

**Mandom Shows That a Deodorant Formula Containing the Antimicrobials Triclosan and IPMP is Effective Across Various Skin States
Pharmaceutical Approval Obtained from the Ministry of Health, Labor, and Welfare**

Mandom Corporation (Headquarters: Osaka; President Executive Officer: Motonobu Nishimura; hereafter, Mandom) showed that formulations containing the antimicrobial compounds triclosan and isopropyl methylphenol (IPMP) exhibit effective antimicrobial activity across different skin states and are effective deodorants. Mandom has received pharmaceutical approval from the Ministry of Health, Labor, and Welfare to implement this technology in its products.

We will announce the results of our research at the Fall Joint Symposium of the Society for Antimicrobial and Antifungal Agents, Japan (Fukui International Activities Plaza) to be held on October 29, 2004.

<The Mechanism of Odor Generation and Antimicrobial Activity>

Body odor and unpleasant odor associated with sweat arise when microorganisms on the skin surface digest agents in sweat and sebum to produce foul-smelling compounds. Deodorants that contain antimicrobial compounds can suppress or limit the activity of these microorganisms and in turn decrease odor.

However, fluctuations in sweat and sebum secretion in response to changes in environmental factors such as increases in temperature, physical activity, and humidity can alter the effectiveness of antimicrobial agents. Sebaceous compounds in particular are predicted to affect the activity of antimicrobial agents.

At Mandom, we have been developing a deodorant that maintains sufficient antimicrobial activity across these fluctuations in skin states. To achieve this goal, we have been actively determining the characteristics of various antimicrobials and the aggregate effect of combinations of antimicrobial agents.

<Discovery of the Combined Use of Triclosan and IPMP>

Triclosan and IPMP both have antimicrobial activity. Triclosan has been included in a broad range of products, whereas IPMP is commonly used in deodorants. We investigated the ways in which these antimicrobials are influenced by changes in the sweat and sebum content at the dermal surface by testing their effectiveness in the presence of sebaceous compounds. We found that sebaceous compounds remarkably decreased the efficacy of triclosan, but only slightly affected the antimicrobial activity of IPMP, which had lower overall antimicrobial activity than triclosan.

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We tested the combined antimicrobial activity of triclosan and IPMP and found that this combination exhibited potent antimicrobial activity in both the absence and presence of sebum. These results indicate that triclosan kills microorganisms in the presence of sweat when water content on the skin is high, and that IPMP exhibits effective antimicrobial activity after the sweat has dried. Thus, this antimicrobial combination effectively eliminates odor-causing microorganisms under various skin states characterized by fluctuating levels of sweat (water content) and sebum (oil content), and maintains continuously high deodorizing power (Table 1).

The confirmation of the effectiveness of this formulation enabled development of the first Japanese deodorant product (non-medicinal product) that contains two or more antimicrobial agents.

Triclosan

Triclosan exists as a white crystalline powder that has a slight odor. It has a broad spectrum of antimicrobial activity and is effective even at low concentrations against fungi and both Gram-positive and Gram-negative bacteria.

Isopropyl methylphenol (IPMP)

IPMP typically exists as an odorless, colorless or white powder that can form white acicular crystals. It is bactericidal and has weak astringency as well as anti-oxidant and UV absorption activities.

Table 1. Antimicrobial Activity of Triclosan and IPMP in Relation to Water and Oil Content

Skin State	Water/Oil Content	Antimicrobial Agent		
		Triclosan	IPMP	Triclosan + IPMP
Sweating	High water content	+++	+	+++
High Sebum	Water and oil present	+	+	++
Overall antimicrobial activity		+	+	+++

+++ : Highly effective ++ : Effective + : Ineffective