

DIOSGENIN-DRY MATTER RELATIONSHIP IN TUBERS OF *DIOSCOREA* SPECIES

DIOSGENIN, a steroidal sapogenin, is the base chemical for the preparation of a number of pharmaceutical products. Its availability from the tubers of some of the wild species of *Dioscorea* is commercially exploited. *Dioscorea*, generally grown wild, is brought under cultivation, thanks to the research work carried out at this Institute¹. The purchase price of wild yam tubers is fixed based on diosgenin per cent. This necessitated the estimation of a representative tuber sample for diosgenin content by the purchaser. Diosgenin estimation by chemical procedures are tedious and time consuming. An observation made earlier² about the relationship between the colour of fresh cut *D. deltoidea* tuber and diosgenin per cent has helped in rapid screening of tuber samples. It was not possible to arrive at such relationship in *D. floribunda*, because the freshly cut tuber colour is mainly yellow. Correlations, if any, between the diosgenin and other easily estimable constituent can also help in the satisfactory assessment of tuber samples. With this idea in view,

Table I gives the data of diosgenin dry matter correlation coefficients. In one year old tubers of *D. floribunda*, the relationship was significant but with low prediction index. Attempts to improve correlation coefficients by taking log dry matter, in fact, decreased the correlation. Even when the data were split into different diosgenin classes the correlation coefficients did not show any improvement. However, the correlation coefficients improved substantially for two year old tubers, showing that in one year old tubers the relationship does not attain a state of equilibrium and is perhaps in a state of flux. The improved relationship in a two year old tuber is quite interesting from the point of view of predicting the diosgenin content. The tuberisation rate is very slow in *D. deltoidea* and the samples collected may be of more than two year old. The existence of relationship shows that the two year period may be quite valid even for *D. deltoidea*.

The relationship between diosgenin and dry matter in both species provides an easy, inexpensive method for predicting the diosgenin content, to a reasonable extent (Table I).

TABLE I
Correlation coefficients between diosgenin and dry matter

Category of sample	Correlation of diosgenin (on fresh weight basis) with	Number of Observations	Correlation	Regression equation for diosgenin	S.E. (\hat{Y} estimated)
<i>D. floribunda</i> (One year old)	dry matter	200	0.4101**	0.4620+0.2257 dry matter	0.729
<i>D. floribunda</i> (one year old)	log dry matter	200	0.3013**	1.3937+0.0769 log dry matter	0.763
<i>D. floribunda</i> (Two year old)	dry matter	60	0.6562**	-0.16157+0.03455 dry matter	0.187
<i>D. deltoidea</i> (age not known)	dry matter	174	0.5805**	2.2913+0.06974 dry matter	0.274

** Significant at 1% level.

correlations³ were worked out between diosgenin and dry matter and the results are reported. Diosgenin was estimated according to the procedure described earlier⁴ and dry matter by standard AOAC⁵ method.

The data used were gathered during the analysis of *D. floribunda* tuber samples for diosgenin from various treatments and replications of the field experiments conducted during the year 1972 to 1976. The data on the screening of clones received for introduction at this centre from various regions of India were used in the case of *D. deltoidea*.

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PHYTOTOXIC METABOLITE FROM *ALTERNARIA MACROSPORA*

THE leaf spot disease of cotton (*Gossypium hirsutum*) caused by *Alternaria macrospora* is a widespread and destructive disease that has affected many areas in Southern India¹. Alternariosis is characterized by irregular necrotic lesions on leaves. The syndrome can be reproduced by artificial inoculation and also by the culture filtrate on leaves. Phytotoxic metabolites produced by this organism *in vitro* from 7-10 day old cultures grown on Richards' medium when tested using the method of Ueno *et al.*² (1975) showed toxicity to susceptible cotton leaves (MCU 5). The brown, necrotic lesions appeared after 16 h of treatment enlarging within 24 h resulting in veinal necrosis. Affected cell walls of the subsidiary cell turned brown. The rapidity of appearance of the phytotoxic symptoms was greater when the organism was grown in potato sucrose broth for 15 days than in Richards' medium. Culture filtrates were extracted with ether and further processed into acid, neutral and alkaline fractions as suggested by Kohmoto *et al.*³ (1976). Each fraction was partially purified by preparative TLC using benzene: acetone (2:1) as the solvent system. As many as 15 zones were partitioned under UV and tested for phytotoxicity. Between

the zones, there was an UV absorbing one present in all the three fractions which was found to be most toxic. This partially purified substance has an R_f value of 0.74 to 0.76. The silica gel containing the sample was then scraped off the glass plate and placed in a small circle on the upper side of the fresh detached leaf (MCU 5) on moist filter paper in a Petri dish. The silica gel on the leaf was wetted with distilled water and incubated in a moist chamber at 27° C. The leaf was examined for the induction of veinal necrosis after 16-24 hours (Ueno *et al.*², 1975). Droplets of water with plain silica gel served as the control. Also, leaves of *Cyamopsis tetragonoloba* and *Phaseolus vulgaris* produced the same syndrome. This fraction gave positive reaction (characteristic blue colour) with Folin's reagent when followed by exposure to ammonia vapour, suggesting that this might be a phenolic acid. Further studies on the chemical nature as well as its action on the permeability of epidermal cells are underway.

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AWARD OF RESEARCH DEGREES

Tamil Nadu Agricultural University, Coimbatore, has awarded the Ph.D. degree to Messrs. S. Subrahmanyam, M. Nagarajan, T. S. Manickam, B. Sethupathi Ramalingam, K. M. Ramanathan.

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Karnatak University, Dharwar, has awarded the Ph.D. degree in Mathematics to Shri Rajasekharan Mohansingh.

Kakatiya University, Warangal, has awarded the Ph.D. Degree in Chemical Engineering to Shri T. Sripathi.

University of Cochin, has awarded the Ph.D. degree in Science to Smt. B. Santhakumari.