

Chemical composition of Azadirachta indica and Ricinus communis oils growing in

# Marigat, Kenya

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## **1. Introduction**

Natural seed oils from plants are in high demand for the development of new products in agriculture and industrial sector compared to synthetic products. Synthetic products have several limitations such as high cost, poor absorption, develop resistance, low bio-availability and pollutants to the environment (Abdul *et al.*, 2018). The use of plant-based products seems to be an alternative to synthetic products since they are biodegradable, inexpensive, have less side effects and are

Table 1: Retention time (min), index and mean (Mean ± SE, n=3) percent concentration of

chemical constituents of seed oil obtained from A. indica

No.	<b>Retention</b> <b>Time (min)</b>	Compound name	% Concentration (Mean ± SE, n=3)	Retention In- dex
1	11.5227	Sulfurous acid, nonyl 2-propyl ester	1.41+1.00	998
2	16.7117	1- octadecene	0.8+0.38	1320
3	20.0696	Oxalic acid, cyclobutyl tridecyl ester	5.46+0.38	1579
4	20.3972	Oxalic acid, 6-ethyloct-3-yl ethyl ester	15.55+7.26	1606
5	20.7891	2-hexyl-1-decanol	30.97+18.86	1640
6	22.6436	Methyl hexadecanoate	3.85+2.76	1832
7	22.9946	n-Hexadecanoic acid	2.38+1.52	1865
8	24.6502	Octadec-9-enoic acid	9.92+4.69	2038
9	24.8491	Octadecanoic acid	29.69+21.91	2059



readily available (Mkenda *et al.*, 2015). Few research have been carried out on chemical constituents of medicinal plants which determine their biological activity. Therefore, the aim of the current study was to investigate the chemical constituents of *A*. *indica* and *R*. *communis* seed oils.

# 2. Research description

Ripe drupes of A. indica and capsules of R. communis were collected each from

three plants chosen at random(Fig 1a &2a). Seeds of A. indica and R. communis

each weighing 500g were extracted through cold pressing and boiling respectively Table 2. Retention time (min), index and mean (Mean ± SE, n=3) percent concentration of

(Fig 1b & 2b) . The samples of A. indica and R. communis seed oils were subjected chemical constituents of seed oil obtained from R. communis

to GC-MSas chromatography-mass spectrometer (Fig 3). One microliter of each

sample was injected in the splitless mode, and helium was used as carrier gas at 1.0 ml min–1. The oven temperature was maintained at 35°C for 5 min, increased to 280°C at 10°C min-1 and then held at this temperature for 5.5 min then to 285° C at 50°C min-1 for 14.9 minutes. Compound identities were determined using NIST'11, 08, 05, Adams and chemecol mass spectral databases. (Adams, 2007).

No.	Retention Time	Compound name	% Concentration	Retention Index	
			(Mean $\pm$ SE, n=3)		
1	11.5169	Tetradecane	3.73+0.25	997	





Fig.1(a) A. indica





Fig. 2(a) *R.communis* 



2	22.3043	2-Ethylbutyric acid, 4-methylpent-2-yl es- ter	2.06+1.42	1800
3	24.0301	13- Hexyloxacyclotridec- 10-en-2-one	26.67+1.40	1971
4	24.7087	(Z)-6-Octadecenoic acid	37.33+12.64	2044
5	26.4169	Ricinoleic acid	30.22+12.37	2231

### 4. Conclusions

Seed oils of *A*. *indica* and *R*. *communis* reveal the presence of methyl and ethyl
esters, cyclic esters, alkanes and alkenes, unsaturated and saturated fatty acids. The
chemical constituents such as Octadecanoic acid ,(Z)-6-Octadecenoic acid, nHexadecanoic acid, Ricinoleic acid and Tetradecane can be applied in medicine,
agriculture and cosmetics industry sector.

## **5.References**



Fig. 2(b) Seeds

### Fig. 3 GC-MS Agilent HP-7890A

### Results

From the results in Table 1, the most abundant compounds in the extract of *A. indica* were 2hexyl-1-decanol (30.97%), Octadecanoic acid (29.69%) and Oxalic acid, 6-ethyloct-3-yl ethyl ester (15.55%). Others were Octadec-9-enoic acid (9.92%), Oxalic acid, cyclobutyl tridecyl ester (5.46%), Methyl hexadecanoate (3.85%), n- Hexadecanoic acid (2.38%), Sulfurous acid, nonyl 2-propyl ester (1.41%) and 1- octadecene (0.8%).

In Table 2, the most abundant compounds in the extract of *R. communis* were (Z)- 6 Octadecenoic acid (37.33%), Ricinoleic acid (30.22%) and 13-Hexyloxacyclotridec-10-en-2one (26.67%). Others were Tetradecane (3.73%) and 2-Ethylbutyric acid, 4-methylpent-2-yl ester (2.06%).

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## 6. Acknowledgements

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