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Analysis of thirteen populations of black cohosh for formononetin.

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Abstract

Black cohosh (*Actaea racemosa* L. syn. *Cimicifuga racemosa* (L.) Nutt.), a North American perennial plant, is a promising natural alternative to hormone replacement therapy for treating menopausal symptoms, but the mechanism of action is not understood. The clinical actions of this plant have been attributed to the isoflavonone formononetin since 1985, when its presence was reported in a black cohosh extract. Others have since looked for formononetin, but have not detected it. We looked for formononetin in extracts of black cohosh roots and rhizomes collected in thirteen locations in the eastern United States, including Maryland, New Jersey, New York, North Carolina, Pennsylvania, Virginia, and Tennessee. The rhizome samples were extracted using 80% methanol, and the extracts were partially purified using solid-phase extraction to concentrate any isoflavonoids that might be present. We tested for formononetin in these partially purified samples using thin-layer chromatography and high-performance liquid chromatography with a photodiode array detector and a mass spectrometer. Formononetin was not detected in any of the thirteen plant populations examined. **Remifemin**, a German product now on the United States market, and CimiPure, a commercially available black cohosh rhizome extract, were also analyzed. We did not detect formononetin, or ononin (formononetin-7-glucoside), in any sample tested by the above-mentioned chemical analyses. Therefore, the clinically observed estrogen-like actions of black cohosh, such as reduction of hot flashes, are likely due to a compound, or combination of compounds, other than formononetin.

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