

CHEMICAL EVALUATION OF *QUERCUS ILEX* SEED AND OIL

by

Fazli Wahid Khan, Pazir Gul and Abdul Ghaffar Marwat*

Summary. Oil extracted from the seeds of *Quercus ilex* was analysed for its physico-chemical constants and composition of fatty acids. The analytical data obtained were compared with those of oils from *Q. incana*, *Q. ruba*, and *Q. palustris*. It is concluded that the oil is non-drying in nature and is fit for edible purposes as it has non-toxic compounds and can be purified cheaply. The seeds have been analysed for protein, carbohydrates and ash and the results indicate their utility as poultry and livestock feed.

Introduction. *Quercus ilex* grows gregariously as dry oak scrub in Dir, Swat Chitral districts of N.W.F.P. and in Azad Kashmir. Its leaves and acorns are utilized as winter fodder by livestock and wildlife. This study reports the assay of oil from its seeds and compares its physico-chemical characteristics with the reported value from *Q. incana*, *Q. ruba*, and *Q. palustris*. The seeds were also analysed for protein, carbohydrates, fat and ash.

Material and method. The acorns were collected from Chitral gol and Shesh valley Forest (elevation 1550-2480 m) of Chitral Forest Division in 1974. The acorns were dried in shade for one month. The shells were separated from the seeds and powdered in Willey mill and sieved through 20 mm mesh. From the seeds the oil was extracted in Soxhlet apparatus with petroleum ether (40-60°C). The solvent was removed on a water bath. The oil was purified by using the method of Jameison (5). The fatty acids in purified oil were determined by fractional precipitation method followed by Rosenthaler (9). The physico-chemical constants and protein, carbohydrate, fat and ash contents were determined using A.O.A.C. (1) and Jacobs (4) methods.

Results and Discussion. The acorns comprised 28.8% by weight of shell and 71.2% by weight of kernel. The kernel contained 14.55% by weight and the acorns 10.27% by weight of oil.

* The authors are Forest Chemist and Technical Assistant at the Pakistan Forest Institute, Peshawar and Asstt. Professor in Islamia College, Peshawar respectively.

The physico-chemical constants of the oil are compared below with the values reported for certain other species of oaks by other workers.

Physico-chemical constants	<i>Quercus ilex</i> (lab. work)	<i>Quercus incana</i> (Puntambekar and Verma) (8)	<i>Quercus ruba</i> (Monarco, Lynn) (6)	<i>Quercus Palustris</i> Jamieson (5)
Specific gravity at 25°C	0.9086 (1,2,3)	0.9081	Not determined	Not determined
Refractive Index at 25°C	1.4701 (1,2,4)	1.4576	„	1.4647
Peroxide No.	78 m.e./Kg. (1,4)	Not determined	„	Not determined
Saponification value	189.05 (1,4)	192.20	195.30	193.20
Acid value	3.7 (1,4)	13.00	Not determined	Not determined
Iodine value	98.80 (1,4)	81.50	100.10	97.2
Hehner value	72.50 (2,4)	96.10	Not determined	Not determined

The observed values for the chemical composition of the oil are like-wise compared below with values for certain other species of oaks determined by other workers.

Name of constants	<i>Quercus ilex</i> (lab. work) %	<i>Quercus incana</i> (Puntambekar & Krishna, (7) %	<i>Quercus ruba</i> (Monarco Lynn,) (6) %	<i>Quercus Palustris</i> (Jamieson, (5) %
Saturated fatty acid	16.00 (4,9)	18.00	Not determined	Not determined
Unsaturated fatty acids	84.00 (4,9)	82.00	„	„
Unsaponifiable matter	1.61 (4)	0.80	0.9	0.45
Oleic acids	57.05 (9)	82.00	48.00	—
Palmatic acids	12.40 (9)	17.10	10.00	—
Linoleic acids	30.50 (9)	Not determined	40.00	Not determined

The analysis of the kernel is compared below with that of *Q. incana* reported by Puntambekar and Krishna (7).

Name of constituents	<i>Quercus ilex</i> %	<i>Quercus incana</i> (reported) %
Moisture	11.25	12.20
Ash	2.09	1.40
Oil	14.55	16.00
Protein	4.00	3.00
Cellulose	1.85	1.40
Carbohydrates	60.05	61.00

Conclusions. On the basis of the data reported above the oil of *Q. ilex* like the oil of the other *Quercus* species, can be used in the manufacture of cosmetics, varnishes and food products. The residue after the extraction of oil, can also be used for the manufacture of poultry feed.

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