From ancient years, the traditional medicinal plants were used for the treatment of various diseases. Nowadays several researches have been focused on medicinal plant aiming to search for efficient alternatives to control pathogenic agents. The Natural products (NP) rise as promising tools in the production of novel drugs. Since many compounds were found in plants with high secondary metabolite content, the *Polygonum limbatum*, appear as a potential candidate of drugs source. The air-dried powder of leaves was extract three times with MeOH and evaporated under reduced pressure. The portion of MeOH extract was subjected to silica gel column chromatography eluted with gradients of *n*-Hexane-EtOAc to afford sub-fractions. The sub-fractions were purified on Sephadex LH-20 using CH$_2$Cl$_2$-MeOH (1:1) to give compounds. As result, a new homoisoflavone (1) and one new natural product 2,4-imidazolidinedione, 3-methyl (2) along with known cardamomin (3), (±)-polygohomoisoflavone (4), (S)(-)-pinostobin (5), (2',4'-dihydroxy-3',6'-dimethoxychalcone (6), (2S)(-)-5-hydroxy-6,7-dimethoxyflavone (7), (2S)(-)-5,7-dimethoxyflavanone (8) were isolated. Their structures were elucidated by spectroscopic means and compared with published data. Antibacterial and cytotoxicity of crude extract and compounds were evaluated. The antibacterial assays showed that crude extract and compound (1), (2) and (3) were highly active against *Escherichia coli, K. pneumonia* and *Pseudomonas aeruginosa*. Furthermore, cytotoxicity assay revealed that, except A549, more than 50% inhibition of proliferation was obtained towardTHP-1 (leukemia), HeLa (cervix), PC-3(prostate), MCF-7 (breast) of the tested samples on at least one the four other cell lines. The IC$_{50}$ values below or around 20µg.mL$^{-1}$ were recorded for the crude extract. For the compounds, the lowest IC$_{50}$ values of 1.8 and 3.5µg.mL$^{-1}$recorded with cardamomin and (2',4'-dihydroxy-3',6'-dimethoxychalcone being lower than that of paclitaxel (4µg.mL$^{-1}$), highlighting their anti-leukemic potentials. The result here presented indicates that *P. limbatum* can be considered as potential antibiotic and anticancer drugs, especially against leukemia.

**Keywords:** *Polygonum limbatum*, Polygonaceae, homoisoflavone, cardamomin

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