INDIAN ROSIN OIL FROM *PINUS EXCELSA*

THE problem of the effective commercial utilisation of various types of indigenous resins, and in particular the disposal of inferior grades of Indian rosin, considerable quantities of which are available, has as yet found no satisfactory solution. In western countries, rosin oils are used in the preparation of lubricants, varnishes, inks, antiseptics, etc. In order to study the chemical nature and to isolate the chemical ingredients as far as possible of a similar product from indigenous rosins, a rosin oil has been prepared from the rosin (12·5 kg.) from *Pinus excelsa* by the method of destructive distillation in iron retorts in an yield of 75%.

Besides the oil, considerable amount of gas and a very porous residue consisting mainly of carbon are also obtained. The oil was separated from aqueous distillate and after removal of acidic constituents by shaking with 5 per cent. sodium carbonate solution, was fractionated repeatedly. The sodium carbonate extracts from every fraction were evaporated to dryness and the acids were isolated by treating the residue with concentrated sulphuric acid. Individual acids were separated by repeated fractionation and identified as their anilides and *p*-toluidides. The solid acids which consists mostly of abietic acid was isolated from fractions E, F and G, crystallised from glacial acetic acid and identified.

The individual fractions of the neutral oil were examined separately by repeated fractionation using an efficient Vigreux partial condensation take-off type column, and the individual fractions analysed. Fractions boiling above 250° gave uniformly high yields (40-50%) of retene on dehydrogenation with selenium.

The results are summarised in Tables I *and* II.

A proximate composition of the distillate is given below. (Figures within the brackets indicate the percentage on the weight of the distillate.)

Total volatile acids expressed as acetic acid .. .. .. (1·5)

Total non-volatile acids expressed as abietic acid .. .. .. (3·5)

TABLE I

	Weight in gram.	Percentage yield on the weight of the rosin	Products isolated
Gases		16·26	CO_2, 64·1%; CO, 9·3%; O_2, 3·7%; H_2, 8·9%; C_nH_{2n}, 2·9%; C_nH_{2n+2}, 13·0%
Aqueous Distillate	710·5	5·9	Acetic acid, Propionic acid.
Acidic Constituents	292·8	2·39	Isobutyric acid, isovaleric acid, and abietic acid
Oily Distillate ..	7913	64·6	See Table II
Residue ..	1050	8·57	Mainly carbon with traces of iron oxide and silica

TABLE II

No.	B.P. Range	% on the wt. of the Rosin	Sp. Gr. $D^{15\cdot5}_{15\cdot5}$	Refractive index n_D^{26}	Specific Rotation $[\alpha]_D^{24}$	Absolute Viscosity	Acid Number	Saponification Value	Iodine Value	Individual Compounds Characterised
A	Up to 150° C.	1·23	0·8344	1·4653	3·521	0·9208	30·63	30·21	87	Isobutyric aldehyde, methyl alcohol, 2-hexene, methyl cyclohexane, Toluene, *p*-xylene, acetic acid & propionic acid
B	150°–250° C.	2·16	0·9053	1·4929	19·618	2·586	14·34	14·8	78	*p*-Xylene, isobutyric acid, isovaleric acid, cumene, α & β pinenes, & *p*-cymene
C	250°–290° C.	2·5	0·9670	1·5262	47·364	25·13	7·77	7·69	71	Abietic acid, various hydrogenated derivatives of retene, *e.g.*, dihydro retene tetrahydro retene, octahydro retene, perhydro retene, abietene and retene
D	290°–330° C.	31·84	0·9774	1·5378	49·092	83·12	6·62	6·6	69	
E	180°–210° C./10 mm.	17·96	0·9908	1·5554	36·71	193 6	3·098	5 23	69	
F	210°–235° C./10 mm.	7·44	1·011	1·5750	30·8	459·8	25·82	28·6	58·5	
G	Above 235° C./10 mm	1·44	..	..	15·728	..	36·17	36·53	..	Mainly retene and abietic acid

Aliphatic unsaturated hydrocarbones	(0·4)
Isobutyric aldehyde	(0·2)
Methyl alcohol	(0·15)
Methyl-cyclohexane	(0·4)
Total aromatic hydrocarbons ..	(1·5)
Total pinenes	(0·4)
Abietene and Hydro derivatives of retene	(70-80)
Retene	(1·4)

Isovaleric acid, 2-hexene and p-xylene are present in the rosin oil from *Pinus excelsa* and these compounds have not been reported in any of the rosin oils from the pine [1, 2, 3].

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1. Renard, *Ann. de. Chemie et Physique*, 6e *serie*, 1884, p. 223. 2. Kelbe, Berichte, 1880, **13,** pp. 1157 and 1827: 1881, **14,** p. 1240. 3. Kelbe, *Ann. de Liebig*, 1881, **210,** p. 1.