Part III

CONCLUSION

C. lacerus Gagn. is a perennial herb which has the botanical characteristic nearly the same as *C.speciosus* Sm. and has always been misidentified for the latter. Therefore, the sample collection is rather difficult and must be done carefully. Besides, the differences between *C.lacerus* Gagn. and *C.speciosus* Sm. have been reported by Maas (1979). The underneath of the leaves of *C.lacerus* Gagn. are more silky than that of the *C.speciosus* Sm. and the period of time between the blooming of each flower of *C. lacerus* Gagn. is shorter than that of the *C. speciosus* Sm., so three full bloom flowers are always seen in the inflorescence of *C.lacerus* Gagn. whereas only one full bloom flower is seen on *C.speciosus* Sm.

C.lacerus Gagn. rhizomes contain the same kind of sapogenin, diosgenin as in *C. speciosus* Sm., the quantity of diosgenin (0.53%) was not as high as that obtained from *C. speciosus* Sm. (2.12%) as reported by Dasgupta and Pandy (1970), but it was nearly the same as that obtained from wild sources of *C. speciosus* Sm. rhizome from different areas in India as reported by Chakravarti *et al.*, (1976) which varies from none to 1.8%. However, the yield of diosgenin from *C. lacerus*Gagn. was extremely variable (0.031% - 0.53%), because the young rhizomes contained very small amount of hecogenin (0.026%) and diosgenin (0.031%) which may not be very appealing in its cultivation for commercial purpose. Beside this the seasons of collecting samples may also be of concern. At present, it is rather difficult to prospect

the *C. lacerus* Gagn. plants for being a potential source of steroid industry. However, because of the similarity in botanical characteristics between *C. lacerus* Gagn. and *C. speciosus* Sm., the *C. lacerus* Gagn. is expected to have share similar advantages of *C. speciosus* Sm. over Dioscorea plants such as, short growing cycle, ease of cultivation, simple staking, enormous rhizomes obtained in short duration and the ease of sapogenin extraction. In addition, the yields of *C. speciosus* rhizomes also increase with growing period which has been reported that the yield of 6 months, 9 months and 20 months crops are 413 g, 665 g and 1,733 g of fresh tubers per plant respectively, with 80-85% moisture content (Asolkar and Chadha, 1979). Furthermore, the seeds of *C. lacerus* Gagn. may also be an additional source of diosgenin as for the seeds of *C. speciosus* Sm. which have been reported to contain 2.4-2.8% of diosgenin depending on extraction procedures. The seeds have the advantage over fresh rhizomes in that their moisture content are much lowere, i.e., only 13.7%. The yield of seeds was 700 kg (600 kg d.w.b) whereas the yield of fresh rhizomes was 40 tonnes (6.0 tonnes d.w.b.) per hectare in 16 months, therefore, the income is accordingly increased at least 20% (Singh, *et al.*, 1980).

The phytochemical study of *C. lacerus* Gagn. is nevertheless deemed necessary because there may be some different compounds of economical or therapeutical values present in the plant extract obtained by different extraction procedures. The extraction procedure with preliminary extraction to exclude the fatty substances may be suitable for extracting sapogenins from *C. lacerus* rhizomes since the matrices together with some impurities are reduced. However the yield of sapo-

genin may be lower because the free sapogenins present are also excluded. In order to get the optimum conditions for the extraction of sapogenins from *C. lacerus* Gagn. rhizomes, further investigations would be required which include the method to increase the yield of sapogenin contents in the extraction procedure. The HPLC method for quantitative determination was chosen because it is a rapid, sensitive and selective method especially for determining very small amount of sapogenins in the sample. The accuracy of this technique is also higher than that other methods and the identification can also be carried out simultaneously. The optimum HPLC conditions in this research are: a reversed phase column μBondapak C18, 30 cm x 3.9 mm ID. with acetonitrile : methanol : chloroform (83:10:7) as mobile phase with a flow rate of 0.2 ml/min. Under these conditions, 5 peaks at the retention times of 22.2, 25.8, 31.2, 60.0 and 66.0 minutes, respectively, were obtained. The retention time of the No.1 and No.3 peaks correspond-ed to hecogenin and diosgenin. The hecogenin and diosgenin contents in the *C. lacerus* Gagn. rhizomes were found to be 0.006% and 0.031% respectively. Separation of sapogenin from its crude extract was also feasible and these conditions could be improved to shorten the time of analysis. However, the HPLC method is only suitable for screening purposes. The gravimetric method is always prefered when the isolation of sapogenins is carried out in industry setting.