Contrast between preservative efficacy tests for cosmetic products that do not disperse in water

NT_516

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Introduction:

The preservative efficacy test (PET) is used to determine whether the preservative effectiveness can be properly maintained within the expiration date of the product. In general, a product PET is conducted using a test method established by organizations such as the Personal Care Products Council (PCPC), or through a method devised in-house by the company. There is a systematically established PET method for each organization for cosmetic water-miscible formulations.
While the PET method for general water-miscible formulations is relatively well established, the PET method for atypical formulations has not been sufficiently developed by companies, organizations, or universities. To overcome this, PCPC microbiology guidelines proposed the introduction of measures such as reducing the volume of inoculation microorganisms, the number of inoculation strains or applying microorganisms to formulations such as lip stick.
However, PCPC determined that the test method for the cosmetic surface or powder form product was insufficient. Because in the case of the method proposed by PCPC, we had to check a new test method because we identified inadequacies in the test method (spreading or applying method) similar to that of consumer use.

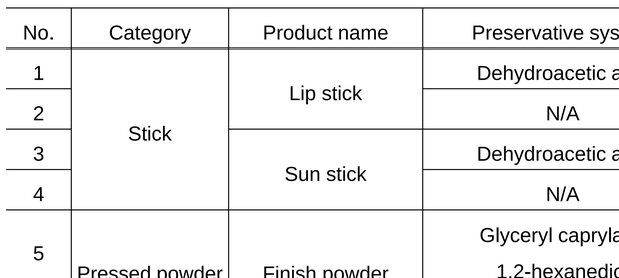
Therefore, we confirmed the difference between the PETs for atypical formulations proposed by organizations and companies. We also recommended appropriate PET and investigated whether the stability and safety of cosmetics towards microorganisms can be established using other methods.

Materials & Methods:

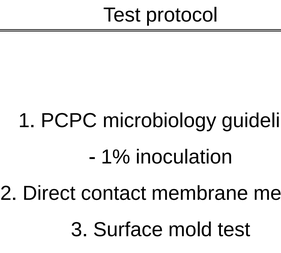
1. Tested sample & test method information

No.	Category	Product name	Preservative system	Test protocol
1	Stick	Lip stick	Dehydroacetic acid	1. PCPC microbiology guideline - 1% inoculation 2. Direct contact membrane method 3. Surface mold test
2			N/A	
3		Sun stick	Dehydroacetic acid	
4			N/A	
5	Pressed powder	Finish powder	Glyceryl caprylate, 1,2-hexanediol	
6			N/A	
7	W/S emulsion	Foundation (1)	Ethylhexylglycerin, glyceryl caprylate, caprylyl glycol	1. PCPC microbiology guideline - Dispersion agent 2. PCPC microbiology guideline - 1% inoculation 3. PCPC microbiology guideline - 0.1% inoculation
8			N/A	
9		Foundation (2)	Ethylhexylglycerin, glyceryl caprylate, caprylyl glycol	
10		Sun cream	Ethylhexylglycerin, glyceryl caprylate, caprylyl glycol, 1,2-hexanediol	
11			N/A	
12	Loose powder	Fix powder	Glyceryl caprylate, 1,2-hexanediol	1. Lyophilized microbial powder 2. PCPC microbiology guideline - 1% inoculation 3. PCPC microbiology guideline - 0.1% inoculation
13			N/A	

2. Direct contact membrane method

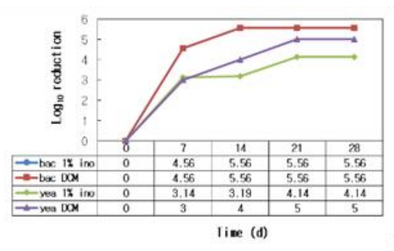


3. Lyophilized microbial powder

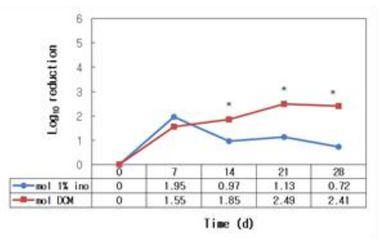


Results & Discussion:

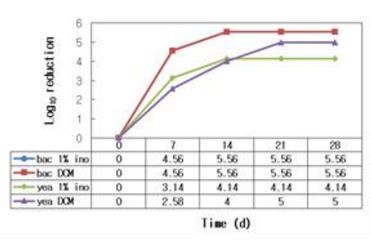
Figure 1. Comparison of the results of the PET for the stick product when using different methods.



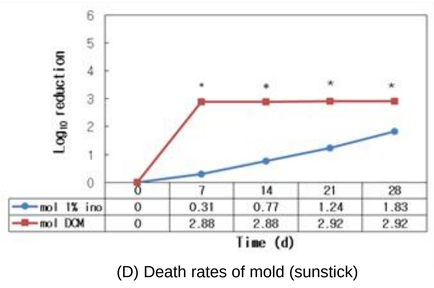
(A) Death rates of bacteria and yeast (lipstick)



(B) Death rates of mold (lipstick)



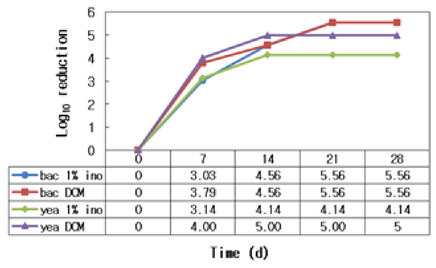
(C) Death rates of bacteria and yeast (sunstick)



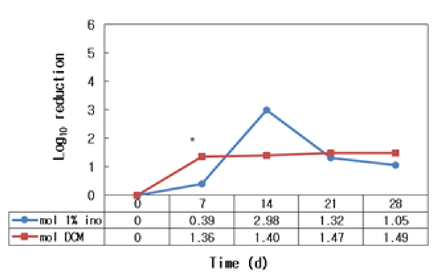
(D) Death rates of mold (sunstick)

(E) Application of surface mold test in each product

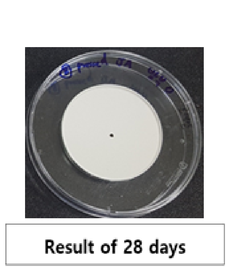
Figure 2. Comparison of the results of the PET for the pressed powder when using different methods



(A) Death rates of bacteria and yeast

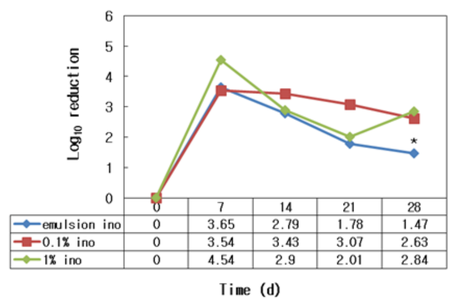


(B) Death rates of mold

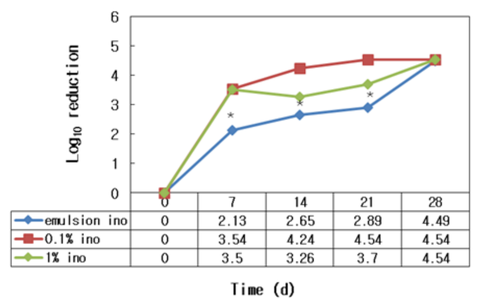


(C) Application of surface mold

Figure 3. Comparison of the results of the PET for the W/S emulsion when using different methods



(A) Death rates of bacteria (W/S foundation)



(B) Death rates of bacteria (W/S sun cream)

Conclusions:

As a result of comparing the test methods applied to stick and pressed powder products, it was confirmed that fewer errors occurred in the DCM method compared to the 1% inoculation test method. Through this, we could see that the DCM method could be used to secure adequate preservative efficacy for stick and pressed powder products. However, in the W/S emulsion and loose powder products, we could not confirm a significant difference in results between the alternative test method using the emulsion or powder and the 1% and 0.1% inoculation rates.

Thus, we judged that it would be easier to proceed with the 1% inoculation method for W/S emulsion and loose powder in terms of test efficiency. Additionally, the safety and stability of the product should be secured through the in-use test or traceability of microbial contamination in the market environment to verify preservative efficacy.

References:

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