THERMAL CHARACTERISTICS OF PARACETAMOL GRANULES PREPARED USING METHOD OF SPRAY GRANULATION EMPLOYING KAPPA-CARRAGEENAN AS BINDER

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ABSTRACT

Granules offer advantages as an intermediate for compression of tablets. Granules can be formed by one of the technique using the fluid bed spray granulator or the spray granulation method. This technique reduces costs by combining the processes in one instrument (mixing, granulating and drying). Differential scanning calorimeter (DSC) was used as a screening technique for assessing the compatibility of paracetamol with kappa-carrageenan which is used as binder. The influence of processing effects by simple drug-excipient blending at different w: w ratio (1:1, 2;1 and 4:1) and granulation was evaluated. The results of the DSC screening show that paracetamol is compatible with kappa-carrageenan. Some changes in peak shape and height-to-width ratio or slight reduction of temperature of melting were sometimes observed for kappa-carageenan but the active drug, Paracetamol thermal characteristic are not significantly change ($P>0.05$). Kappa-carrageenan shows significantly decrease or a noticeable downward shift of melting peak temperatures of about $41^{o}C$ ($P <0.05$). We can conclude that the interaction of Paracetamol with kappa-carrageenan is not significant as there is no significant changes in the thermal characteristics of paracetamol. The SEM scanning shows the morphology of the granules form.

ABSTRAK

Granul memberi kelebihan dalam persediaan pembuatan tablet. Granul boleh dibentuk dengan menggunakan teknik semburan granulasi cecair atau kaedah granulasi semburan. Teknik ini dapat mengurangkan kos dengan gabungan pelbagai proses di dalam satu alatan (percampuran, pengranulasian dan pengeringan). Kalorimeter pengimbasan perubahan (DSC) telah digunakan bagi teknik pengimbasan untuk penilaian kesesuaian bagi paracetamol dengan kappa-karageenan yang digunakan sebagai pengikat. Kesan pemprosesan bagi campuran diantara dadah-eksipien pada kadar berat-berat berlainan (1:1, 2:1 dan 4:1) dan pengranulasian telah dinilai. Keputusan pengimbasan DSC menunjukkan bahawa paracetamol adalah sesuai bersama kappa-karageenan. Terdapat beberapa perubahan pada bentuk puncak termogram dan kadar tinggi kepada lebar atau sedikit penurunan pada suhu pencairan kadangkala dilihat pada kappa-karageenan tetapi tidak pada bahan aktif dadah, ciri-ciri termal Paracetamol adalah tidak berubah signifikasi ($P>0.05$). Kappa-karrageenan menunjukkan signifikasi penurunan atau notifikasi gerak kebawah pada puncak suhu pencairan antara 41^{o}C ($P<0.05$). Kesimpulan dapat dibuat bahawa interaksi diantara Paracetamol dengan kappa-karageenan adalah tiada signifikasi sebagaimana tidak terdapat signifikasi perubahan pada ciri termal terhadap paracetamol. Pengimbasan SEM menunjukan moforlogi pada bentuk granul.

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LIST OF SYMBOLS AND ABBREVIATIONS

Symbols & Abbreviations	*Meaning*
%	Percentage
<	Less than
>	More than
±	Plus and minus
ΔH	Entalphy of fusion
µl	Microliter
DSC	Differential Scanning Calorimeter
DTA	Differential Thermal Analysis
J/g	Joule per gram
mg	Milligram
N	Newton
^{o}C	Degree celcius
rpm	Rotation per minute
SEM	Scanning Electron Microscopy
sp.	Species
w:w	Weight per weight
ι	Iota
κ	Kappa
λ	Lambda