

High Diosgenin Content in Some Selected Clones of *Dioscorea floribunda*

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Genetic improvement in *Dioscorea floribunda* was made through recycling of clonal selection since 1976 and a wide range of variation in diosgenin content ranging from 2.61 to 6.64 per cent was noticed. However, in 44 per cent of samples it was found to be above 5 per cent. Average diosgenin content in these clones has been found to be the highest.

Several wild and cultivated species of *Dioscorea* are known to contain diosgenin¹. However, all species are not commercially acceptable either for difficulties in cultivation or for low diosgenin content. Diosgenin is a very important and versatile precursor and accounts for about 50 per cent of the total steroid drug output in the world. Diosgenin is being used as a primary product in the synthesis of sex hormones, corticosteroids and in the production of family planning drugs.

D. floribunda introduced from central America in different parts of the country was proved to be high diosgenin yielding species²⁻⁴. The plants have moderate to high diosgenin content varying from 2-5 per cent on dry weight basis. The performance of *D. floribunda* has been studied at the Institute since 1976 under genetic improvement by successive cycles through selection and breeding⁵⁻⁷ while some of the selected clones are being maintained.

TABLE 1 : DIOSGENIN CONTENT IN *D. FLORIBUNDA* SELECTIONS IN 1998

Selection No.	% Diosgenin	Selection No.	% Diosgenin
D1	5.31	D14	6.64
D2	5.12	D15	6.12
D3	3.44	D16	3.07
D4	6.64	D17	5.36
D5	6.24	D18	3.88
D6	4.13	D19	4.04
D7	4.25	D20	2.86
D8	5.69	D21	3.25
D9	2.62	D22	3.49
D10	4.98	D23	4.51
D11	5.55	D24	5.10
D12	6.34	D25	2.61
D13	4.20		

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TABLE 2 : DIOSGENIN CONTENT IN *D. FLORIBUNDA* ON 10 YEAR BASIS

Year	No. of tubers	diosgenin content			Range
		<4%	4-5%	>5%	
1976	135	129	6	-	1.0-4.5
1978	36	29	7	-	3.0-5.5
1988	56	11	32	13	3.5-5.8
1998	25	8	6	11	2.6-6.6

In continuation of our studies⁵⁻⁷ on *D. floribunda*, an account is given on ten years basis for the comparison of diosgenin contents in tubers. The cultivation practices and method of diosgenin estimation are the same as described earlier⁶. A random of 25 plant samples were taken from the selected population maintained in our experimental plots and were analysed for diosgenin content. After continuous genetic improvement the diosgenin content was found to range from 2.6 to 6.6 per cent (Table 1), in contrast to our earlier reports which showed a limited range in the diosgenin content. This suggests greater scope of selecting high diosgenin clones. However, the average diosgenin content of 25 population was found to be 4.6 per cent. It is noteworthy to mention here that maximum diosgenin content of 4.5, 5.5 and 5.8 was observed in selected clones developed during 1976, 1978 and 1988, respectively (Table 2). These clones were the base of present study in which we observed diosgenin content upto 6.6 per cent. The high content of diosgenin in present set of material might be due to continuous recycling of the clonal selection and propagation from high diosgenin lines. Diosgenin content was found more than 5 per cent in 44 per cent of the samples. Thus, it has been possible to maintain higher diosgenin yielding plants. There are reports⁸ of development of clones of *D. floribunda* with diosgenin content between 3.5-4.0 per cent, where as, the average diosgenin content in the

present material selection has been found to be the highest reported so far.

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REFERENCES

1. Asolkar, L.V. and Chadha, Y.R., In ; Diosgenin and other Steroid Drug precursors. PID, CSIR, New Delhi, 1979, 11.
2. Bammi, R.K. and Randhawa, G.S., In; Dioscorea Improvement Project-Status Report, Indian Institute of Horticulture, Bangalore, 1975.
3. Murty, V.R. and Rama Rao, V., *Indian J. Hort.*, 1976, 33, 274.
4. Tyagi, M.C. Sharma, B., Singh, M.P. and Jain, H.K. In; Proc. Second Workshop of AICIP on Medicinal and Aromatic Plants, Anand, Nov. 1-4, 1976.
5. Khanna, K.R., Sharma, S.C., Srivastava, S.N., Singh, S.P. and Dixit, B.S., *Indian J. Pharm. Sci.*, 1976, 38, 144.
6. Khanna, K.R., Srivastava, S.N., Singh, S.P. and Dixit, B.S., In; Proc. National Seminar on Medicinal and Aromatic Plants, Tamil Nadu Agriculture University, Coimbatore, 1982, 90.
7. Khanna, K.R., Dixit, B.S., Singh, S.P. and Srivastava, S.N., *Indian J. Pharm. Sci.*, 1989, 51, 112.
8. Chadha, K.L. and Rao, V.R. *Indian Hort.*, 1984, 28, 13.