

## Anti-Inflammatory, Wound Healing, and Anti-Diabetic Effects of Pure Active Compounds Isolated from the Ryudai Gold Variety of *Curcuma longa*

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### Track: Agricultural Sciences

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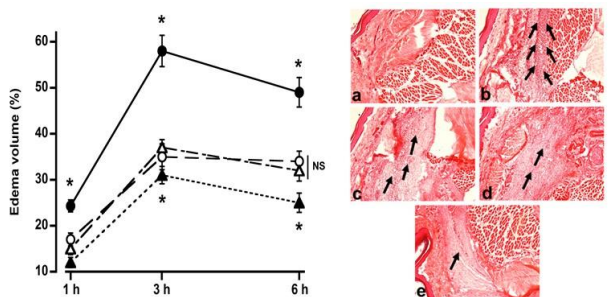
### Extended Abstract

**Background:** The rhizome of *Curcuma longa* (turmeric) is commonly utilized in traditional medicine. It contains curcumin, demethoxycurcumin (DMC), and bisdemethoxycurcumin (BDMC). The Ryudai gold cultivar of *Curcuma longa* contains a higher concentration of these curcuminoids [1] and shows better antifungal and antioxidant activities than other species of turmeric [2]. We investigated the impact of these curcuminoids on wound healing, inflammation, and diabetes in vivo.

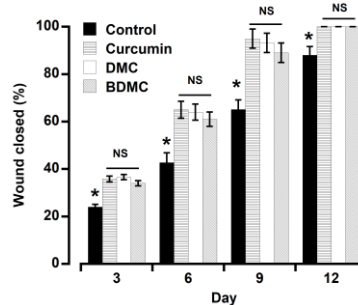
**Methodology:** Sub-planter injections of carrageenan induced acute paw inflammation in rats. The wound-healing ability of 1% curcuminoids was examined by making a 6 mm round wound on the shaved dorsum of the mice with a biopsy punch. A single intraperitoneal injection of streptozotocin (50 mg/kg) was used to induce diabetes in mice. Curcuminoids at a dose rate of 100 mg/kg body weight were used with feed and as a gastric gavage to treat diabetes and inflammation in experimental animals. Paw thickness was measured at 1, 3, and 6 h following carrageenan injection.

**Results:** After three hours, mean paw volume was 58% in carrageenan-injected mice, which was 35%, 37%, and 31% in the curcumin, DMC, and BDMC groups, respectively. BDMC showed the highest anti-inflammatory potency. Structural difference of BDMC make it more bioavailable and water-soluble than curcumin and showed more COX-1 and COX-2 inhibitory effects than curcumin and DMC [3]. Histopathology of the paw tissue demonstrated severe infiltration of inflammatory cells and thickening of the dermis, which were remarkably improved by the curcuminoids. The wound-healing abilities were significantly higher in the curcumin- (95.0%), DMC- (93.17%), and BDMC-treated (89.0%) groups, in comparison to that of the control (65.09%) group at day nine. Topical application of the curcuminoids makes them equally accessible at the wounded site which might be the cause of non-significant difference among the groups. Streptozotocin-induced diabetes was characterized by an increased blood glucose (552.2 mg/dL) and decreased body weight (31.2 g), compared to that of the control rats (145.6 mg/dL and 46.8 g blood glucose and body weight,

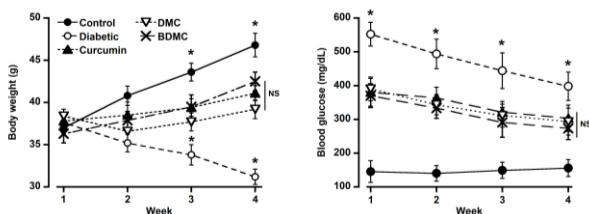
respectively). It also caused an increase in serum alanine aminotransferase (ALT; 44.2 U/L) and aspartate aminotransferase (AST; 55.8 U/L) compared to that of the control group (18.6 U/L and 20.1 U/L, respectively). Histopathological examination of the liver showed that diabetes caused hepatic cellular necrosis, congestion of the central vein, and parenchymatous degeneration. However, all three curcuminoids significantly decreased blood glucose levels, ALT, and AST and improved the histopathological score of the liver.



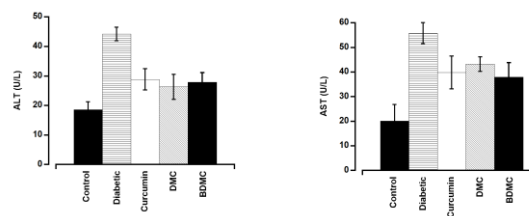
**Figure 1:** Effects of 100 mg/kg body weight of curcumin (□), DMC (△), and BDMC (◻) on rat paw edema caused by carrageenan (●). n = 4.



**Figure 2:** Effects of topical application of curcumin, DMC, and BDMC (1%) on the wound-healing time in mice. N = 3.



**Figure 3:** Effects of curcumin, DMC, and BDMC on body weight and blood glucose level of diabetic mice. N = 5.

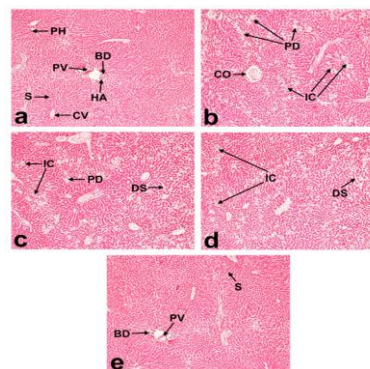


**Figure 4:** Effects of curcumin, DMC, and BDMC on serum ALT and AST levels in mice. N = 5.

**Conclusion:** These results evidenced that not only curcumin but also DMC and BDMC have potent anti-inflammatory, wound healing, and anti-diabetic efficacy, and the Ryudai gold variety of turmeric could be used as a functional food supplement.

## References

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**Figure 5:** Effects of curcumin, DMC, BDMC and STZ on histoarchitecture of mice livers (a) control; (b) streptozotocin; (c) streptozotocin + curcumin; (d) streptozotocin + DMC; and (e) streptozotocin + BDMC. Dilated sinusoid (DS), congested central vein (CO), parenchymatous degeneration (PD), central vein (CV), (S), hepatic artery (HA), bile duct (BD), and inflammatory cells (IC).