

Condensed Tannin Methods

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Condensed tannins (proanthocyanidins) are flavanoid-based tannins. Functional group methods can be used to detect characteristic flavanoid monomers of condensed tannins.

In the acid butanol method the interflavanoid bond is oxidatively cleaved by acidic alcohol and the anthocyanidin which is released is quantitated. Several modifications of this method have been described to overcome problems with interference by pigments or chlorophyll.

An alternative method for condensed tannins, the vanillin method, is difficult to perform reproducibly and to standardize properly. Modifications of the vanillin method and of the acid butanol method have been used to estimate molecular weights of condensed tannins.

If acid butanol reactions are carried out in the presence of a nucleophilic agent such as phloroglucinol then reaction products useful for qualitative and quantitative characterization of the tannin are obtained. HPLC, mass spec, nmr and other instrumental methods are less well developed for condensed tannins than for hydrolyzable tannins. Instead, chemical methods have been devised for providing structural information. For example, in the phloroglucinol method for determining condensed tannin composition and molecular weight, degradation products from condensed tannin are separated by HPLC.

Alternative methods for separating condensed tannin include centrifugal partition chromatography (Okuda, T.; Yoshida, T.; Hatano, T. 1994. In: Foucault, A.P. (Editor) ***Centrifugal Partition Chromatography***. Vol 68 in Chromatographic Science Series, Page 99, Marcel Dekker: New York) or chromatography of acetylated tannins (Williams, V.M.; Porter, L.J.; Hemingway, R.W. ***Phytochemistry*** 1983, 22, 569).

Appropriate standards for condensed tannin methods include purified Sorghum tannin, purified quebracho tannin, and commercially available anthocyanidins such as cyanidin. In some cases the flavan-3-ol catechin may be useful.