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The Tanning Principles of Plants

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THE TANNING PRINCIPLE OF PLANTS

BY

FREDERIC J. SMITH M.S. horticulture 1896

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A BRIEF ABSTRACT

The tanning or astringent principles are widely distributed in plant life and infusions of those parts rich in tannin have long been used in the art of converting animal hides into leather.

Since Deyeux discovered and separated Gallo-tannin acid from gall nuts in 1795, the tannins have been the subject of much investgation by chemists.

In the study of plant life, the Botanists have also endeavered to discover what role the tannins play in plant physiology. Hence a study of tannins form a good topic for both branches of science.

While the microscope was used to make qualitative tests for tannins over a wide range of native and cultivated plants, the qualitative determinations have been confined to two species of native forest trees, viz:- the Hemlock Spruce (Abies Canadensis) and the White oak (Quercus Alba), and which are used as commercial sources of tannin. Specimens of these trees were selected and continued under observation as long as materials were needed to carry on the work. Samples of bark were taken from different size trees beginning with the larger roots, and from the trunks as near the ground as practicable; also midway and near the top.

Samples were taken from the same specimens in October, January and in the spring when the sap had started to flow.

Microscopical examinations on the freshly gathered materials showed the presence of tannin in the bark from all parts of the trees of both species.

The woody portions of the Hemlock Spruce did not respond to the test as did the Oak.

The richness in tannin of the medullary rays in the smaller oak roots is especially worth noting.

The tanning or str

Tannin bodies mixed with starch grains (resembling potato starch) was a very prominent feature in the cambrium of small Hemlock roots while the tree was dormant.

Notable also was the abundance of tannin in the opening buds of the oak.

The analytical tests were performed by the Lowenthal, volumetric and Proctor's powdered hide methods for comparison.

Analysis shows the storage of tannin greatest in the base of larger and older portions of trees of both species, and the bark of the larger was especially rich, often showing double the percentage of tannin than bark from the same trunk.

There seems to be little seasonal variation of the distribution of tannin in the bark and the custom of felling trees for their tannin in the spring when the bark will peel readily can be followed without loss.

Whether it would be economical to pull the stumps and secure the richer tan bark of the roots would depend on local conditions or if the land were to be cleared for agricultural purposes.

From the fact that tannins have a strong attraction for oxygen, as well as albuminous matter, and their tendency to form glucosites with grape sugars suggests their function in the plant is to assist in assimilation, acting possibly as a reducing agent in the growing tissues and as a means of storing reserve nutrients in the more dormant plants.

That its activity in growing tissues is of short duration may be assumed, as tannin bodies are found in abundance in tissues that have ceased to grow, which has led some botanists to believe they are a by-product and not an essential to the growing tissue.

The richness in tannin

The Tanning Principle of Quercitron.

By Theodore L. Smith

1876.

A brief Abstract.

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widely distributed in plant life and infusions
of these parts rich in tannin, have been
used in the art of converting animal hide
into leather.

Since Degeux discovered and extracted
gallo-tannic-acid from gall nuts in 1795,
the tannins have been the subject of much
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tannin parts in plant physiology.

Here a study of the tannins from a good
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While the microscope was used to make qualitative
tests for tannins over a wide range of
native and cultivated plants, the quantitative
determination ~~of tannin~~ has been confined to the special
tannin bearing plants, the Hemlock, Oak
Chestnut, Sumach and the White and Quercus
alba from which the most extensive commercial
supplies of tannin are obtained.

The analytical tests were performed by the Löwenthal permanganate and Procter's powder hide methods for comparison.

Analysis shows the storage of tannin greatest in the bark of the larger and older portions of trees of both species and the bark of the larger roots was especially rich, often showing double the amount of tannin than bark from the same trunk.

There seems to be little seasonal variation of the distribution of tannin in the bark and the custom of peeling trees for their tannin in the spring when the bark will peel easily can be followed without loss.

Whether it would be economical to pull the stumps and secure the richer tan bark of the roots would depend on local conditions or if the land was cleared for agricultural purposes.

From the fact that the tannins have a strong attraction for oxygen as well as albuminous matter and their tendency to form associates with simple sugars, suggests their function [illegible] in the plant; it is in that case in the process of assimilation, acting perhaps as a tanning agent in the young tissue and as a means of storing reserve nutrients in the more dormant plants.

That its activity in growing tissue is of [illegible]

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