

Fatty Acid Composition of Raw and Roasted Kulthi Seeds

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Abstract: Raw and roasted kulthi (*Dolichos biflorus*) seeds of drought prone area of Maharashtra were studied for their fatty acid composition using gas chromatographic analysis. Kulthi is under cultivation in remote areas of India. It is used as food and fodder. Legumes are in general good source of unsaturated fatty acids, which are beneficial for health. Therefore study was performed for analysis and characterization of fatty acids of raw and roasted kulthi seeds and to obtain reliable data on their suitability for both human nutrition and pharmaceutical purposes. Test results indicate that raw and roasted seeds also contain higher amount of unsaturated fatty acids i.e. 72.49 and 71.99%, respectively. Both the samples contain good percentage of linoleic acid i.e., 42.78 and 40.83%, respectively. Linoleic acid is useful for the treatment of diabetes and cardiovascular disease.

Key words: *Dolichos biflorus*, fatty acid composition, gas chromatogram, legume, saturated fatty acids, unsaturated fatty acids

INTRODUCTION

Legumes occupy a prominent place in our diet and Indian agricultural economy, since they are major protein sources for the people (Kuppuswami *et al.*, 1985). Horse gram (*Dolichos biflorus*) is one of the lesser known legumes. It is also known as Gahat, Kulth or Kulthi. In India it is grown to be used as food and fodder. The traditional healers specialized in the treatment of kidney stone, grow kulthi crop for their patients. The total lipid content of raw and roasted seeds of kulthi was found to be 30.0 and 30.10%, respectively (Mishra and Pathan, 2010). So the seeds were analysed for their fatty acid composition. Essential fatty acids are the functional component of membrane lipids and have other metabolic functions (Nagraj, 1995). Legume seeds contain low levels of total oil and saturated fatty acids, as well as has high content of unsaturated fatty acid, therefore increase intake of legumes can be beneficial to human health (Ryan *et al.*, 2007; Bamji, 1997). Horse gram can be grown in extreme weather conditions. Good nutritional value and low cultivation cost have attracted the present study to assess the nutritional compatibility of kulthi seeds with other legumes.

EXPERIMENTAL

The seeds under investigation were procured from local market of village Hivre of Pune District

(Maharashtra). The seeds were cleaned and stored properly at room temperature prior to their use in actual experiment. The seeds are roasted (sand bath 180°C, 20 min) (Seena and Sridhar, 2006). Powdered samples of experimental seeds were subjected to solvent extraction in Soxhlet Apparatus for 20 h, using petroleum ether (40-60°C) as solvent. Lipids were then estimated gravimetrically (Colowick and Kaplan, 1957). The lipids were converted in to Methyl esters (Chowdhari *et al.*, 1984) and analysed for fatty acids using IUPAC 2.301 method. Gas chromatograms were recorded at Geo Chem. Laboratories Pvt. Ltd., Kanjur Marg (East), Mumbai using FID AND HRGC-gas chromatograph during Dec 2010.

RESULTS AND DISCUSSION

Fatty acid composition (g/100 g) of raw and roasted Kulthi seeds is reported in Table 1.

Raw seeds of kulthi contain saturated fatty acid 27.5% and unsaturated fatty acid 72.49% while roasted seeds contain 27.99% saturated fatty acid and 71.99% unsaturated fatty acids. Unsaturated fatty acid content is found higher than other varieties of Kulthi (Joshi and Luthra, 2003; Gopalkrishna *et al.*, 1997). From the perusal of data it appears that raw and roasted seeds of kulthi was reported to have 0.36 and 0.51% myristic acid, 21.97 and 21.89% palmitic acid, 2.32 and 2.53% stearic acid, 16.15 and 16.51% oleic acid, 42.78 and 40.83% linoleic acid,

Table 1: Fatty acid composition of raw and roasted kulthi seeds (g/100g).

Fatty acids	Myristic	Palmitic	Stearic	Arachidic	Oleic	Linoleic	Lino-Lenic	Saturated	Unsaturated
Carbon double bond ratio	14:0	16:0	18:0	20:0	18:1	18:2	18:3	-	-
Raw seeds	0.36	21.97	2.32	2.85	16.15	42.78	13.56	27.5	72.49
Roasted seeds	0.51	21.89	2.53	3.06	16.51	40.83	14.65	27.99	71.99

13.56 and 14.65% linolenic acid, 2.85 and 3.06% arachidic acid, respectively. These values are in close proximity with other varieties of legumes (Health Benefits of Soyabean, 2005, Varmuza *et al.*, 2000; Alpaslan *et al.*, 2001; Liu., 1997; Hammond and Fehr, 1984; Popescu *et al.*, 1969; Wang and Daun., 2004; Tatjana and Vekoslava., 2003; Singhai and Shrivastav., 2002; Chansoria *et al.*, 2001; Saxena *et al.*, 2001; Vijayakumari *et al.*, 1993; Reddy *et al.*, 1982). Value of palmitic acid is lower and that of linoleic acid is higher than other varieties of Kulthi (Joshi and Luthra, 2003).

CONCLUSION

Raw and roasted samples of kulthi are good source of unsaturated fatty acid. Kulthi seeds can be considered superior with respect to oil quality. It is concluded from the experimental data that roasting does not affect the compositions. Samples contain higher of linoieic acid. Linoleic acid is reported to be useful for reducing the risk of diabetes and cardiovascular disease (Venkatchalam *et al.*, 2004).

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