

Antibacterial effect of OM-X extract against *Staphylococcus epidermidis* and *Staphylococcus aureus*

To maintain the healthy skin, it is necessary to inhibit growth of *Staphylococcus aureus**¹ which is bad bacteria without killing *Staphylococcus epidermidis**² which is resident bacteria on the skin. Therefore, the antibacterial activity of the wild fruits and plants fermentation extract (OM-X extract) which is contained in “Kampuku soap” and “Kampuku Medicate soap was studied against *S. aureus* and *S. epidermidis*. As a result, it was confirmed that OM-X extract has the effect of inhibiting the growth of only *S. aureus* without inhibiting the growth of *S. epidermidis*.

*¹ *Staphylococcus aureus* (*S. aureus*)

Staphylococcus aureus is a bad bacterium which is a high pathogenic bacterium and also famous as a causative bacterium of food poisoning. *S. aureus* is normally present on the skin surface, in pores and nostrils of some people. Also, it is thought that *S. aureus* is involved in exacerbating or causing allergic skin disease, such as atopy.

*² *Staphylococcus epidermidis* (*S. epidermidis*)

Staphylococcus epidermidis is a representative bacterium of good bacteria on the skin of all human. *S. epidermidis* metabolizes our sweat and sebum and generates acid. Then, *S. epidermidis* plays a role in maintaining the mildly acidic healthy skin.

<Summary>

The antibacterial test of the wild fruits and plants fermentation extract (OM-X extract) against *S. aureus* NBRC102138 and *S. epidermidis* JCM2414 was performed by paper-disk method.

Considering the effect of the low pH of OM-X (pH4.0) on bacterial growth, the OM-X extract (pH7.0) was prepared with sodium hydroxide. Another OM-X extract (pH10.0) was also prepared

with sodium hydroxide because soaps are mildly alkaline. Paper discs (ADVANTEC, diameter: 8mm) were impregnated with 50µl of each test body which was sterilized by a process of steaming under pressure (at 121 degrees Celsius / for 15 minutes) and dried. These were used as test specimens.

Normal saline solution was used as a control. These test specimens were put on the surface of the Mannitol Salt Agar plates with Egg Yolk (MSEY media) inoculated with each bacterial suspension.

<i>S. aureus</i>	<i>S. epidermidis</i>
<div style="border: 1px solid black; width: 100px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> Existence of halo* </div>	<div style="border: 1px solid black; width: 100px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center;"> Non-existence of halo* formation </div>
Paper disc impregnated with OM-X extract	Paper disc impregnated with OM-X extract
----- halo(growth-inhibitory zone): shows that a test body inhibit the growth of bacteria.	

After incubated for 48 hours at 37 degrees Celsius, the existences of the growth-inhibitory zone (halo) were checked.

As a result, OM-X extract showed antibacterial activity against *S. aureus* under all pH conditions. Especially, OM-X extract prepared to the same condition as mild alkaline soap (pH10.0) showed the strongest antibacterial activity. Meanwhile, the formation of halo against *S. aureus* was not admitted under any pH condition.

Therefore, it was revealed that OM-X extract does not inhibit the growth of *S. epidermidis*, resident bacteria on the skin, but has a growth-inhibitory activity distinctly against *S. aureus*. And such growth-inhibitory activity against *S. aureus* showed the strongest power under the mild alkaline condition.

(Table. 1) Existence of halo (growth-inhibitory zone) formation against test bacteria on test specimens

Test body	Existence of halo * ¹	
	<i>S. aureus</i>	<i>S. epidermidis</i>
OM-X extract (pH 10.0)	+	- (0mm)
OM-X extract (pH 7.0)	+	- (0mm)
OM-X extract (pH 4.0)	+	- (0mm)
Normal saline solution (control)	- (0mm)	- (0mm)

+ : formation of halo was admitted

*¹ in parentheses : width of halo : indicated by "W" below (n=2)

$$W=(T-D)\div 2$$

W: width of halo (mm)

T: sum of length of test specimen and width of halo (mm)

D: length of test specimen (mm)