FEASIBILITY STUDY ON THE PRODUCTION OF HIGH VALUE CHEMICALS FROM LOCAL PLANTS

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Introduction

In our studies on the chemical constituents of *Hedyotis* species (Hamzah et al. 1996; Ahmad et al. 1996; Hamza and Lajis, 1996; Hamza et al. 1997), a compound identified as arbutin was the major component of the plant in one species. The compound occurs up to 5% the fresh weight of the plant. Arbutin is the important ingredient in cosmetics for the purpose of skin care and whitening used as anti-oxidant in food preservation. The project is aimed at establishing the feasibility of producing arbutin from selected *Hedyotis* species.

Materials and Methods

Hedyotis species was collected from the populations found Tanjung Tualang District in Perak. The plantlet was then cultivated in Farm C, UPM. The seeds collected were then successfully germinated at the Germ-plasm Unit UPM. The progress of the plant growth was followed and recorded. Extraction and various purification methods were also conducted and the efficiency compared. A new variety of the species was also cultivated in the germ-plasm unit and investigated for its chemical constituents. The constituents were established and compared with the previous variety.

Results and Discussion

The seedlings grew very well during the first two months of their transplantation. The plant grew between approximately 50 to 200 g per stalk with average height of 30 cm and bush diameter of 15 to 30 cm. Fruits began to appear at the age of 1.5 month after bearing white flowers. Distortion of leaves (probably due to viral infection) however was observed on 10 percent of the population at the end of this period. In addition, wilting and dying parts (probably due to fungal infection through soil) were also observed on 20 percent of the population. The infected plant eventually became dark, dried and died. Due to these unexpected results, fresh seeds were collected for the next planting cycle. Germination of seeds was successfully conducted on the sand top-soil mixture. The three weeks old seedlings were transferred to the planting plot of sand/top-soil mixture. Harvesting was done at the age of three months. Blackening of harvest was observed on the stem and leaves when the plant were exposed to the high sunlight radiation. All fresh and dried samples were used in this investigation.. Extraction and purification of arbutin were conducted on the extracts from the plants grown in the pots. The harvest was air dried in the shade without blackening effects. Extraction of arbutin was about 3% of yield. Of several extraction and purification methods tested for arbutin extraction using water/methanol mixture on the fresh blended samples was the most suitable based on cost and environmental considerations. The isolation of components from the virus/fungus-infected plant was continued and seven compounds isolated were characterised by NMR. Four of the compounds were quinonoids, two being new. The new 1,4-anthraquinones were found to be strongly cytotoxic. In addition, a flavonoid-glycoside, kaempferol rutinoside and two triterpenoids were also isolated.

Conclusion

The study has shown the possibility of cultivating the *Hedyotis* species in isolating and extracting high yields of arbutin. Infestation of fungus/virus can occur and propagated during storage, reducing the yield of arbutin and production of several new anthraquinones.

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