INVESTIGATION OF THE FRUIT OF SAMBUCCUS CALICARPA.*

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Sambuccus Calicarpa, a species of elder indigenous to the Pacific Northwest, has elicited local unestablished statements that the conspicuous red fruit of the plant is poisonous. Just how such rumors started or from where they emanated is uncertain, but the fruits from this plant so far as is known, are never used in medicine. Since the flowers of two species of Sambuccus are official in the National Formulary, and since the fruits of these species are used as food for man, it seemed that a scientific investigation of the fruit and its components was worth while. It was thought that the chemical composition might throw some light upon the reputed toxicity, along with pharmacological experiments on animals, using freshly gathered materials and extracts.

Sambuccus calicarpa is a shrub or small tree 8–20 feet high; leaves thin, pubescent beneath with short oppressed hairs above. The leaflets are oblong-ovate, accuminate, sharply serrate to the very apex and 2–7 inches long. The flowers are cream colored in racemes 2–5 inches across and very showy. The fruit is scarlet, but occasionally yellow or chestnut colored.

According to Piper (1) this plant is also known under the species name of *S. pubens* and *S. leiosperma* and under the variety name of *S. racemosa arborescens*.

From a survey of the literature, the only chemical investigation made on this plant was an analysis of the expressed fixed oil of the fresh fruit by Byers and Hopkins (2) at the University of Washington. They state that the fruit of the above species was not used for wines or food because of its unpleasant odor and taste. The results of their analysis were:

Palmitin	22.0%	Linoleic	7.8 %
Olein and linolein	73.6%	Caprinin, caproin and caprylin	3.0 %
Oleic acid	92.0%	Unsaponified residue	0.66%

The latter component was a yellow crystalline mass with a peculiar odor. Constants on the oil were determined and reported as follows:

Saponification number	209.3	Reichert-Meissl number	1.5
Iodine number	8.44	Free fatty acid	4.65
Hehner value	91.75		

The above constants were observed to approximate those of olive oil.

EXPERIMENTAL.

The fruit used in the investigation was obtained on Mercer Island, the University of Washington Campus and vicinities adjacent to Seattle.

Several samples of the ground whole fruit were air-dried and lost approximately 75% of their weight. The pericarp was removed from the seed of the fresh fruit and both this and the seed were ground and dried.

Selective extractions were performed on dried samples of both the pericarp and seed meal. One set of extractions was made using new dried samples for each solvent and another set carried out using the same samples for all solvents. Following are the results:

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* Scientific Section, A. PH. A., Dallas meeting, 1936.

PERICARP.

Solvent.	Using New Samples in Duplicate. Mean Wt. Sample (Gm.).	Mean Wt. Extract.	Mean % Extract.	Using Same Sample in Duplicate. Mean Wt. Sample (Gm.).	Mean Wt. Extract.	Mean % Extract.
Pet. Ether	5.0	1.2849	25.69	20.0	5.1320	25.66
Eth. Ether	5.0	1.3012	26.02	..	0.2000	1.00
Eth. Alc.	5.0	2.2915	45.83	..	2.7485	13.74
Water	5.0	2.8948	57.9	..	7.9662	39.83
$CHCl_3$	5.0	1.5446	30.89	..	....	...
Acetone	5.0	1.6084	33.61	..	....	...
		Seed Meal.				
Pet. Ether	10.0	3.2150	32.15	20.0	4.2920	21.46
Eth. Ether	10.0	3.3610	33.61	..	2.4200	12.10
Eth. Alc.	10.0	4.4210	44.21	..	2.0067	10.03
Water	10.0	1.1515	11.52	..	1.8020	9.10
$CHCl_3$	10.0	3.7370	37.37	..	....	...
Acetone	10.0	3.6310	36.31	..	....	...

From the relatively large percentages of fixed oil obtained from the pericarp and seed meal were observed:

(*a*) The pericarp oil was an orange-yellow *non-drying* oil, while the seed oil was an amber-colored drying oil.

(*b*) The rapid conversion upon standing of the seed oil to a thick, viscous product.

(*c*) Deposition of white fatty materials from both oils, particularly abundant from the pericarp oil.

(*d*) Extremely unpleasant taste and odor of both oils.

(*e*) Intense red color alcohol extracts of the oils.

VOLATILE OIL.

Three thousand grams of the fresh fruit were steam distilled and gave a yield of 0.2795 Gm. of oil or 0.009 per cent. Upon standing a few days at 10° C., white needle-shaped crystals were deposited in the volatile oil. The purified crystals had a melting point of 122° C. After reduction, a benzaldehyde odor developed and tests indicated that the crystals were benzoic acid.

Ash:		Minerals in Fruit:	
From pericarp	9.55% green colored	Manganese	0.0015%
From seed	3.25% reddish brown	Iron	0.0020%
Acid-Insoluble Ash:		Alkaloids	Negative
From pericarp	0.65%	Saponins	Positive
From seed	0.32%	Pectins	3.47%
Alkalinity of Ash:		Malic and tartaric acid	3.12%
From pericarp	0.360	Tannic acid	2.94%
From seed	0.460	Reducing sugars	7.42%

Constants for the non-drying fixed oil of the pericarp and the drying oil of the seed were made.

CONSTANTS.

	Non-Drying Fixed Oil of Pericarp.	Drying Fixed Oil of Seed.
Specific gravity	0.9210	0.9245
$[\alpha]_D^{25°}$	1.4713	1.4788
Iodine value (Hanus)	83.11	187.7
Saponification number	201.2	198.7
Soluble fatty acids	7.10%	4.1%
Hehner number	92.02	94.2

	Non-Drying Fixed Oil of Pericarp.	Drying Fixed Oil of Seed.
Reichert-Meissl number	1.22	1.31
Polenske number	0.98	0.87
Solid fatty acids	23.7%	12.4%
Liquid fatty acids	75.1%	86.2%
Free fatty acids (as oleic)	6.19%	5.72%
Unsaponifiable residue	0.70%	0.61%
Elaidin test	Weak	Strong

Investigation of the unsaponifiable residues from both fixed oils indicated that it was largely phytosterol.

TOXICOLOGICAL.

Six albino rats were fed the ground air-dried fruit, each receiving 5 Gm. per Kg. of body weight daily. Along with this they were given a sustaining diet of ground semolina and scratch food. A seventh rat was used as a control omitting the elder fruit from the food. The following table indicates the changes in weight.

Rat.	Weight 1st Day.	Amt. Fruit Eaten in 20 Days.	Weight at End of 20 Days.	Weight Change in Gm.
1	195 Gm.	19.5 Gm.	197 Gm.	2.0 Gm.
2	200 Gm.	20.0 Gm.	200 Gm.	0.0 Gm.
3	222 Gm.	22.2 Gm.	220 Gm.	−2.0 Gm.
4	225 Gm.	22.5 Gm.	225 Gm.	0.0 Gm.
5	187 Gm.	18.7 Gm.	188 Gm.	1.0 Gm.
6	202 Gm.	20.2 Gm.	203 Gm.	1.0 Gm.
7	211 Gm.	Control	210 Gm.	−1.0 Gm.

The data show that the rats suffered no ill effects from the 20-day feeding.

Two small dogs with an average weight of 5.5 Kg. were given a mixture of equal parts of canned dog food and the ground fruit. A third dog of approximately the same weight was used as a control and fed the same brand of dog food. The two test animals each consumed 250 Gm. of the air-dried fruit daily for seven days. No variations could be noted in the appearance of the three dogs which was conclusive evidence that the fruit lacks toxicity to the animals.

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THE VALUE OF A PHARMACEUTICAL MUSEUM.

The plea that the new building of the Society should contain a room specially set apart as a museum is one to which most pharmacists are likely to respond. We all admit that pharmacy owes a great deal to the past; the point was emphasized by Dr. Sprague in his talk on "Early Herbals," and one's thoughts naturally turn to the many interesting pharmaceutical relics which are still scattered up and down the country. Old invoices, prescription books and accounts may have some historical value. I recently read some advertisements drawn up by druggists over 100 years ago, and was impressed by the little changes which subsequent years have introduced. There was the same claim made for a remedy for all ailments, and the same appeal to the fear of the sufferer; in fact, with a little alteration in the language one advertisement might have been incorporated in a broadcast advertisement of the present day. Photographs of old-established pharmacies, many of which are being pulled down, or refitted with new shop fronts, would form an interesting collection. So, too, would a file of old-fashioned labels for medicinal proprietaries. To study pharmacy as it was practiced some seventy years ago would be a liberal education; and might help the modern generation to realize something of the dignity and respect which was attached to the pharmacist of a bygone age.—From *The Pharmaceutical Journal* (British).
