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A study on antiproliferative activity of methanolic extract of *Nephelium lappaceum* peel towards selected cancer cell lines

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Nephelium lappaceum (NL) is known as rambutan in Malaysia. The fruit is generally consumed fresh and industrially processed to juices, jams and jellies. However, the seeds and peels of NL are often treated as a waste. Studies on NL showed it to pose some therapeutic activities such as antioxidant, antibacterial, antiviral and anti-hyperglycemic. The information of NL peel extract as an anticancer however are still limited. The purposes of this study are to extract the peel of NL using methanol and to determine the antiproliferative activity of NL peel on selected cancer cell lines using methylene blue assay. The two varieties of NL (rambutan kuning and rambutan merah) peels were used in this study. Three cancer cell lines including cervical cancer (HeLa), breast cancer (MDA-MB-231) and osteosarcoma (MG-63) were tested with non-malignant cell Madin-Darby canine kidney (MDCK) as control cell and positive control (cisplatin). The antiproliferative activities were expressed in IC₅₀ value. Both of NL showed a potent antiproliferative activity against MDA-MB 231 at 5.42 µg/ml and 12.4 µg/ml, respectively. For MG-63, both of NL also showed effective antiproliferative effects at 6.97 µg/ml and 13.95 µg/ml, respectively. However, no antiproliferative activity on non-malignant cells (MDCK) (37.15 µg/ml) and HeLa cells (>99 µg/ml) were observed. In conclusion, methanolic extract of NL peel exhibited an effective antiproliferative towards MDA-MB-231 and MG-63. It has the potential and promising resources for anticancer compound especially for breast cancer and osteosarcoma. A further investigation on their molecular mechanism is worth carried out in understanding the anticancer drug development.

Keywords: antiproliferative activity, cancer cell lines, HeLa cell, methanolic extracts, *Nephelium lappaceum*

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Introduction

Nephelium lappaceum which belongs to family Sapindaceae is subtropical and tropical native fruit of the Southeast Asia but unknown in the United States (Ong et al., 1998). *Nephelium lappaceum* is known as rambutan in Malaysia where the fruit is generally consumed fresh and industrially processed to juices, jams and jellies. However, the seeds and peels of *Nephelium lappaceum* are often treated as a waste. Some phytochemical constituent such as geraniin (Palanisamy et al., 2010), ascorbic acid and vitamin c (Wall, 2006) and volatile compounds (Ong et al., 1998) of *Nephelium lappaceum* had been isolated from the fruits and peels. Studies on *Nephelium lappaceum* showed it to pose some therapeutic activities such as antioxidant (Palanisamy et al., 2008), antibacterial (Thitilertdech et al., 2008), antiviral (Nawawi, 1999) and anti-hyperglycemic (Palanisamy et al., 2010). In this study, *Nephelium lappaceum* was extracted using a different organic solvents and were tested for antiproliferative effect on several cancer cell lines using methylene blue assay. The purpose of this study was to determine the antiproliferative activity of organic extracts of *Nephelium lappaceum* peels on selected cancer cell lines.

Materials and Methods

Plants collection and preparation The two varieties of *Nephelium lappaceum* (Rambutan Kuning and Rambutan Merah) peels were collected from Pasir Tumboh, Kota Bharu, Kelantan, Malaysia. All the plant parts were washed using tap water and were dried in oven at 50°C. The dried plants were then blended into powder form.

Successive extraction of plants 25 g of each plant powder was subjected to successive extraction using Soxhlet instrument according to Hasmah (2006) with few modifications. The peels of *Nephelium lappaceum* were extracted using methanol. Extraction was stopped when the solvent became clear. All the extraction