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Morindone from *Morinda citrifolia* as a potential antiproliferative agent against colorectal cancer cell lines

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Abstract

There is an increasing demand in developing new, effective, and affordable anti-cancer against colon and rectal. In this study, our aim is to identify the potential anthraquinone compounds from the root bark of *Morinda citrifolia* to be tested *in vitro* against colorectal cancer cell lines. Eight potential anthraquinone compounds were successfully isolated, purified and tested for both *in-silico* and *in-vitro* analyses. Based on the *in-silico* prediction, two anthraquinones, morindone and rubiadin, exhibit a comparable binding affinity towards multitargets of β-catenin, MDM2-p53 and KRAS. Subsequently, we constructed a 2D interaction analysis based on the above results and it suggests that the predicted anthraquinones from *Morinda citrifolia* offer an attractive starting point for potential antiproliferative agents against colorectal cancer. *In vitro* analyses further indicated that morindone and damnacanthal have significant cytotoxicity effect and selectivity activity against colorectal cancer cell lines.

Introduction

Colorectal cancer (CRC) as a malignant cancer affecting both male and female, is ranked the third most common cancer worldwide and second most frequent cancer in Malaysia [1]. Significant associations between dietary factors and CRC risk have been determined, in addition to smoking and alcohol intake [2]. Regular consumption of fruits and vegetables was demonstrated effective in reducing CRC risk as polyphenolic compounds in plants contribute to decreasing cell adhesion process, migration, and tumour angiogenesis [3]. Standard chemotherapy regimens in treating CRC patients accommodates the use of cancer drug particularly 5-fluorouracil (5-FU) and doxorubicin hydrochloride (DOX) that function by inhibiting DNA synthesis [4]. Despite higher survival rate in patients, the adverse toxicity risk associated with