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Anticancer properties of crystallographically elucidated (-)-pseudosemiglabrin, a natural flavone isolated from *Tephrosia apollinea*

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Introduction: Natural products especially from terrestrial plants are considered as important sources of potential chemotherapeutic agents. *Tephrosia apollinea* is a perennial shrublet widely distributed in Africa and is known to have medicinal properties.

Objective & Method: In the present study (-)-pseudosemiglabrin has been isolated from the aerial parts of *Tephrosia apollinea*. The plant material was dried and mechanically ground to fine powder. Three sequential crude extracts using n-Hexane, chloroform and ethanol were collected. The chloroform extract showed much better results compared to the other two extracts and was further subjected to fractionation using vacuum liquid chromatography (VLC) over silica gel. The elution used was n-hexane: chloroform: methanol with increasing polarity to obtain 10 fractions (F1-F10). The individual fractions were subsequently tested for antiproliferative effect against the same cell lines (HL-60, K562 and MCF-7). The fifth fraction (F5) was noted to be the most active and hence was further subjected to a small column (5x20 cm) eluting with n-Hexane: dichloromethane of increasing polarity that resulted in isolation of (-)-pseudosemiglabrin. The molecular structure of the isolated compound has been elucidated by means of physical and several spectroscopic methods including IR, UV, NMR (1H, 13C NMR, DEPT, 2D 1H-1H COSY, HSQC and HMBC) and LC-MS experiments. Furthermore, the stereo chemical structure of the isolated compound was confirmed by X-ray crystallographic analysis. The cytotoxicity of the isolated (-)-pseudosemiglabrin was evaluated against eight cancer cell lines using MTT assay, in addition to human fibroblast normal colon cell line CCD-18 (as a model for normal cells).

Results & Discussion: In the present work, the isolation of (-)-pseudosemiglabrin from the aerial parts of *T. apollinea* and its detailed stereochemistry and antiproliferative activity is reported. The natural compound showed significant antiproliferative effects against leukemia, prostate and breast cancer cell lines, interestingly, the compound did not display toxicity against the normal human fibroblast.

Conclusion: It can be concluded that (-)-pseudosemiglabrin is worthy of further investigation as a potential chemotherapeutic agent.

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New and an interesting epimer and osazone charts in carbohydrate chemistry

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One of the major classes of substances common to living systems are carbohydrates, so these compounds as very familiar to us that we call many of them as sugars. Recently, we have reported the new monosaccharide's barcoding that caused drawing of Fischer projection of the linear monosaccharides to be easily and this new barcodes forced the invention of the new monosaccharide's osazone chart. In this educational research a new epimeric chart (Scheme1, left) was introduced for easy determination of the kind of epimers in each monosaccharide using the corresponding barcode. This new epimeric chart is facilitating the determination and the prediction of any kind of epimers in each monosaccharide. Osazone chart (Scheme1, right) indicates the new determination rule for finding of a pair aldose and a ketose that make the same osazone.

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