

## CHAPTER V

### BIOLOGICAL ACTIVITY

#### 5.1 Results of biological activity test

The *in vitro* activity of some compounds (10 $\mu$ g/ml) from *Croton oblongifolius* Roxb. against 6 cell lines, for example, HS27 (fibroblast), Hep-G2 (hepatoma), SW 620 (colon), Chago (lung), Kato (gastric) and BT474 (breast) are reported in Table 20.

Table 20 Cytotoxic activity against 6 cell lines of some compounds from *C. oblongifolius*.

Compound	% Survival					
	HS 27 (fibroblast)	Hep-G2 (hepatoma)	SW 620 (colon)	Chago (lung)	Kato-3 (gastric)	BT 474 (breast)
Doxorubicin	35	17	20	63	54	28
1	108	91	88	96	69	94
2	104	79	112	104	67	115
3	66	13	18	23	15	42
4	93	62	95	97	65	95
6	49	9	6	7	10	57
7	115	76	103	104	71	129

As summarized in Table 20, all compounds were evaluated against a panel of human tumor cell lines. Compound 3 and 6 showed significant cytotoxicity against all human tumor cell lines. Compound 1, 2 and 7 were inactive against all

cell lines. Compound 4 showed moderate activities against Hep-G2 (hepatoma) and Kato-3 (gastric). This was the first report of the cytotoxicity of Compound 2 against HS 27, Hep-G2, SW 620, Chago, Kato-3 and BT 474 tumor cell lines.

## 5.2 Literature reviews in biological activity of (-)-hardwickiic acid

Furthermore, (-)-hardwickiic acid (Compound 2) which was the main product of the hexane crude extract has been widely studied for its biological activity such as antimicrobial activity, insecticidal activity and anti-tumor activity. The bioactive properties of (-)-hardwickiic acid are shown below.

In 1987, Bandara and coworkers isolated (-)-hardwickiic acid from the roots of *Croton aromaticus* and modified its derivatives. (-)-Hardwickiic acid showed insecticidal activity against *Aphis craccivora* [37].

In 1991, McChesney and Clark reported that (-)-hardwickiic acid which was isolated from *Croton sonderianus* showed significant qualitative antibacterial activity against the Gram-positive bacteria (*B. subtilis*, *St. aureus*) and *M. smegmatis* [25].

In 1994, Chen and coworkers isolated (-)-hardwickiic acid from the sap of *Croton lechleri*. In that studied, They have shown that (-)-hardwickiic acid possesses cytotoxicity against human oral epidermoid carcinomas ( $IC_{50} = 21.90 \pm 3.50 \mu\text{g/ml}$ ), using emetine hydrochloride, as a control substance ( $IC_{50} = 0.2 \mu\text{g/ml}$ ) [38].