Constituents of *Millettia zechiana* and their Anti-Prostate Cancer Activity

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Abstract:

Millettia species are a rich source of flavonoid compounds such as isoflavones, flavones, anthocyanins, and chalcones. *Millettia zechiana* is a shrub or tree that can grow up to nine meters tall and is widely distributed in Africa, especially in West Africa and Cameroon. The leaves and stem bark are used as analgesics and for treating nasopharyngeal and pulmonary infections. Sometimes, it is also used to manage related issues of menstrual cycle. However, not much work has been done on the plant to scientifically verify its therapeutic potential. Prostate cancer is one of the commonly diagnosed cancers in men. The need for safer, accessible and cost-effective drugs to supplement the existing ones is imperative. Chromatographic purification of the chloroform extract of the flowers led to the isolation of two novel benzoic acid esters: benzyl 2,3,4-trimethoxybenzoate and benzyl 2-hydroxy-3,4-dimethoxybenzoate. Further purification of the ethanol extract of the roots yielded two known isoflavones: 5,6,7-trimethoxy-3-(6-methoxybenzo[d][1,3]dioxol-5-yl)-4H-chromen-4-one (Stuhlmannione A) and 5,6,7-trimethoxy-3-(benzo[d][1,3]dioxol-5-yl)-4H-chromen-4-one (Odoratine). The structures were elucidated based on one-dimensional and two-dimensional NMR and mass spectrometry. When tested against prostate cancer cells, the results showed that odoratine had an IC50 value of 23.3 µg/mL, while stuhlmannione A had a value of 44.2 µg/mL, compared to the standard curcumin, which had a value of 7.9 µg/mL. This is the first report of the isolation of the isoflavones and benzoic acid esters from *M. zechiana*. The activities of the isoflavones are of chemotaxonomic significance, as other *Millettia* species have produced similar isoflavones, suggesting the possibility of more bioactive and novel compounds.