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大根に含まれる刺激性生理活性成分（4-メチルチオ-3-ブテニルイソチオシアネート）の加水分解を抑えるため、α-シクロデキストリンとの包接体を作成すると、抗炎症作用、抗酸化作用を示し、高脂肪食により誘発される肥満を予防できることがわかりました。

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Anti-obesity effects of α-cyclodextrin-stabilized 4-methylthio-3-butenyl isothiocyanate from daikon (Raphanus sativus var. longipinnatus) in mice

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Associated Data

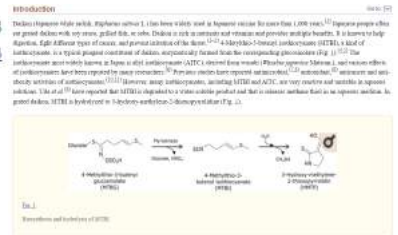
Supplementary Materials

Abstract

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4-Methylthio-3-butenyl isothiocyanate (MTBI) is a pungent bioactive constituent found in daikon. However, MTBI is immediately hydrolyzed to 3-hydroxy-methylene-2-thioxopyrrolidine in grated daikon. In this study, we evaluated whether MTBI in grated daikon complexed with α-cyclodextrin (αCD) has anti-obesity effects in mice. C57BL/6J mice were fed a normal diet (normal group), high-fat diet (HFD, control group), HFD with αCD (αCD group), or HFD with MTBI-αCD (MTBI-αCD group) for 16 weeks. The results showed that the final body weight, epididymal white adipose tissue weight, and plasma triglyceride and total cholesterol levels were significantly lower in the MTBI-αCD group than in the control group. The cell size in epididymal adipose tissue was significantly smaller and the accumulation of lipids in the liver was significantly lower in the MTBI-αCD group than in the control group. Furthermore, real-time polymerase chain reaction showed that the mRNA expression level of tumor necrosis factor-α was suppressed in the MTBI-αCD group. We also observed low superoxide dismutase activity in the MTBI-αCD group, possibly because MTBI-αCD has the potential to resist HFD-induced oxidative injury. In conclusion, MTBI-αCD exerted anti-inflammation and antioxidant effects to suppress lipid accumulation in epididymal adipose tissue and the liver. These effects then prevented HFD-induced obesity in mice.

Keywords: 4-methylthio-3-butenyl isothiocyanate, αCD, anti-obesity effect, antioxidant effect, high-fat diet



Introduction Daikon (Raphanus sativus L.) has been widely used as a human vegetable for more than 1,000 years... Abstract (continued) Cyclodextrin (CD) is a family of cyclic oligosaccharides... Materials and Methods Overview Experimental Design

Table 1. Components of high-fat diet (HFD) and HFD with 3% α-CD (HFD-αCD). Table with 2 columns: Component, HFD (g), HFD-αCD (g).



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