Structure-activity relationship studies of antibacterial (MRSA and VRE) active xanthones from *Garcinia mangostana*

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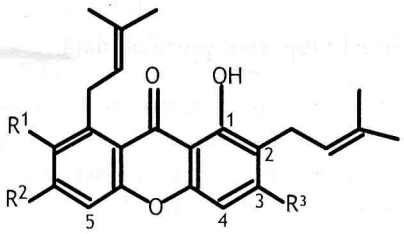
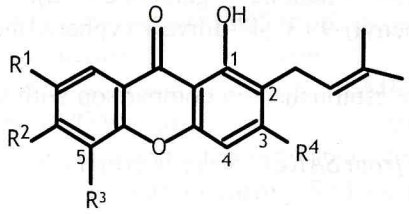
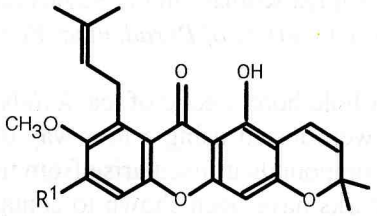
A number of xanthones (**1**, **2**, **3** and **4**) have been isolated from the medicinal plant *Garcinia mangostana*, and some of them are claimed to have anti methicillin resistant *Staphylococcus aureus* (MRSA) and Vancomycin Resistant *Enterococci* (VRE) activity. Even though the above xanthones share a basic xanthone skeleton with common substituents such as prenyl, hydroxyl and methoxyl groups, their antibacterial activity vary with the substituents at C-6 and C-3 hydroxyl groups. Our analysis using natural (**1**, **2**, **3**, **4**, **5** and **6**) and synthetic (**7**, **8** and **9**) xanthone derivatives suggested that the presence of free hydroxyl groups at C-3 and C-6 in the xanthone nucleus is essential for the higher antibacterial activity. When free C-6 hydroxyl group is absent, the activity completely disappears. The absence of a free hydroxy group at C-3 drastically reduces the activity of the xanthone derivatives.



1. $R^1 = OCH_3$, $R^2 = R^3 = OH$, α-mangostin.
2. $R^1 = R^2 = R^3 = OH$, γ-mangostin
3. $R^1 = R^3 = OCH_3$, $R^2 = OH$, β-mangostin
4. $R^1 = R^3 = R^2 = OCH_3$ 3,6,7–trimethoxy–γ-mangostin
7. $R^1 = R^3 = OH$, $R^2 = OCH_3$



5. $R^1 = R^2 = R^4 = OH$, $R^3 = H$, assiguxanthone-B
6. $R^1 = H$, $R^2 = R^3 = R^4 = OH$



8. $R^1 = OH$
9. $R^1 = OCH_3$