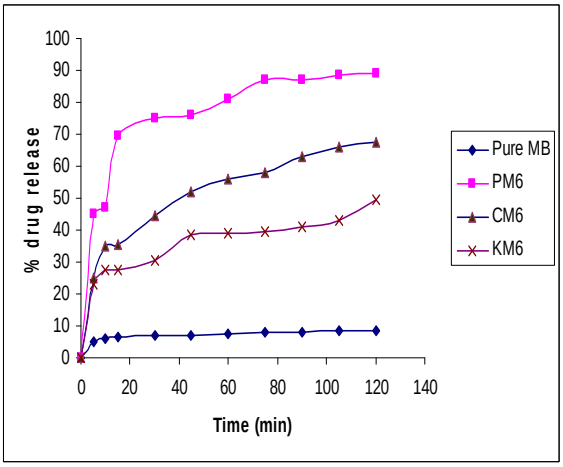


Fig 2: Dissolution profile of Mebendazole from Physical mixing, co-grinding and Kneading containg high quantity of Hupugum (1:5) and (1:7).

presence of low and high quantity of carrier on dissolution rate of mebendazole. Among the solid mixtures containing low quantity of Hupugum (10:1, 10:2) prepared by all the three methods, the order of increase in dissolution rate of mebendazole was found to KM > CM > PM > pure drug. Among the solid mixtures containing high quantity of Hupugum(1:1,1:2,1:5 and 1:7) prepared by all the three methods, the order of increase in dissolution rate of mebendazole was PM > CM > KM > pure drug. Among all methods, the physical mixing technique with 1:5 ratio showed maximum improvement in dissolution rate of mebendazole.

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