

Cytotoxic fatty acid ketodienes from eggplants

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Abstract

Based on the traditional use of the calyx of eggplants for treatment of common warts and a clinical report that the ethanol extract of the calyx of the eggplant is effective for curing genital warts, the cytotoxicity of the ethanol extract of the eggplant against various cell lines established from human cancer cells was examined. The extract of eggplants inhibited cell growth of human ovary cancer (HRA) cells, which are of epithelial cell origin similar to common warts. The cytotoxicity of the extract from the calyx of the eggplants is much higher than that of the extract from the edible part of the eggplants. Two compounds, 9-oxo-(10*E*, 12*Z*)-octadecadienoic acid (9-*EZ*-KODE) and 9-oxo-(10*E*, 12*E*) octadecadienoic acid (9-*EE*-KODE) were isolated as cytotoxic constituents from the calyx of the eggplants. 9-*EE*-KODE exhibited approximately 10-fold higher cytotoxicity than 9-*EZ*-KODE. Furthermore, 9-*EE*-KODE revealed 5-fold more potent cytotoxicity against HRA cells than against other cell lines examined. The calyx contained higher levels of 9-*EE*-KODE than the edible part of the eggplants.

Keywords : eggplant, cytotoxicity, 9-oxo-octadecadienoic acid

I Introduction

Eggplants are fruits of the species *Solanum melongena* L. (Solanaceae). They belong to the nightshade family of vegetables together with tomatoes, bell peppers, and potatoes. Eggplants are popular vegetables in Asia and in some European countries, such as Italy, and are a rich source of vitamins and dietary fibers. In addition, they are components of a healthy diet because they contain antioxidative phenolic compounds, including caffeic acid, chlorogenic acid, and flavonoids¹⁾.

In Japan, the calyx of eggplants have been traditionally used as a folk remedy for common warts caused by infection with some types of human papilloma virus (HPV)^{2, 3)}. The ethanol extract of the calyx of the eggplants was shown to be effective for treatment of genital warts (*Condylomata acuminata*), a sexually transmitted disease caused by HPV.* These facts prompted us to examine the cytotoxic activity of eggplants

against human cancer cells. In the present manuscript, we describe that the calyx of the eggplants exhibited cytotoxic activity against HRA, a cell line obtained from human ovary cancer, and 9-oxo-(10*E*, 12*Z*)-octadecadienoic acid (9-*EZ*-KODE) and 9-oxo-(10*E*, 12*E*)-octadecadienoic acid (9-*EE*-KODE) were isolated and identified as active compounds from the calyx. 9-*EE*-KODE revealed 10-fold higher cytotoxicity against HRA than 9-*EZ*-KODE. We also demonstrated that the content of 9-*EE*-KODE is higher in the calyx tissues than in the fruits.

II Materials and Methods

1. Materials

Eggplants, fruits of *Solanum melongena* (cultivar, Senryonasu), were purchased from the local markets in Nagoya. Roswell Park Memorial Institute (RPMI) 1640 medium

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* Tomoda, Y., Tomoda, K., Horio, H., Mano, N., Mano, S., Morikawa, Y., Ito, T., Sugiyama, M.: 18th Annual Meeting of Japanese Society of Sexually Transmitted Infections, 2007, Kokura, Japan