# THE SEARCH FOR NEW ANTI-OXIDATIVE COMPOUNDS FROM ZINGIBERACEOUS SPECIES

N.H. Lajis, H. Mohammad, A.G. Othman and M.A. Hj. Sukari

*Faculty of Science and Environmental Studies*
*Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia*

***Keywords:*** zingiberaceae species, anti-oxidative activity.

## Introduction

In recent years the role of free radicals and reactive oxygen species in human disease process including cancer, atherosclerosis, rheumatoid arthritis, inflammatory bowel disease, immuno-suppression, brain dysfunction, cataracts and malaria has become apparent (Gordon, 1996). This has led to considerable research on the possible contribution of dietary anti-oxidants to disease prevention, since anti-oxidants are able to remove or prevent the formation of free radicals and reactive oxygen species and prevent oxidative deterioration *in vitro*. In cosmetics anti-oxidants have been widely used for prevention of melanin which causes skin darkening and in food it is used to reduce rancidity of fats and oils stuff (Nakatani, 1994). Although synthetic anti-oxidants, (e.g., BHA and BHT) are effective, concern about possible adverse effects is increasing. As with other synthetic products BHA and BHT have been criticised mainly due to possible toxic effects. Zingiberaceae consists of 700 species belonging to 45 genera and mainly found in Indomalaysian region. In the Malay society zingiberaceous plants are used widely in traditional medicine and spices.

## Materials and Methods

A collection of more than 30 Zingiberaceae were available in the germ-plasm unit of UPM. These specimens were collected from several areas of Peninsular Malaysia. The plant samples obtained from the unit were extracted using various organic solvents. Plants with relevant medicinal claims are primarily of higher interest to our study. The extracts were then subjected to anti-oxidative assays and the activity was measured. Plants showing high activity from the assays were selected for detail investigation to isolate and purify the constituents and finally identified spectroscopically. The activity of each isolate was measured and the bio-activity-structure relationship was established.

## Results and Discussion

Twenty species of Zingiberacea family available in the germplasm unit of UPM has been extracted and tested for their anti-oxidative activity. Most of the species have shown anti-oxidative activity when tested using ferric thiocyanate and thiobarbituric acid methods of assay. A number of these showed stronger activities then the other, which indicate their potential for further detail investigation. Based on this observation three of the species, *Alpinia nutans*, *Costus discolor* and *Alpinia malacensis* have been subjected for further extraction, isolation and structural elucidation of the active components present in the species. Several compounds were isolated and identified: 5,6-Dehydrokawain, methyl cinnamate *(Alpinia malacensis)*, 5,6- Dehydrokawain, flavokawain-B, β-sitosterol, stigmasterol *(Alpinia nutans),* and β-sitosterol, stigmasterol *(Costus discolor)*. Dihydrokawain showed anti-oxidative activity comparable to the commercially available tocopherol and vitamin-C. Fractionation of the extract indicated that the more polar components seem to be more active than the non-polar. Further investigation to isolate the polar components is conducted now using suitable chromatographic methods.

## Conclusion

Some of the zingiberaceae species showed strong anti-oxidative activity, which encourage us to investigate further on the active constituents. Currently, we have looked into three of the species and the study is still continued.

## References

Gordon, M.G. 1996. Dietary Anti-oxidants in Disease Prevention, *Natural Product Reports.* 13: 265-274.

Nakatani, N. 1994. Anti-oxidative and Anti-microbial Constituents of Herbs and Spices, In: *Herbs and Edible Fungi*, G. Charalambous (ed.) ElsevierScience B.V. p. 251-271.

*Supported by IRPA Grant 09-02-04-0067*