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Clarification of the Mechanisms of Virus Inactivation in a Cationic Surfactant, Alkyldimethylbenzalkonium Chloride (BAC)

The results of joint research on inactivation mechanisms of alkyldimethylbenzalkonium chloride (BAC) against enveloped viruses conducted by Kao Corporation's Biological/Material Science Research Laboratory and Academic Assembly of Yamagata University (Professor Yoshimune Nonomura, Chemistry and Biochemical Engineering) were published in Scientific Reports, an electronic journal of Nature Research, on March 28, 2025.*¹

The results will contribute to the appropriate use of BAC in sanitation products and reduction of its release into the environment around the world.

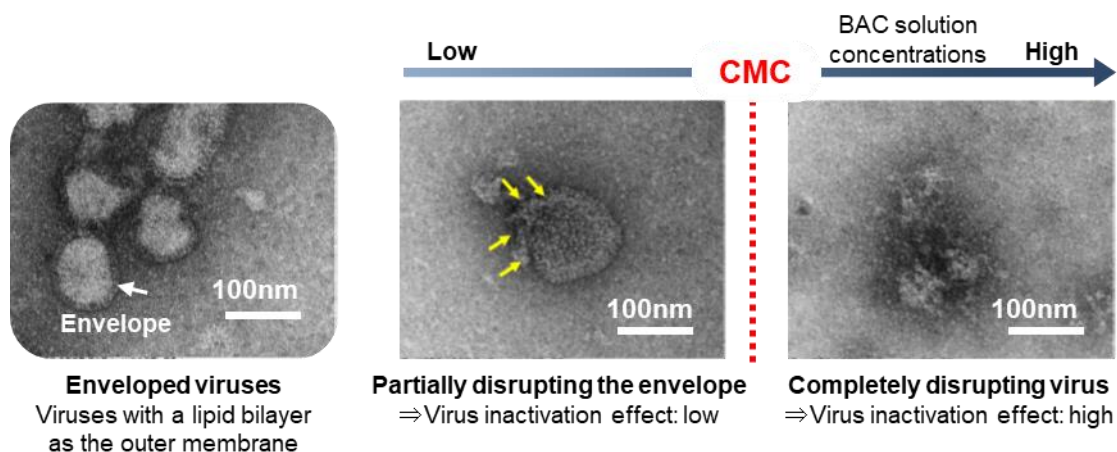
*¹ [Novel mechanisms of alkyldimethylbenzalkonium chloride in virucidal activity](#)

Main Content

BAC is a surfactant that exhibits virucidal and virus inactivating action without the use of ethanol. It is used in many disinfectants and other sanitation products around the world. However, the mechanism of action against enveloped viruses has not yet been sufficiently clarified, and reports on its efficacy and degree of effectiveness have varied between research institutions.

Therefore, researchers specializing in biology and chemistry at Kao collaborated to investigate in detail the mechanism of BAC function against enveloped viruses. Results revealed that at concentrations above and below critical micelle concentration (CMC), which significantly change the characteristics of the surfactant, BAC functions against virus change; and at concentrations above CMC, BAC rapidly inactivates the virus, leading to its complete destruction. Since CMC changes depend on the conditions of BAC use, these findings serve as essential information not only for product development, but also in setting conditions for virus inactivation tests conducted by research institutions.

Because the use of BAC has rapidly increased due to the COVID-19 pandemic, the impact of BAC on people and the environment has been increasingly discussed. Setting “Maximum with Minimum” as the sustainable product development policy, Kao aims to minimize the burden on people's lives and society while maximizing value for everyone. Kao anticipates that the results will contribute to the appropriate use of BAC in sanitation products and reduction of its release into the environment around the world.



About Kao

Kao, a Japan-based manufacturer of personal care and household products, cosmetics, and specialty chemicals creates high-value-added products and services that provide care and enrichment for the life of all people and the planet. Through its brands such as *Attack* laundry detergent, *Bioré* and *Jergens* skin care products, *Laurier* sanitary products, *Curél*, *SENSAI*, and *MOLTON BROWN* cosmetics, and *Oribe* hair care products, Kao is part of the everyday lives of people across Asia, the Americas, Europe, the Middle East, and Africa. Combined with its chemical business, which contributes to a wide range of industries, Kao generates about 1,630 billion yen in annual sales. Kao employs about 32,600 people worldwide and has more than 130 years of history in innovation. As an enterprise that provides products people use on a daily basis, the Kao Group takes responsibility to actively reduce the environmental footprint of its products throughout the product lifecycle. This is laid out in Kao's ESG strategy, the Kirei Lifestyle Plan, which launched in 2019.

Please visit [the Kao Group website](https://www.kao.com) for additional information.

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