

## ABSTRACT

### CHARACTERIZATION FREEZE DRIED OF AMSCMP AND EVALUATION OF SKIN PENETRATION WITH SPACE-PEPTIDE ADDITION

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AMSCMP is a fluid-based metabolite containing growth factors in the form of proteins such as Epidermal Growth Factor (EGF), basic Fibroblast Growth Factor (bFGF), Transforming Growth Factor- $\beta$  (TGF- $\beta$ ) and Keratinocyte Growth Factor (KGF). It is known that protein is unstable in the water component and has a direct effect on storage stability because it is a good medium for microbial growth. So that specific handle is needed to maintain the stability of the existing growth factor by freeze dry. The study was to investigated the study stability, pH, TGF- $\beta$  levels, molecule size of fluid and freeze dried. Futhermore, investigated physical characteristic of freeze dried AMSCMP the parameter wich was carried out includes the surface morphology, diffraction intensity, fuctional group, and melting temperature. The results show that freeze dried is more stable to room temperature and cold, has a pH value of 7-7.4, TGF- $\beta$  levels stable for 21 days, and has the same molecule weight between fluid and freeze dried which is 75.33 kilodalton (kDa). AMSCMP freeze dried has a tetragonal crystal surface morphology, sharp absorption peaks at an angle of  $2\theta$  31.59; 45,35 and 56,39, have a characteristic group of proteins namely N-H Amide III in wavenumber (1400-1360 $\text{cm}^{-1}$ ) and C = O (1675-1640 $\text{cm}^{-1}$ ) and melting temperature 163.8 $^{\circ}\text{C}$  with enthalpy 305 J / g.

AMSCMP is a hydrophilic molecule that is  $> 75,330$  Dalton (Da), whereas a hydrophilic molecule  $> 500$  Da is difficult to penetrate into the skin. So that to improve its penetrating properties, it is necessary to add specific enhancers from the peptide group, namely Skin Penetrating and Cell Entering (SPACE). This study compared the effect of an increase in SPACE Peptide levels on TGF- $\beta$  levels, molecule size, penetration and irritation into the skin. Determination of TGF- $\beta$  levels in the formula no different significant, as well as molecular weights obtained the same result which was 75.33 kDa. Penetration test results obtained that the F2 with the smallest SPACE levels showed maximum penetration to the hypodermis and had no irritation value. F3 and F4 have irritation score values with the parameters of Polymorpho Nuclear (PMN), Degenerative, and Edema. However, the irritation value is very mild, so it is still allowed with certain restrictions.

**Keywords :** AMSCMP, Determination-TGF- $\beta$ , Freeze-dry, Physical characterization.