

# Evaluation and Identification of "SNOW-WHITE" Material on Lipstick Surface Affected by Synthetic Wax with Stearic Acid

Habiburrohman, Hafez<sup>1</sup>; Noviani, Widyantia<sup>1</sup>; Rosalia, Purwita<sup>1</sup>; Susanto, Eriwan<sup>1</sup>; Ramdani, Bayu<sup>1\*</sup>

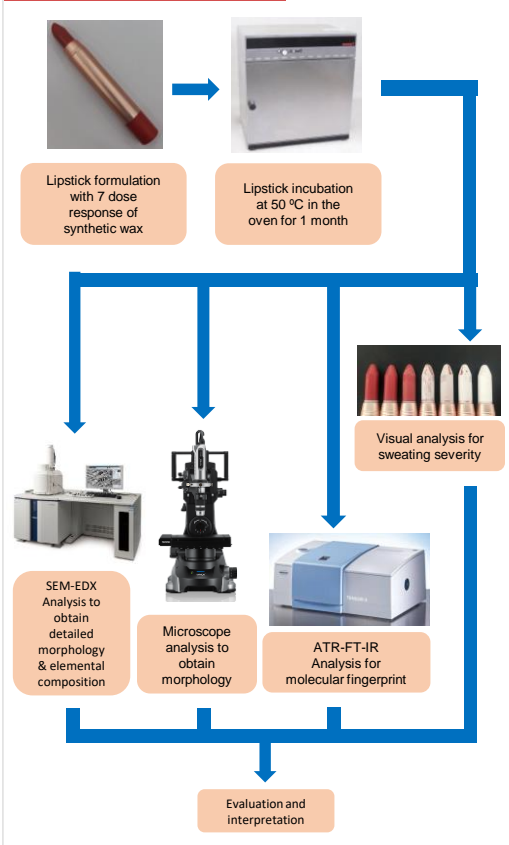
<sup>1</sup>Research and Development, Paragon Technology and Innovation, Banten, Indonesia.

## Introduction

Lipstick sweating is a phenomenon caused by temperature fluctuations that causes oil excretion on the surface of a lipstick and is perceived as unattractive by consumers (Seo et al., 1999). According to previous research, several factors influence sweating and blooming phenomenon, including the flaming process, molding temperature, wax and oil compatibility, pigment addition, and ageing (Seo et al., 1999).

Candelilla wax substitution with synthetic wax containing stearic acid (11% (w/w)) showed severe blooming phenomena that appeared as thick white crystal material. The experiment tries to investigate that sweating phenomena, and qualitatively identify the snow-white material morphology on the lipstick surface using digital and scanning electron microscope coupling with Energy Dispersive X-Ray Analysis (SEM-EDX); Attenuated Total Reflection Fourier-Transform Infrared spectroscopy (ATR-FT-IR) for their molecular fingerprint; and to evaluate the effect of molding cooling time towards sweating phenomena in lipstick.

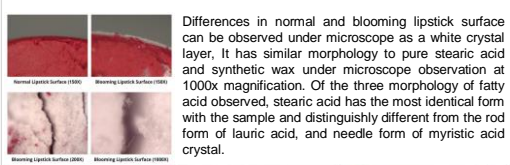
## Materials & Methods



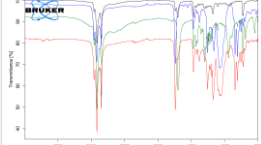
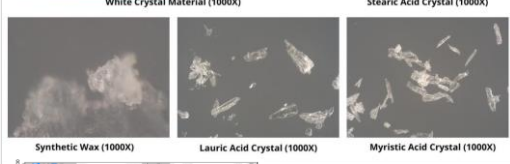
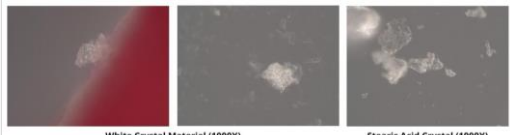
## Results & Discussion



The higher concentration of the synthetic wax resulted in a growing number of the white crystal formation on the lipstick surface.



Differences in normal and blooming lipstick surface can be observed under microscope as a white crystal layer. It has similar morphology to pure stearic acid and synthetic wax under microscope observation at 1000x magnification. Of the three morphology of fatty acid observed, stearic acid has the most identical form with the sample and distinguishly different from the rod form of lauric acid, and needle form of myristic acid crystal.



IR spectrum overlay of synthetic wax (black), normal lipstick (blue), stearic acid (green), and blooming lipstick (red)

EDX	White Crystal Material		Stearic Acid	
	% Weight	% Atomic	% Weight	% Atomic
Spectrum 1	85.77	13.58	89.00	10.87
Spectrum 2	88.66	11.05	91.33	8.54
Spectrum 3	85.35	14.38	88.66	11.22
Spectrum 4	88.94	10.70	91.57	8.27
Spectrum 5	88.45	11.30	91.15	8.74
Spectrum 6	83.95	15.85	87.51	12.40
Spectrum 7	89.15	10.60	91.69	8.16
Spectrum 8	88.32	13.49	89.42	10.49
Sample Average	87.87	12.87	90.04	9.84
Std. Deviation	1.87	2.00	1.59	1.81

Under electron microscope evaluation, the morphology of snow-white crystal is identical to synthetic wax, and just slightly different from pure stearic acid crystal. Nevertheless, refer to the SEM-EDX spectrum, the percentage ratio of C and O atom of the snow-white crystal is closely identical with the profile of pure stearic acid crystal.

## Acknowledgements

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## Conclusions

Stearic acid is a substance that may induce the formation of blooming on the lipstick. The level of blooming severity depends on its concentration in the formula. The experiment results by using digital microscope, SEM, FTIR, and SEM-EDX analysis, reveal that the snow-white material on the lipstick surface is confirmed as stearic acid.

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