

heating molecular quantities of benzoyl chloride and anhydrous chloretone on the steam bath until hydrogen chloride ceases to be given off. The ester is a solid which melted between 34-35° and not an oil as claimed by Willgerodt and Dürr, and may be distilled under reduced pressure without decomposition. It is not readily saponified, and in this respect is much more stable than the other esters previously studied. Boiling with conc. nitric acid does not decompose it as is the case with the aliphatic esters of both chloretone and brometone. Pharmacological tests would indicate that it possesses less hypnotic or anesthetic properties and is less toxic than the esters studies thus far.

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[CONTRIBUTION FROM THE NORTH CAROLINA DEPARTMENT OF AGRICULTURE.]

**COCKLE-BUR OIL. A NEW SEED OIL.**

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The purpose of the investigation was to prepare cockle-bur oil and determine some of its physical and chemical constants, also to determine some of the properties of the kernels.

The burs for examination were gathered in the vicinity of Raleigh, N. C., during October, 1919, and until the middle of November. They were of the variety sometimes known as the clot-bur (*Xanthium Echinatum*), a coarse asteracious weed having rough leaves and prickly bur-like heads. The seed has the property that one-half germinates one year and the other half the succeeding year. The burs were cut in half by a trimming board; by a quick sharp movement the burs are not mashed and the kernels come out readily. After cutting, the burs were placed in a box and shaken vigorously. The hulls were then taken out, leaving the kernels on the bottom. The kernels as thus obtained were placed in a mortar and gently pounded and rubbed to remove the black shucks. By blowing into the mortar the shucks were removed, leaving the kernels.

In order to determine the per cent. yield of the kernels, the most luxuriant plants were harvested and the kernels separated by hand from a 500 g. sample of burs. 30.69% by weight was recovered.

TABLE I.—PROPERTIES OF THE KERNELS.

	1. %.	2. %.
Moisture (by heating).....	6.85	6.95
Moisture (by vacuum).....	7.22	7.23
Crude protein.....	40.34	40.53
Crude fiber (A. O. A. C. method).....	2.58	2.47
Oil (Soxhlet) extracted with ethyl ether.....	29.89	29.78
Oil (Soxhlet) extracted with petroleum ether.....	29.80	...
Ash.....	5.42	5.41

The oil was obtained by subjecting the ground kernels to very heavy pressure in the cold between steel plates, after which it was allowed to settle for 2 or 3 days, and then filtered through filter paper with suction. It is light yellow, sparkling, has a pleasant odor and an agreeable and nutty taste, but the taste is not marked. A sample was kept 6 months and no rancidity was observed, but all samples were stored in a dark cool place.

TABLE II.—PROPERTIES OF COCKLE-BUR OIL.

Sp. gr. at 15.5°.....	0.9251
Refractive index at 15.5°.....	1.4773
Zeiss butyro. at 20.0°.....	1.4771
Refractometer at 40.0°.....	1.4691
Solidification point.....	-18.0°
Iodine number (Hanus).....	140.8
Saponification number.....	190.2
Reichert-Meissl number.....	0.233
Hegner number.....	89.7
Acetyl value.....	10.6
Melting point of the fatty acids.....	+ 19.0°

A drying test was also made on the oil. The oil was dropped on a pane of glass inclined at an angle of 30° from the horizontal, down which it ran leaving a film of graduated thickness. The glass was placed in a well-lighted place, not in direct sunlight, but indoors, and exposed to the air during the test. Average room temperature, 22°. The oil was completely dried in 5 days. Pure raw linseed oil under like conditions required 4 days to reach the same degree of dryness.

In considering the oil for commercial value it was thought that the volume of the crude burs for unit weight should be obtained as well as the toxicity of the meal. A one liter measure packed tightly with the burs was found to weigh 160.3 g. Thus one liter will yield 49.19 g. of kernels. The meal was found to be highly toxic. A small quantity of meal or press cake fed to guinea pigs killed them in one day.

With sulfuric acid cockle-bur oil gives, first, a bright yellow color, changing to brownish yellow, which alters to purple and finally to green.

### Summary.

The physical and chemical characteristics of a sample of cold-pressed cockle-bur oil have been determined, and also some of the properties of the unpressed kernels. The oil is a drying oil, with an iodine number of 140.8, saponification number 190.2. The kernels contain 29.89% oil and 40.34% crude protein.