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TABLETTING PROPERTIES OF MUSOL, A NEW DIRECT COMPRESSION VEHICLE

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ABSTRACT

A new autocompressible vehicle, Musol, obtained by chemical modification of an edible seed polysaccharide was evaluated for direct compression properties. A Hausner ratio of 1.2 and percent compressibility of 16.7 obtained for Musol indicate that it has very good flow properties. Musol showed superiority over Avicel PH 101, USP Fast-Flo lactose, and Encompress when evaluated in terms of flow rate of powders and moisture sorption by both powders and their slugs. Compacts prepared with Musol were found to disintegrate by erosion and therefore did not perform as well as either alginic acid or Ac-disol in 250 mg Sulphadimidine tablets. However, good drug release was obtained from aspirin tablets containing 5 % w/w Musol as a dry binder. The t_{50}, t_{90} and Dissolution efficiency were as good as the values obtained with 5 % w/w Avicel PH 101. A 50/50 blend of Musol and Avicel PH 101 surpassed other blends in performance.

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INTRODUCTION

Mucuna bean is ordinarily ingested through the use of its flour as a thickening agent for food in some parts of Southern Nigeria (1). The pharmaceutical application of the polysaccharide gum obtained from Mucuna flagillepes was previously reported (1). Chemical modification of natural gums is often effected to obtain improved physico-chemical properties of the parent gum (2). The insoluble amorphous but dispersible mucuna gum was chemically modified to yield a crystalline soluble product, Musol. Since crystallinity often confers flowability on some substances (3), attention was therefore directed to possible application of Musol as a filler and dry binder in tablets. Perhaps the most important parameters often considered are the flowability and compressibility of tablet vehicles. The flow rate of a powdered solid can be assessed from the Hausner ratio (4, 5) and percent compressibility (4, 5, 6, 7) derived from the fluff bulk density and the consolidated bulk density at equilibrium. Flow rate may be affected by moisture in the vehicle. There is also ample indication that the presence of moisture often contributes to degradation in solid dosage forms (8, 9). Recently, Guyot-Herman and Leblanc (10) showed that although gamma sorbitol gave good directly compressible aspirin and ascorbic acid tablets, instability occured at relative humidities above 80 % due to hygroscopic nature of gamma sorbitol. Water sorption from the atmosphere has also been reported as a disadvantage in plain Avicel tablets or conventional tablets containing various excipients and drugs in combination with Avicel (11). From stability point of view, an absorption-desorption study of a new tablet excipient such as Musol is therefore necessary.

Aspirin and Sulphadimidine were used for trial formulation of tablets containing Musol powder of 150 μm average particle size. The disintegrant property of the new vehicle in Sulphadimidine tablets was investigated with Ac-di-Sol and alginic

acid as the basis for comparison. Musol was assessed for its dry-binder property in 300 mg Aspirin tablets. It was compared to Avicel PH 101, Fast-Flo lactose and Encompress. The single vehicles and binary blend of each with Avicel PH 101 in 50/50, 25/75 and 75/25 proportions were also assessed in tabletting. The mechanical properties of Musol, its mode of consolidation under pressure as well as its use as an autocompressible agent for drugs with poor compressibility are being evaluated and will constitute a separate report.

MATERIALS

The following materials were used as procured from the manufacturers; Avicel PH 101,[1] USP-Fast-Flo lactose[2], Encompress[3], Alginic acid[4], Ac-di-Sol[5], Sulphadimidine[6], Aspirin[7] and Maize starch[8]. Musol was processed and crystallised in our laboratory.

METHODS

Particle size, Flow Rate and Angle of Repose

A weighed amount of crystalline aggregate of Musol was placed on the first sieve of a nest of sieves[9] arranged in order of decreasing aperture size. The nest of sieves was clamped onto a sieve shaker[9] and then subjected to vibrations for 10 min. The amount retained by each sieve was ascertained. The static angle of repose and flow rate of the various size fractions were determined by methods similar to those used by Ramachandra and coworkers (12). A funnel with orifice diameter, base diameter and slope angle of 0.9 cm, 10 cm and 31° respectively was used.

Bulk Densities

Initially, the Musol powder was dried for an hour in a hot air oven[10,11], set at 60°C. The powder was allowed to attain equilibrium at 30°C before being used for any determination. The mean fluff density, D_o and the consolidated density at equilibrium, D_e were determined using a 250 ml measuring cylinder tilted to an angle of 50° while the powder was poured

(12, 13). This procedure was repeated for Avicel PH 101, Encompress and Fast-flo lactose. The Hausner quotient and percent compressibility were calculated in each case.

Equilibrium Moisture Content

The technique used by Chowhan and Chow (14) was adopted. Aluminium dishes were dried in a hot air oven maintained at 60°C. The dishes were later equilibrated at 30°C. A quantity of each powdered vehicle was dried to a constant weight. Four 5 g samples of each vehicle were placed in four separate desiccators within which relative humidities of 21, 56, 78 and 100 % were respectively maintained by salt solutions at 30°C. The samples were monitored for 28 days by which time there was no further weight increase. Each sample was weighed and then dried to a constant weight under an IR lamp[12] set at 100 V. The moisture sorbed by each sample was calculated from the weight difference before and after drying.

Compression of Tablets

Blank tablets or slugs were compressed with 400 mg of each vehicle. Sulphadimidine and Aspirin tablets were respectively formulated. The tablets were compressed on an F3 tabletting machine[11] fitted with 9.5 mm flat-faced punches. The same compression load was maintained for each batch of tablets.

Compacts containing 250 mg Sulphadimidine were prepared by the wet method. The disintegrant which comprised of either Musol, Ac-di-Sol or Alginic acid was varied between 1 to 4 % w/w in the tablet batches. A mixture of Sulphadimidine powder and disintegrant was massed with an appropriate quantity of 10 % w/w maize starch binder solution. The moist mass was passed through 1.70 mm screen on an oscillating granulator[13] and after drying, through 1.0 mm screen. Each batch of granules was lubricated with 1 % w/w magnesium stearate prior to compression.

On the basis of preliminary experiment, 300 mg aspirin powder, 3 % w/w Ac-di-sol (disintegrant) and 2-5 % w/w of either Avicel PH 101, Musol, Fast-Flo lactose or 50 % w/w Encompress were mixed and directly compressed. A lubricant was not incorporated since there was no sticking. Aspirin tablets were also formulated with binary blends of Avicel PH 101 and Musol or Encompress in 50/50, 25/75 and 75/25 proportions. The blend of Avicel and Musol was used at 5 % w/w concentration while the blend of Avicel and Encompress was used at 50 % w/w concentration.

Tablet Characteristics

In order to allow for equilibration of the tablets, all tests were initiated 24 h after compression.

Moisture Sorption

Moisture sorption test was carried out with plain tablets compressed with each of the vehicles being investigated. The dimensions of the tablets were measured with a micrometer[14] after which five tablets of a given vehicle were placed in a desiccator stored at 30°C. The humidity within the desiccator was maintained at either 78 % or 100 % RH with an appropriate salt solution. The tablets were stored under a given humidity for 20 days after which no further weight increase was detectable. The dimensions of each tablet were once again ascertained and the percent moisture content determined after drying to constant weight under IR lamp[12] set at 100 V.

Crushing Strength

Twenty tablets were randomly selected from each batch. The crushing strength of each was determined with an automatic tablet hardness apparatus[15]. The mean crushing strength and coefficient of variation were determined for each batch of tablets.

Friability Test

A sample of twenty tablets was selected from each batch and dusted by directing a stream of air onto the tablets. The weighed sample of tablets was placed in the drum of a Roche friabilator[16] programmed to revolve for 4 mins at 25 rpm, after which the tablets were de-dusted. The weights before and after the test were used to calculate the friability.

Uniformity of Weight

The BP (1980) method was adopted. The tablets were weighed singly and then together. The deviation from the mean and the coefficient of variation were determined.

Disintegration Time

A disintegration apparatus[17] complying to the specifications of B.P (1980) was used for the test. A 0.1 N hydrochloric acid maintained at 37 $\pm$ 1°C constituted the disintegration medium. Altogether five tests were performed with a single tablet at a time and the mean calculated from the five runs.

Dissolution Test

Initially, the absolute drug content of the Aspirin tablets was determined on a UV spectrophotometer[18] provided with a direct concentration read-out. This and subsequent concentration measurements were read at 229 nm. The dissolution profile of the aspirin tablets was determined with a USP XIX dissolution apparatus[19]. The dissolution medium was a litre of 0.1 N HCl maintained at 37 $\pm$ 1°C. The basket containing the test tablet was made to rotate at 100 $\pm$ 2 rpm. Aliquots of the dissolution medium were withdrawn at predetermined time intervals. A loose plug of cotton wool at the tip of the pipette ensured the exclusion of suspended excipients. Each volume of sample withdrawn was replaced with an equivalent volume of dissolution medium maintained at the same temperature. A direct concentration read-out was obtained on the spectro-

photometer. The average of three dissolution data points were used for obtaining a dissolution profile.

RESULTS AND DISCUSSION

Particle Size and Flow Property

The particle size distribution of Musol is shown in Figure 1. It can be seen that the 200 μm particles were predominant. The dependence of the angle of repose and flow rate of Musol on the mean particle size is presented in Figure 2. Both parameters which are functions of mean particle size can be seen to adhere to the general pattern for most powders (15). Particle size distribution amongst other factors, affects both the angle of repose and flow rate of a powder (16). The relatively poor flow rate of smaller particles is due to blockage of the orifice resulting from cohesive forces. On the other hand, the subsequent decrease in flow rate after a maximum and as the particle size increases, is often attributed to container wall drag on the powder of high particle diameters (17). The presence of glidants in powders usually reduce both effects. The values of 20^{o} to 30^{o} angle of repose obtained for Musol is quite below the upper limit of 42^{o} often regarded as a good working range for most pharmaceutical powders. The highest angle of repose of 30^{o} and a good flow rate of 4 g S^{-1} for a mean particle size of 52.5 μm indicate that Musol may be used to improve the flow of cohesive materials of similar particle size. Avicel PH 101, which has a similar particle size could hardly flow under the condition of the test. The poor flow property of Avicel PH 101 is widely reported in literature (18, 19, 20, 21). Fast-Flo lactose, reported to exhibit the best flowability of all grades of lactose (22), had a drained angle of repose of 39^{o} for a mean particle size of 140 μm. The low angle of repose obtained for the various size fractions of Musol is probably due to low level of interparticulate attraction. This has been reported

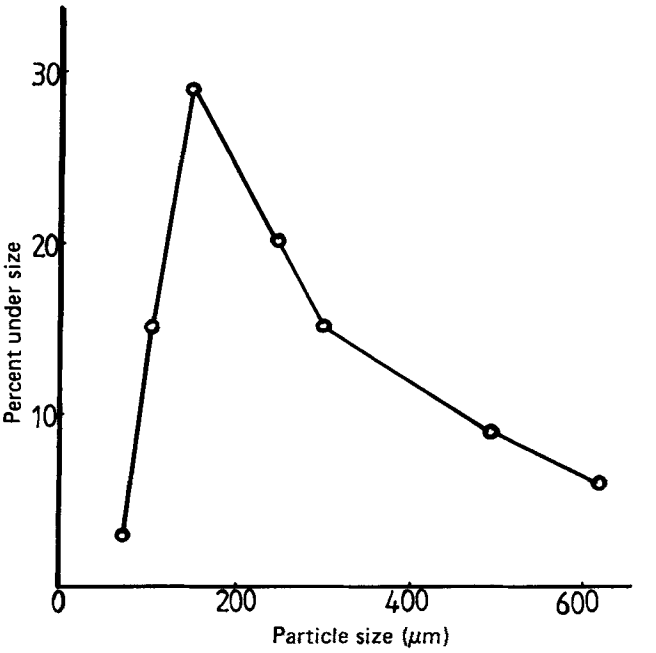

FIGURE 1

Particle size distribution of Musol

to be the case for powders with good flowability (23). Since powder flow is a function of particle size, shape, roughness of particle surface, chemical nature and moisture content (17), and since the principal requirements for auto-compressibility are good fluidity and adequate binding properties (21), Musol would seem to satisfy the basic criteria required of direct compression tablet vehicles.

Hausner Quotient And Percent Compressibility

Table 1 shows the loose density, D_o; the consolidated density at equilibrium, D_e; the corresponding values of the Hausner quotient, H.Q and percent compressibility for Avicel PH 101, Encompress, Musol and USP Fast-Flo lactose, FFL.

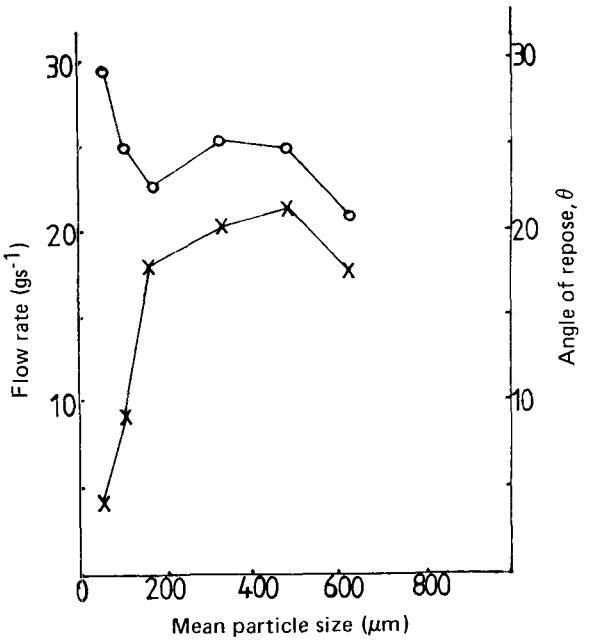

FIGURE 2.

Flow rate and angle of repose, θ, as functions of mean particle size of Musol.
X, Flow rate
O, Angle of repose

TABLE 1

Powder Characteristics of Some Direct Compression Vehicles

Vehicle	D_o (g ml^{-1})	D_e (g ml^{-1})	H.Q	Compressibility (%)
Avicel PH 101	0.22	0.32	1.45	31.25
Encompress	0.75	0.99	1.32	24.44
Musol	0.70	0.84	1.20	16.67
FFL	0.55	0.74	1.33	24.99

Musol of 150 μm mean particle size was used for the investigation while the other vehicles were used as supplied by the manufacturers. The bulk density of a powder is usually a measure of its packing behaviour. An increase in consolidated bulk density is advantageous in tabletting (6). This is because the fill volume of the die used would be reduced. Good flow rate and fill ensure uniformity of weight and content of compressed tablets. Many workers have used the H.Q. (8,9,10, 22) and Carr's percent compressibility (9,10,24) to predict the flow behaviour of powdered solids. The H.Q. is a measure of interparticulate friction and values of approximately 1.2 indicate good flowability (8). Higher values indicate interparticulate cohesion which reduce flow properties. According to Carr (25), materials with percent compressibility of 5–15, 12–16 and 18–21 probably show excellent, very good and fair flow behaviours respectively. Values of 23 to 35 % compressibility indicate poor flow. Table 1 shows that the values of H.Q and percent compressibility obtained for Musol indicate a superiority in flow property over the other filler-binders. These values also correlate with the angle of repose and flow rate observed for Musol in Figure 2. The poor flow of Avicel PH 101 also correlates with its high values of H.Q and percent compressibility. However, the flow behaviour of a new powdered solid need not be assessed by the H.Q and percent compressibility alone since the H.Q in particular may not always be related to the angle of repose and flow rate (9). Flow rate and angle of repose therefore have to be determined by at least one of the several methods in use.

Equilibrium Moisture Content

Figure 3 shows the variation in moisture content of the vehicles at 30°C and under varying humidity conditions. The least moisture uptake was observed for Musol at all relative

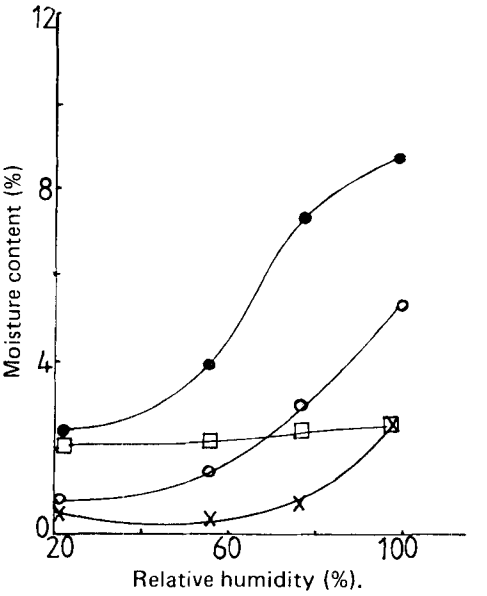

FIGURE 3.

Equilibrium Moisture curves of some direct compression diluents at 30°C.
●, Avicel PH 101; X, Musol
○, Fast-Flo lactose; □, Encompress.

humidities except 100 % RH at which no significant difference exists between Musol and Encompress. The same figure shows that there was a rapid moisture uptake by FFL and Avicel PH 101 respectively. The moisture uptake by Encompress was in contrast, rather gradual over the range investigated. A similar pattern can be observed for Musol except between 80 % and 100 % RH where there is indication of increased moisture uptake. Nevertheless, the maximum amount of moisture sorbed by Musol was far less than that sorbed by either FFL or Avicel PH 101.

The equilibrium moisture content at 100 % RH are 8.82 %, 5.50 %, 2.60 % and 2.60 % w/w for Avicel PH 101, FFL, Encompress

and Musol respectively. The high moisture uptake by Avicel PH 101 has been widely reported (26, 27, 28). This, along with poor flow, constitute a disadvantage since increased moisture content promotes instability (5, 6) and microbial growth in formulations (29). The high surface area of Avicel PH 101 is responsible for the rapid moisture uptake (26, 27). Musol when stored at 40°C and 55 % RH for twelve months showed no discernible change in its physical characteristics.

The moisture uptake by the blank tablets and the subsequent change in their volume are presented in Table 2. It can be seen that the highest moisture uptake and increase in volume occured in tablets compressed with Avicel PH 101. At 78 and 100 % RH, Encompress tablets picked up the least amount of moisture. Musol tablets however performed as well as FFL tablets. Both Encompress and Musol tablets showed the least volume increase. Earlier in this report, we have shown that both Encompress and Musol attained the same equilibrium moisture content. The same would be expected of the tabletted vehicles. However, the difference in the porosities of the two compacts would probably explain the difference observed. Water sorption by microcrystalline cellulose tablets is known to be very rapid and follows a first order process (30). This brings about pronounced irreversible changes in its physical properties even when the moisture is removed by desorption (11). Rapid penetration of water into plain Avicel PH 101 or blends of it with excipients even at low tablet porosities was reported (30). This was explained as due to breakage of hydrogen bonds between microcrystalline cellulose particles and subsequent widdening of pore inside the tablet core. The reduction of the high moisture content of microcrystalline cellulose often reduces its compactibility (31) and this is a disadvantage. A blend of a vehicle with high moisture sorption property such as Avicel PH 101 and another with low moisture sorption property would yield a binary

TABLE 2.

Moisture Uptake And Change In Volume, V Of Blank Tablet At 78 % And 100 % RH, At 30°C.

Vehicle	78 % RH (%) Moisture Uptake	78 % RH ΔV(%)	100 % R.H (%) Moisture Uptake	100 % R.H ΔV(%)
Avicel PH 101	0.420	9.28	2.69	13.59
Encompress	0.014	2.19	0.44	4.50
Musol	0.046	1.95	0.79	4.68
FFL	0.054	4.59	0.84	6.99

vehicle that retains the amount of moisture tolerable in a given tablet formulation. The result obtained does indicate that Musol can serve as a vehicle with low moisture uptake property.

Disintegrant Property of Musol

It is an advantage if a vehicle in addition to being autocompressible, has a disintegrant property. The effectiveness of Musol as a disintegrant was assessed with sulphadimidine tablets produced by the wet method. Its disintegrant effect was compared with the effect of alginic acid and Ac-di-Sol respectively. It can be seen in Figure 4 that those tablets that contained 1-4 % w/w alginic acid or Ac-di-sol disintegrated in less than 3 mins. In contrast, tablets that contained 1-3 % w/w Musol as disintegrant required much longer times for disintegration. Although the disintegration times obtained with this range of concentration is within compendial limits the result shows that Musol is not as effective a disintegrant as either alginic acid or Ac-di-sol. It was observed that sulphadimidine tablets containing Musol in contrast to those

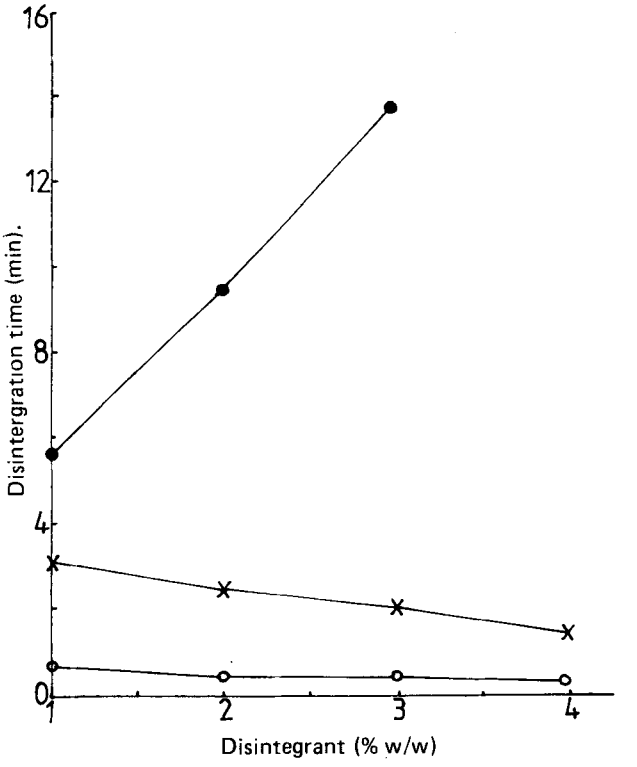

FIGURE 4.

Variation of disintegration time of Sulphadimidine tablets with type and concentration of disintegrant.

X, Alginic acid; O, Ac-di-sol; ●, Musol

containing either alginic acid or Ac-di-sol, disintegrated by erosion. The latter disintegrants are known to increase the penetration rate of water into tablets and then swell to cause the tablets to rupture into aggregates (17). Musol probably belongs to a class of autocompressible vehicles which are free-flowing and disintegrate by dissolution. This class includes spray dried lactose, Emdex, sucrose, dextrose and mannitol (32). Musol was found to possess some surface activity and this may account for its disintegrant property. The result shows that it

TABLE 3.

Characteristics of 300 mg Aspirin Tablets Formulated with Named Direct Compression Vehicles.

Vehicle	Uniformity of wt (C.V)	Mean crushing strength (MNm^{-2})	Mean disintegration time (sec)	Friability
Avicel PH 101[a]	0.28	45.3	10.38	1.08
Musol	0.27	44.0	12.26	1.05
FFL	0.28	43.4	15.45	1.04
Avicel PH 101[b]	0.31	46.7	10.02	1.03
Musol	0.25	49.7	12.96	0.95
FFL	0.22	43.8	16.16	1.01
Encompress[c]	0.20	53.4	18.30	1.28

a = First three vehicles used at 2 % w/w concentration
b = Next three vehicles at 5 % w/w concentration
c = Vehicle used at 50 % w/w concentration.

can function as a disintegrant at low concentrations. At higher concentrations, strong interparticulate bonds probably superceed its surface activity. The use of higher concentration of Musol as a filler-binder would therefore require the addition of other vehicles that permit penetration of water or have disintegrant property.

Directly Compressed Aspirin Tablets

The characteristics of 300 mg aspirin tablets formulated with Avicel PH 101, FFL, Musol and Encompress respectively are shown in Table 3. Each batch of tablets contained 3 % w/w as disintegrant. At low dry binder content of 2-5 % w/w good

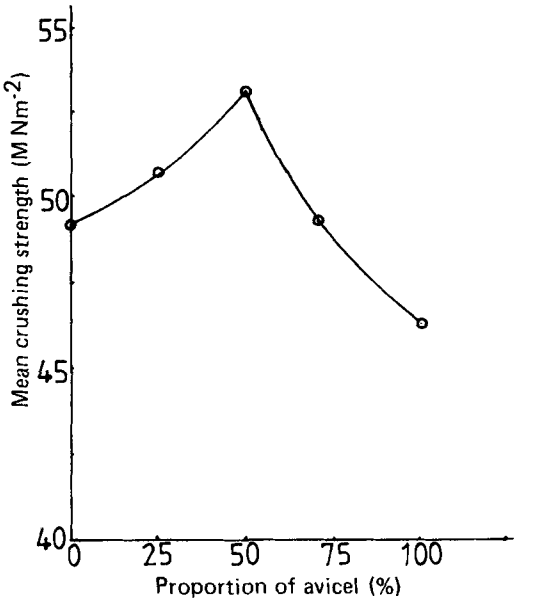

FIGURE 5.

Effect of increasing proportion of avicel PH 101 on the crushing strength of 300mg aspirin tablets formulated with 5 % w/w binary blend of avicel and musol.

aspirin tablets were obtained with Avicel PH 101, Musol or FFL. However 50 % w/w Encompress was required to obtain tablet of acceptable physical characteristics. Avicel PH 101 imparts strength to tablets even at concentration as low as 3 % w/w (19). The same may be said of Musol and FFL when used in aspirin tablets. The coefficient of weight variation obtained are quite low in all cases and thus indicate uniform flow and die fill.

Some aspirin tablets were compressed with 5 % w/w binary blend of Avicel PH 101 and Musol. Figures 5, 6 and 7 respectively show the effect of varying the proportion of Avicel in the blend on the crushing strength, friability and disintegration of the tablets. The mean crushing strength increased as

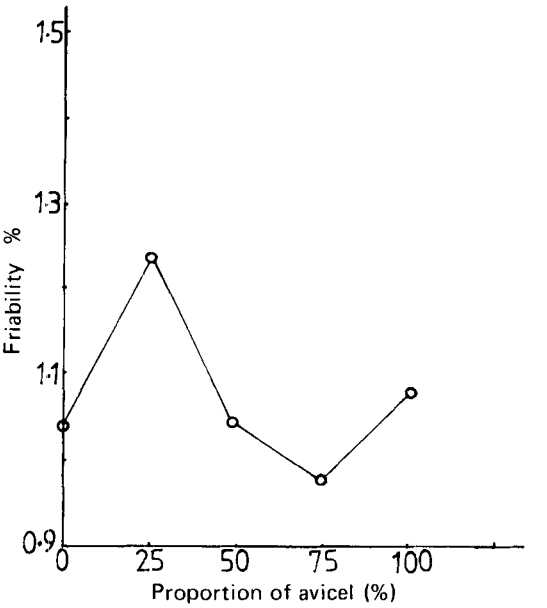

FIGURE 6.

Effect of increasing proportion of avicel PH 101 on the friability of 300mg aspirin tablets formulated with 5 % w/w binary blend of avicel and musol.

the proportion of Avicel PH 101 increased. The highest crushing strength was obtained when the binary blend contained equal concentration (50/50) of Avicel and Musol. Thereafter, it decreased as the concentration of Avicel increased. However, in no case was the crushing strength less than the values obtained for tablets compressed with either of the single excipients. The nature of the curve suggests that binding in the tablet is strongest when the concentrations of Musol and Avicel PH 101 are equal. The combined effect of dry binders on tablet strength is not always additive. Armstrong and Lowndes (33) reported a reduction in tablet strength as the proportions of spray-dried lactose was increased in a binary blend of Avicel PH 101 and spray-dried lactose. An investigation with another

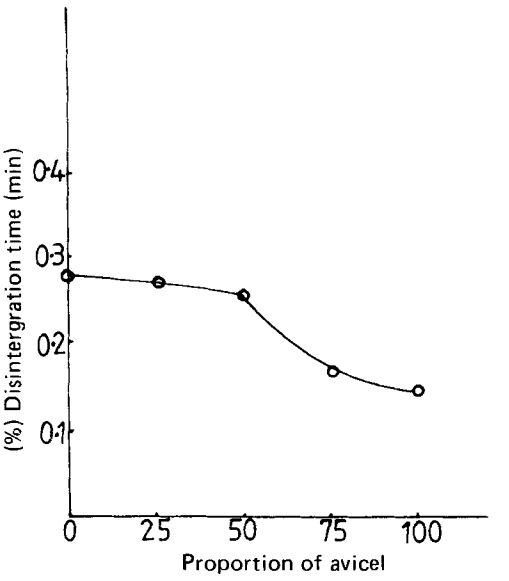

FIGURE 7.

Effect of increasing proportion of avicel PH 101 on the disintegration of 300mg aspirin tablets formulated with 5 % w/w binary blend of avicel and musol.

system showed that a minimum occured in the tablet strength-composition as the proportion of sodium chloride and lactose in the vehicle was varied and compressed (34). On the other hand, a maximum was reported for microcrystalline cellulose-dicalcium phosphate dihydrate system (24). Cook and Summers (35) had reported a maximum turning point in the tablet strength-composition curve for aspirin tablets directly compressed with Encompress. Thus tablet strength should be ascertained for a given concentration, type of direct compression vehicle and tablet excipients.

The effect of Musol and its concentration on tablet strength in other tablet systems require separate investigation since no general conclusion can be drawn on the basis of the present investigation.

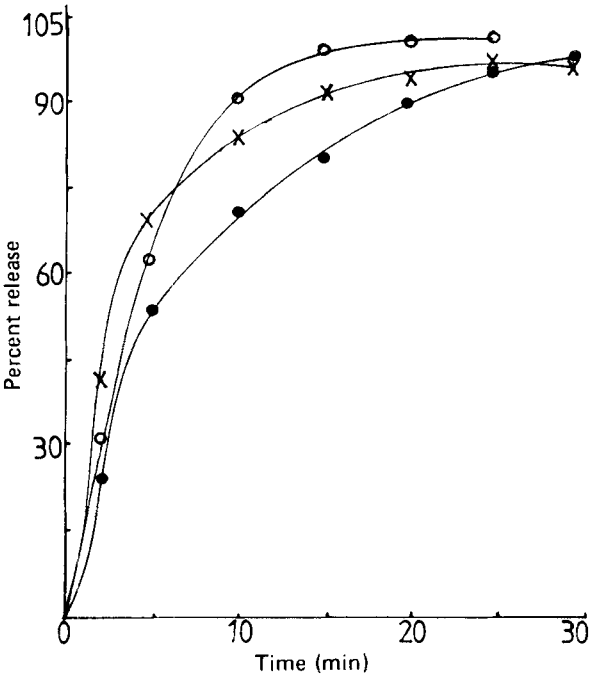

FIGURE 8

Dissolution profile of aspirin from tablets containing 5 % w/w direct compression diluent.

X, Avicel PH 101; O, Musol; ● Fast-Flo Lactose.

The friability - concentration curve of tablets produced with blends of Musol and Avicel PH 101 is shown in Figure 6. A maximum and minimum were obtained with 25/75 and 75/25 Avicel-Musol proportions respectively. This difference in friability is hardly significant. Tablets compressed with the blends were however more friable than tablets compressed with either of the single vehicles. The 50/50 mixture of Musol and Avicel which initially yielded tablets of maximum crushing strength did not necessarily yield tablets of maximum friability.

Figure 7 shows that blending Musol with Avicel PH 101 enhanced disintegration in all cases. A 50 % w/w Avicel or

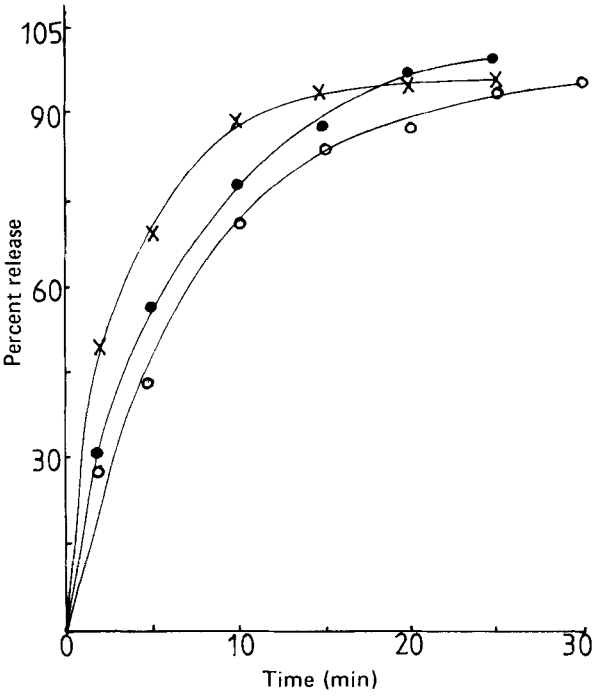

FIGURE 9

Dissolution profile of aspirin from tablets containing 5 % w/w binary blends of avicel and musol.

●,75/25 Avicel PH 101/Musol; X,50/50 Avicel/Musol

O,25/75 Avicel/Musol.

above was most effective in promoting disintegration. It is generally accepted that this vehicle promotes disintegration by "wicking" the aqueous medium into the tablet matrix.

Dissolution Profile

The dissolution profile of Aspirin tablets compressed with either 5 % w/w Avicel PH 101, Musol or FFL is shown in Figure 8. Figure 9 shows the dissolution profile of tablets compressed with 5 % w/w binary blend of Avicel PH 101 and Musol. The dissolution pattern of tablets compressed with 50 % w/w binary

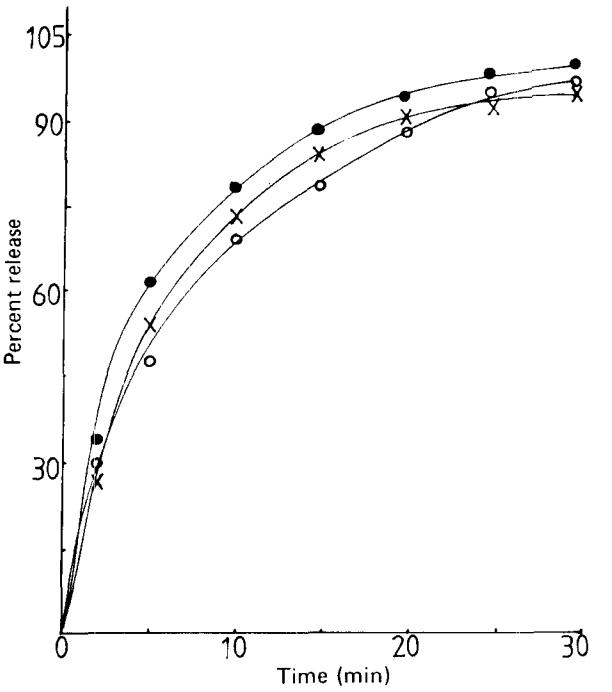

FIGURE 10

Dissolution profile of aspirin from tablets containing 50 % w/w binary blends of avicel PH 101 and encompress

●,75/25 Avicel/Encompress; X 50/50 Avicel/Encompress.

O,0/100 Avicel - Encompress.

blend of Avicel PH 101 and Encompress is presented in Fig. 10. In addition to the Dissolution Efficiency D.E. (36), t_{50} and t_{90} were used as parameters for evaluating the influence of the various vehicles or their blend on dissolution. These parameters derived from the various dissolution profiles are presented in Table 4a and b.

The t_{50}, t_{90} and D.E for each of the vehicles are presented in Table 4a. It can be seen that there is no difference between the D.E obtained for either Avicel PH 101 or

TABLE 4(a)

Some Dissolution Parameters of Aspirin Tablets Compressed With 5 % w/w of Named Vehicles.

	Avicel PH 101	Musol	FFL	Encompress*
t_{50} (min)	2.70	3.50	4.10	5.75
t_{90} (min)	15.00	10.00	20.00	21.30
D.E. (15 min) %	77.70	77.60	73.02	71.89

* 50 % w/w Encompress used.

TABLE 4(b)

Some Dissolution Parameters of Aspirin Tablets Compressed With 5 % w/w Avicel/Musol (AM) and 50 % w/w Avicel/Encompress (AE) Binary Blends respectively.

	25/75 AM	50/50 AM	75/25 AM	50/50 AE	75/25 AE
t_{50} (min)	6.00	2.20	4.50	5.00	3.75
t_{90} (min)	20.50	11.50	15.40	20.00	15.00
D.E. (15 min) %	69.70	79.47	70.83	70.30	66.67

Musol. Although tablets compressed with Musol showed a slightly longer t_{50}, 90 % dissolution was obtained at a shorter time. This may be due to the surface activity of Musol which has been amply demonstrated during the course of this work. Tablets compressed with 5 % w/w of either Avicel PH 101 or Musol performed better than those compressed with either FFL or 50 % w/w Encompress. On the basis of the data presented in Table 4b, tablets compressed with 5 % w/w binary blend of 50/50 AM performed best in terms of t_{50}, t_{90} and D.E. The other blends except 75/25 AE can be considered close to each other in over all performance.

CONCLUSION

In this presentation, we have demonstrated that a chemically modified edible seed polysaccharide gum, Musol is a potential autocompressible tablet excipient. Preliminary toxicological tests have shown that it is non-toxic to groups of male and female albino mice. Musol has better flow properties than Avicel PH 101, Encompress or FFL. Its relatively low moisture uptake under high relative humidities places it at advantage over Avicel PH 101. It may, like Avicel permit the selection of particle size range for a given formulation. Although Musol is not as good a disintegrant as alginic acid or Ac-di-sol, it may function as one when used at concentrations not exceeding 5 % w/w. Higher concentrations may indeed prolong disintegration and thus require an effective disintegrant. At 5 % w/w Musol performed as well as Avicel PH 101 in the release of aspirin from directly compressed tablets. A blend of Musol with Avicel in 50/50 proportion may be the best in terms of release of tabletted drugs. The performance and compatibility of Musol in the presence of other direct compression vehicles and tablet excipients are being investigated.

FOOTNOTES

1. FMC Corp. Philadelphia, Pa.
2. Selectchemie, AG.
3. Mendel Co. Inc.
4. Fluka, AG. Buchs.
5. FMC. Corp. Philadelphia, Pa.
6. I C I
7. Merck.
8. May and Baker
9. Endecotts Ltd, England
10. Manesty Ltd, England
11. Manesty Ltd, England.
12. Neuberger
13. Erweka type FGS.
14. Fowler Precision Tools.
15. Erweka, TBH 28
16. Erweka, TAR Model
17. Erweka Apparatabeau ZT4.
18. Pye Unicam, England, SP-8 400 UV spectrophotometer.
19. Erweka DTD model

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