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Effect of three antihyperglycamemic plants on lipid and blood urea nitrogen profile of alloxanized rabbits

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Plant products like *Eugenia jambolana* seeds, *Cyamopsis tetragonoloba* seeds and whole fruit of *Momordica charantia* with established antihyperglycaemic activity exhibit hypocholesterolaemic and hypotriglyceridemic activities in diabetic subjects (Kedar and Chakrabarti 1983, Srivastava *et al.* 1987, Singh *et al.* 1989). *Cajanus cajan* suppressed the blood glucose and urea nitrogen levels in diabetic rats (Giri *et al.*1986). This communication deals with the effect of *Aegle marmelos* leaves, *Musa sapientum* fruits and *Caesalpinia bonducella* seeds exhibiting antihyperglycaemic activity (Rao 1992, Rao *et al.* 1994a, 1994b) on plasma total cholesterol, triglyceride and blood urea nitrogen levels of alloxan-diabetic rabbits.

The leaves of *A. marmelos*, seeds of *C. bonducella* and unripe fruits of *M. sapientum* were procured locally. Outer coverings of *C. bonducella* seeds and *M. sapientum* fruits were removed. These were dried in shade, pulverised with electric grinder and kept in sealed containers at room temperature until used. The powdered leaves of *A. marmelos* were subjected to aqueous extraction in Soxhlet apparatus. The extract was evaporated by slow heating and continuous stirring till it dried completely. The yield was 32%.

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Adult albino rabbits of either sex weighing 1.5 - 2 kg were procured from the Central Drug Research Institute, Lucknow. They were kept in individual iron cages and supplied with standard diet and water *ad lib.* during entire period of experimentation. Rabbits made diabetic (Rao *et al.* 1994 a, b) were divided into 5 equal groups of 6 animals each. Animals of these groups were given following treatments - group 1 : standard antihyperglycaemic drug i.e. phenformin (@ 125 mg/kg bw.); group 2 : aqueous extract of *A. marmelos* leaves (equivalent to 1 g/kg bw of powder); group 3 : *C. bonducella* seed powder (@1.5 g/kg); group 4 : *M. sapientum* fruit powder (@ 1.5 g/kg); group 5 : served as untreated control. Estimation of normal, diabetic and post treatment levels of plasma total cholesterol (Zlaitkis *et al.* 1953), triglycerides (McGowan *et al.* 1983) and blood urea nitrogen (Wybenga *et al.* 1971) was made. Intragroup and intergroup comparison was made between normal and diabetic (pre-treatment and post-treatment) values. The data was analysed by employing paired 't' test and ANOVA (Snedecor and Cochran 1967).

Plasma total cholesterol, triglycerides and BUN levels of diabetic rabbits showed significant increase ($P<0.01$) as compared to their prediabetic levels (Table 1). Similar findings were reported earlier in alloxanized subjects (Giri *et al.* 1986, Srivastava *et al.* 1987). Also none of 3 tested indigenous drugs could lower the levels of these

Table 1. Plasma total cholesterol, triglyceride and urea nitrogen levels of diabetic rabbits (mg/100 ml) after oral administration of phenformin, aqueous extract of *A. marmelos*, powder of *C. bonducella* seed and powder of *M. sapientum* unriped fruits

Groups	Treatment schedule	Cholesterol					Triglyceride					Blood urea nitrogen				
		Normal level	Diabetic level	Post-treatment (days)			Normal level	Diabetic level	Post-treatment (days)			Normal level	Diabetic level	Post-treatment (days)		
				3	5	10			3	5	10			3	5	10
1.	Phenformin	102.1 ±1.5^{A}	214.7^{**a} ±4.9^{A}	201.0^{**b} ±4.9^{A}	181.5^{**b} ±3.9^{A}	149.6^{**b} ±2.2^{A}	75.1 ±2.7^{A}	352.9^{**a} ±8.9^{A}	348.5^{**b} ±8.5^{A}	317.2^{**b} ±8.7^{A}	250.4^{**b} ±6.0^{A}	21.5^{A} ±0.9	62.1^{**a} ±1.1^{A}	64.8^{**a} ±1.0^{A}	68.1^{**a} ±1.2^{A}	78.5^{**a} ±1.8^{A}
2.	*A. marmelos*	99.2 ±1.0^{A}	217.6^{**a} ±3.8^{A}	235.8^{**a} ±3.6^{B}	256.1^{**a} ±3.0^{B}	284.9^{**a} ±4.5^{B}	77.0^{A} ±2.1	359.2^{**a} ±7.8^{A}	368.4^{**a} ±7.8^{A}	381.8^{**a} ±3.1^{B}	448.0^{**a} ±6.8^{B}	20.0^{A} ±1.1	60.7^{**a} ±1.5A	66.2^{**a} ±1.1^{A}	68.3^{**a} ±1.3^{A}	76.7^{**a} ±1.8^{A}
3.	*C. bonducella*	103.4 ±1.1^{A}	219.1^{**a} ±2.0^{A}	233.4^{**a} ±3.1^{B}	261.8^{**a} ±3.6^{B}	281.9^{**a} ±5.1^{B}	73.9 ±1.9^{A}	348.2^{**a} ±8.1^{A}	357.1^{**a} ±8.1^{A}	378.1^{**a} ±7.0^{B}	441.7^{**a} ±3.3^{B}	23.1^{A} ±0.8	65.6^{**a} ±1.3^{A}	70.1^{**a} ±1.1^{A}	72.8^{**a} ±1.1^{A}	83.1^{**a} ±1.6^{A}
4.	*M. sapientum*	101.1 ±1.2^{A}	215.2^{**a} ±3.5^{A}	231.4^{**a} ±4.4^{B}	258.1^{**a} ±3.2^{B}	283.1^{**a} ±3.3^{B}	76.6 ±2.0^{A}	356.1^{**a} ±6.0^{A}	366.1^{**a} ±6.0^{A}	382.1^{**a} ±3.1^{B}	455.4^{**a} ±6.0	20.7^{A} ±0.9	61.5^{**a} ±1.2^{A}	67.2^{**a} ±1.1^{A}	70.8^{**a} ±1.2^{A}	79.1^{**a} ±1.8^{A}
5.	—	99.7 ±1.1^{A}	218.4^{**a} ±3.8^{A}	234.2^{**a} ±3.1^{B}	260.8^{**a} ±3.1^{B}	282.8^{**a} ±3.3^{B}	74.3^{A} ±2.1	359.1^{**a} ±7.9^{A}	367.1^{**a} ±6.2^{A}	380.1** ±3.3^{B}	435.6^{**a} ±6.2^{B}	21.3^{A} ±0.9	61.5^{**a} ±1.4^{A}	69.4^{**a} ±1.1^{A}	71.1^{**a} ±1.2^{A}	81.7^{**a} ±1.8^{A}

^{**a}, Significant as compared to normal level ($P<0.001$); ^{**b}, significant as compared to diabetic level ($P<0.01$); capital letters indicate between group comparison. Means having different capital letters are significant ($P<0.01$) but same capital letters are nonsignificant.

parameters indicating absence of concerned activities. Such phenomenon is not uncommon with antihyperglycaemic plants and was reported for plants, viz. *Momordica charantia* (Singh *et al.* 1989), *Tinospora cordifolia* (Wadood *et al.* 1992) and *Caesalpinia bonducella* and *Emblica officinalis* (Sharma 1994). On the other hand, phenformin significantly ($P<0.01$) lowered the plasma cholesterol and triglycerides levels on days 3, 5 and 10 post-treatment, as compared to diabetic levels. However, it could not exert any effect on BUN level.

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