

Review Article

**FATTY ACID CONTENT OF FENUGREEK SEED AND FENUGREEK
RESIDUE FOR LIVESTOCK AND POULTRY**

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Introduction

The active therapeutic constituents of fenugreek seeds are 4-hydroxy isoleucine (Hajimehdipoor *et al.*, 2008), lysine and L-tryptophan rich proteins, mucilaginous fibre (galactomannan) and other rare chemical constituents such as saponins, coumarin, fenugreekine, nicotinic acid, saponins, phytic acid, scopoletin and trigonelline, which are thought to account for many of its presumed therapeutic effects like inhibition of cholesterol absorption and lowering blood sugar level (Bukhari *et al.*, 2008).

Galactomannan in fenugreek, due to its viscous property, is effective in inhibiting the intestinal glucose uptake and lower blood glucose (Srichamroen *et al.*, 2009), hence separation of galactomannan in fenugreek is undertaken at industrial level to produce anti-diabetic nutraceutical. The residue is designated as Galactomannan Depleted Fenugreek Residue (GDFR) and marketed as Parry Fenumax[®]. With the increased incidence of diabetes in India and the clamour for using natural drugs for diabetes, the growth of galactomannan separation from fenugreek is likely to increase resulting in more quantity of the GDFR available.

Fenugreek seed and GDFR contain 24 - 26% and 26 - 32% protein, respectively. Since both the products have high carbohydrate content, the expected energy value is presumed to be equivalent to cereals. In addition, these products possess nutraceutical value.

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Table 1: Fatty acid composition (g/100 g fat) of fenugreek seed, GDFR and maize

Fatty acids	Fenugreek seed							GDFR	Maize
	a	b	c	d	e	f	g	h	i
Myristic acid (C14:0)		0.2	0.2		0.1		1.4	0.1	
Pentadecanoic acid (C15:0)								0.1	
Palmitic acid (C16:0)		11.0	8.9	11.0	10.5	10.5	3.9	9.9	0.6
Palmitoieic acid (C16:1)		0.2	0.2		0.2		8.3		
Heptadecanoic acid (C17:0)								0.4	
Heptadecanoic acid (cis 10 C17:1)								0.1	
Stearic acid (C18:0)	0.1	4.5	3.7	6.0	4.0	6.5	1.8	4.5	0.1
Oleic acid (C18:1)	0.4	16.7	12.9	36.0	14.9	20.0	8.3	5.6	1.2
Linoleic acid (C18:2)	0.3	43.2	35.8	47.0	46.3	42.5	34.9	41.4	1.8
Linolenic acid (C18:3)		22.0	18.1		20.6	18.0	30.8	25.4	0.1
Arachidic acid (C20:0)		1.5	1.2			2.0		1.3	
Eicosamonoenoic acid (C20:1)		0.1	0.1		0.3			0.3	
Behenic acid (C22:0)		0.5	0.4		0.6	0.5		0.6	
Docosaenoic acid (C22:1)								0.2	
Tricisanoic acid (C23:0)								0.1	
Lignoceric acid (C24:0)		0.1	0.1		0.2				

a. El-Malky and Gouda (2007);

d. Ziwar (2010);

g. Al-Jasass and Al-Jasser (2012);

b. Sulieman *et al.* (2008);e. Ciftci *et al.* (2011);

h. Anonymous (2010);

c. Chatterjee *et al.* (2010);f. Ali *et al.* (2012);

i. NRC

(1994).

Fatty Acids

The per cent fatty acids in the fat component of fenugreek seed (FS) are presented in Table 1. The chief saturated fatty acids (percent) in FS are palmitic (3.9 - 11.0) and stearic acid (0.1 - 6.5) while the predominant unsaturated fatty acids (percent) are oleic (0.4 - 36.0), linoleic (18.0 - 22.0) and linolenic acid (18.0 - 30.8).

The average myristic (0.5 vs 0.1%), palmitic (9.3 vs 9.9%), stearic (3.8 vs 4.5%), arachidic (1.6 vs 1.2%), eicosamonoenoic (0.2 vs 0.3%) and behenic (0.5 vs 0.6%) acid content of FS and GDFR were similar. The oleic acid (15.6 vs 5.58%) content was higher and linoleic (35.7 vs 41.4%) and linolenic (21.9 vs 25.4%) acids were lower in FS compared with GDFR.

In maize the palmitic (0.6%), stearic (0.1%), oleic (1.2%), linoleic (1.8%) and linolenic (0.1%) content were lower compared with FS and GDFR.

Conclusion

The fatty acid content of fenugreek seed and fenugreek residue (GDFR) revealed that it can be used for livestock and poultry feed preparation.

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