

## Photomicrograph of Nanogel Andrographolide-Beta Cyclodextrine Inclusion Complex As Anti-Burns

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### INTRODUCTION

Inclusion complex is a complex formed between drug molecules which act as guest or located inside the cavity of host molecule. Host molecules are commonly originated from the derivative group of cyclodextrin. Among cyclodextrin groups, beta cyclodextrin (BCD) is mostly used in formula development and drug delivery system [1].

Andrographolide (AG) is a pure isolate chemically synthesized from sambilito herbs (*Andrographis paniculata* Nees), in the form of needle crystal-like which is colorless and extremely bitter. AG has variety of medical properties, particularly as anti-inflammation to treat skin burns [2]. However AG has poor solubility in water. This will result in low ability to solute, penetrate membrane, and distribute the drug when applied transdermally in burn skin. In burn skin, there is tendency to skin damage, especially in *stratum corneum* which acts as semipermeable barrier. The ability of drugs that applied transdermally tends to be high.

Formation of inclusion complex using AG and BCD to increase the ability of AG in penetrating membrane should be done. Transmission Electron Microscope (TEM) is a fast technique to confirm the formation of drug or inclusion complex by comparing the shape and particle size [3]. Study on percutaneous penetration of AG-BCD inclusion complex is produced through solvent evaporation method at mole ration 1:2 in viscolam gel preparation.

### MATERIALS AND METHODS

Materials used are analytical balance, TEM, AG, BCD, viscolam, propylene glycol, glycerin, triethanolamine, methylparaben, propylparaben, aquadest.

Production of inclusion complex of AG-BCD (1:2) was done through the method of solvent evaporation. Nanogel was made with composition as listed below.

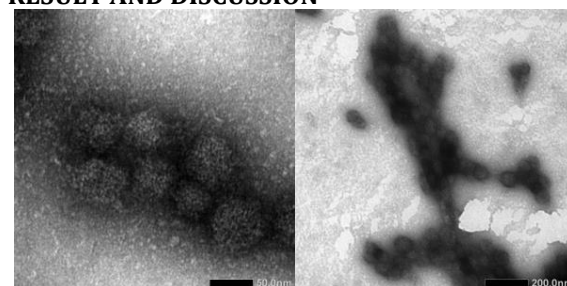
Composition of Formula	(gram)	
	FA	FB
Andrographolide (AG)	0.16	-
Inclusion complex of AG-BCD (1:2)	-	1.196
Viscolam	80	80
Propylene glycol	80	80
Glycerin	160	160
Triethanolamine	32	32
Methylparaben	2.88	2.88
Propylparaben	0.32	0.32
Aquadest ad	1600	1600

FA: Formula of AG gel preparation

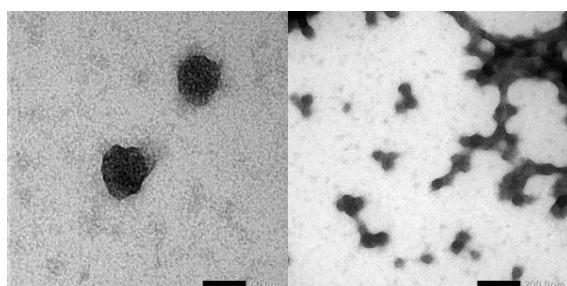
FB: Formula of AG-BCD (1:2) inclusion complex nanogel preparation

Evaluation of nanogel to determine the distribution of particle size was confirmed using TEM. This measurement was compared with the formula of viscolam gel which contained pure AG.

### RESULT AND DISCUSSION



Micro photo TEM gel of pure AG at magnification of 50 nm (left) and 200 nm (right)



Micro photo TEM nanogel of AG-BCD inclusion complex at magnification of 50 nm (left) and 200 nm (right)

The particle size of gel contain AG-BCD inclusion complex was seen to be smaller and more uniform compared with the gel that contain pure AG. This result indicated that the nanogel contain AG-BCD inclusion complex has been formed. The smaller size will affect percutaneous penetration of AG in viscolam nanogel formulation through skin layer.

## CONCLUSION

Nanogel of AG-BCD inclusion complex has been formed and able to reduce the size particle.

## REFERENCES

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