

## **Morinda citrifolia edible leaf extract enhanced immune response against lung cancer**

### **ABSTRACT**

Lung cancer causes 1.4 million deaths annually. In the search for functional foods as complementary therapies against lung cancer, the immuno-stimulatory properties of the vegetable *Morinda citrifolia* leaves were investigated and compared with the anti-cancer drug erlotinib. Lung tumour-induced BALB/c mice were fed with 150 mg kg<sup>-1</sup> or 300 mg kg<sup>-1</sup> body weight of the leaf extract, or erlotinib (50 mg kg<sup>-1</sup> body-weight) for 21 days. The 300 mg kg<sup>-1</sup> body weight extract significantly (and dose-dependently) suppressed lung tumour growth; the extract worked more effectively than the 50 mg kg<sup>-1</sup> body weight erlotinib treatment. The extract significantly increased blood lymphocyte counts, and spleen tissue B cells, T cells and natural killer cells, and reduced the epidermal growth factor receptor (EGFR) which is a lung adenocarcinoma biomarker. The extract also suppressed the cyclooxygenase 2 (COX2) inflammatory markers, and enhanced the tumour suppressor gene (phosphatase and tensin homolog, PTEN). It inhibited tumour growth cellular gene (transformed mouse 3T3 cell double minute 2 (MDM2), V-raf-leukemia viral oncogene 1 (RAF1), and mechanistic target of rapamycin (MTOR)) mRNA expression in the tumours. The extract is rich in scopoletin and epicatechin, which are the main phenolic compounds. The 300 mg kg<sup>-1</sup> *Morinda citrifolia* leaf 50% ethanolic extract showed promising potential as a complementary therapeutic dietary supplement which was more effective than the 50 mg kg<sup>-1</sup> erlotinib in suppressing lung adenocarcinoma. Part of the mechanisms involved enhancing immune responses, suppressing proliferation and interfering with various tumour growth signalling pathways.

**Keyword:** Lung cancer; *Morinda citrifolia*