

THE BIOTECHNOLOGY CENTRE

Professor M. Ahmad, BSc Bhagal, MSc, PhD LARI – Director

WORK OF THE CENTRE

Under the Directorship of Prof. M. Ahmad and with the cooperation and dedication of all staff members, the Biotechnology continued its mandate of teaching and research, aimed at educating and training postgraduate and undergraduate students.



In its pursuit to educate and train students the Biotechnology Centre hosted several workshops/seminars. One such workshop hosted by the Centre, “Concepts of Biotechnology and Genetic Engineering” was held on December 18 and 19, 2006 and July 10-12, 2007. The course aims at training CAPE and A level Biology high school students in Jamaica. Students were trained in recombinant DNA technology, biotechnology and related areas. The workshops included five (5) hours of lectures and seven (7) hours of laboratory sessions conducted by Dr. Marcia Roye and her research team (graduate students). Two workshops are expected to be hosted annually.

The various teams at the Centre continued their research efforts in pursuit to finding solutions to forensic, health, food, agricultural and environmental problems. The main research teams at the Centre are The Gemini Virus Research Team led by Dr. Marcia Roye, The Medicinal Plant Team led by Dr. Sylvia Mitchell, The Transgenic Papaya Team led by Dr. Paula Tennant and the Yam-bioengineering Team led by Prof. Helen Asemota and Dr. Andrew Wheatley.

The Centre continued to receive funding from various organizations to assist in carrying out research. One such organization, the Environmental Foundation of Jamaica funded approximately J\$5Million for a two year project “Production and dissemination of medicinal plant monographs” which commenced July 2006. The project’s Principal Investigator is Dr. Sylvia Mitchell.

The Citrus Replanting Project came to an end in January 2007. The project which aimed at developing effective methods of controlling the citrus virus and generating clean planting materials for the industry was successfully completed. The project was funded by the Ministry of Agriculture and the Principal Investigators were Drs. Wayne McLaughlin and Paula Tennant.

Visitors to the Centre

On the invitation of the Director, the Centre had two (2) visitors' Prof. Hans Jorge Fehling and Dr. Meera Berry, from University of Ulm, Germany. Prof. Fehling works on stem cell research on embryonic mouse cells. A luncheon was held for the visitors at the Mona Visitors' Lodge.

PAPERS PRESENTED

- Mitchell, S.A. "Overview of in vitro secondary metabolite research – challenges and opportunities, case study of *Catharanthus roseus*", SIVB annual conference, Indianapolis, USA, June 2007.
- Mitchell, S.A. "Potential for in vitro manipulation and production of tropical secondary metabolites", SIVB annual conference, Indianapolis, USA, June 2007.
- Mitchell, S.A. "Standards and Accreditation for Alternative and Complementary Medicine", Caribbean Tourism Organization's (CTO) 9th Annual Conference on Sustainable Tourism Development (STC-9), Cayman Islands, May 2007
- Mitchell, S.A. and Ahmad M.H. "Medicinal Plant Biotechnology Research in Jamaica – Challenges and Opportunities", Fort Valley, USA, March 2007
- Bahado-Singh, P.S., Wheatley, A.O., Osagie, A.U., Boyne, M., Morrison, E.Y.St. A, Ahmad, M.H. and Asemota, H.N. "Glycemic Indices of some commonly eaten Caribbean foods and dietary intervention using low glycemic index foods to achieve normoglycemia in type 2 Diabetics. Morgan State University 2nd International Complimentary and Alternative Medicine Conference, Baltimore, USA, 2006.

- Riley, C.K., Wheatley, A.O. and Asemota, H.N. “ The effect of physicochemical properties on the in vitro digestibility of starches extracted from yams (*Dioscorea* spp.) grown in Jamaica”. 2nd International Food and Nutrition Conference (IFNC), Alabama, USA, 2006.
- Riley, C.K., Adebayo, A.S, Wheatley, A.O. and Asemota, H.N. “Exploitation of yam (*Dioscorea* spp.) glycosidic biomaterials in paracetamol formulations”. 14th Conference on Composites and Nanoengineering, Colorado, USA, 2006.
- Brown, M.C., Roye, M.E., Stanley, J. “TrAP of Cabbage leaf curl virus (CaLCuV-[JM]) as a suppressor of gene silencing”. Jamaica Society for Agricultural Sciences, 17th Annual Conference, Bodles Agricultural Research Station, St Catherine, Jamaica, 2006.

PUBLICATIONS

Refereed Journals

WIMJ = *West Indian Medical Journal*

- * Roye, M., Collins, A., Brown, M., Stewart, C., Turner, S, Chin, M., Fisher, L., Tennant, P., McLaughlin, W. (2007). Plant Virus and Phytopathology Research in Jamaica: A Review. *The American Journal of Plant Science and Biotechnology* (1): 36-46.
- * Collins, A.M., Roye, M.E. (2007). Two new bipartite begomoviruses infecting, *Wissadula amplissima* in Jamaica. *Plant Pathology* 56:340.
- * Graham, A.P., Stewart, C.S., Roye, M.E. (2007). First report of a begomovirus infecting two common weeds: *Malvastrum americanum* and *Sida spinosa* in Jamaica. *Plant Pathology* 56: 340.
- * Green, C., Wheatley, A.O., Osagie, A.U., Morrison, E.Y.St.A and Asemota, H.N. (2007) Determination of polymethoxylated flavones in peels of selected Jamaican and Mexican Citrus (*Citrus* spp.) cultivars by High Performance Liquid Chromatography (HPLC). *Biomed. Chromatogr.* 21: 48-54.

- * Riley, C.K., Wheatley, A.O. and Asemota, H.N. (2006) Physiochemical characterization of starches from Jamaica yam (*Disocorea* spp.): potential for pharmaceutical exploitations. *Eur J. Sci Res.* 15: 207-219.
- * Riley, C.K., Wheatley, A.O. and Asemota, H.N. (2006) Isolation and Characterization of starches from eight *Dioscorea alata* cultivars grown in Jamaica. *Afr. J. Biotechnol.* 5: 1528-1536.
- * Bahado-Singh, P.S., Wheatley, A.O., Ahmad, M.H., Morrison, E.Y.St.A. and Asemota, H.N. (2006) Food processing methods influence the glycaemic indices of some commonly eaten West Indies carbohydrate-rich foods. *Br. J. Nutr.* 96: 476-481.
- * Webster S.A., Mitchell S.A., Reid W. and Ahmad M.H. (2006) Somatic embryogenesis from leaf and zygotic embryo explants of *Blighia sapida* 'cheese' ackee. *In Vitro Cell. Dev. Biol. – Plant.* 42(5): 467-472.
- * Mitchell S.A., M.H. Ahmad (2006). A Review of Medicinal Plant Research at UWI, Mona 1948-2001. *WIMJ* 55(4): 243-269.
- * Mitchell S. A. and M. H. Ahmad (2006) Protecting our medicinal plant heritage: the making of a new national treasure. *Jamaica Journal*, Institute of Jamaica, Kingston. 29 (3): 28-33.

Other Peer Reviewed Publications

- * Dilworth, L. L., Stennett, D.K., Green, C., Bailey, D. Wheatley, A. O., Simon, Oladiende, F. and Asemota H. N. (2007) Kidney function analyses in genetically modified hypercholesterolemic mice fed bitter yam (*Dioscorea polygonoides*) proprietary preparation. *LifeScience* 2007, July 9-12, 2007, Glasgow, UK. pg 114.
- * Bahado-Singh, P. S., Wheatley, A. O., Osagie, A. U., Boyne, M., Morrison E.Y. St. A. and Helen N. Asemota (2007) Low glycemic index foods: A nutritional approach for management of hyperglycemia and cardiovascular disease in type 2 diabetes. *LifeScience* 2007, July 9-12, 2007, Glasgow, UK. pg. 119.

- * Riley, C.K., Adebayo, S.A., Wheatley A.O. and Asemota, H.N. (2007) The correlation between granular properties and the in vitro digestion of native starches extracted from yams (*Dioscorea* spp.). LifeScience 2007, July 9-12, 2007, Glasgow, UK. pg. 120.
- * Riley, C.K., Wheatley, A.O., Adebayo, A.S., Ahmad, M.H., Morrison, E.Y. St. A. and Asemota, H.N. Formulation of drug delivery systems for diabetics using yam (*Dioscorea* sp.) starches; effect of starch physicochemical properties. Proceedings from the 13th Ann. UDOP Diabetes Conference, Montego Bay, Jamaica (2007)
- * Bahado-Singh, P.S., Wheatley, A.O., Osagie, A.U., Boyne, M., Morrison, E.Y.St.A, Ahmad, M.H. and Asemota, H.N. Lifestyle dietary intervention using low glycemic index foods for the management of type 2 diabetes in the Caribbean. International Diabetes Federation 19th Congress, Cape Town, South Africa – December 2006.
- * Riley, C.K., Wheatley, A.O. and Asemota, H.N. (2006) The effect of physicochemical properties on the in vitro digestibility of starches extracted from yams (*Dioscorea* spp.) grown in Jamaica. Proceedings from the 2nd International Food and Nutrition Conference (IFNC), Alabama, USA, pg. 7.
- * Riley, C.K., Adebayo, A.S., Wheatley, A.O. and Asemota, H.N. (2006) Exploitation of yam (*Dioscorea* spp.) glycosidic biomaterials in paracetamol formulations. Proceedings from the 14th Conference on Composites and Nanoengineering, Colorado, USA, pg. 43.

INCOME GENERATION

Grants

Dr. Marcia Roye

USD2000.00 – Campus Committee for Research and Publication & Graduate Grant Awards. “The molecular characterization, interaction and agricultural implications of three geminiviruses infecting the weed *Wissadula amplissima* from Jamaica” (2007).

USD2000.00 – Campus Committee for Research and Publication & Graduate Grant Awards. The molecular characterization of

Sida golden Braco virus (SiGBuV) and Sida golden Bukup virus (SiGBuV) and their importance to Jamaican agriculture” (2007).

USD2000.00 – Campus Committee for Research and Publication & Graduate Grant Awards. “The Molecular characterization of the geminiviruses associated with the weed *Malvastrum americanum* in Jamaica” (2007).

Dr. Sylvia Mitchell

J\$5M – Environmental Foundation of Jamaica – “Production and dissemination of medicinal plant monographs”. Sept . 2006 – Aug 2008

Dr. Andrew Wheatley

J\$750,000.00 – Environmental Health Foundation, J\$750,000.00 - Scientific Research Council and J\$750,000.00 - Jamaica Bureau of Standards on the project entitled “Nutritional Supplement as a tool for harm reduction in illicit drug addiction: Derivation of mechanism of action in animal model”.

PUBLIC SERVICE

Prof. M. Ahmad

- Board Member, National Commission on Science and Technology
- Member, CARICOM Working Group on genetically modified organisms (GMOs)
- Member, National Biosafety committee, NCST

Dr. Sylvia Mitchell

- Member, Biosafety Ccommittee, NCST
- Member, Hope Gardens Landscaping Committee
- Member, Ginger Innovation Group (organized by the NCST)
- Member, Nutraceutical Stakeholders Group (organized by SRC)
- Scientific Advisor, Ministry of Health Advisory Committee on Complementary and Alternative Medicine
- Member, Jamaican Society for Agricultural Sciences (JSAS)
- Member, Jamaica Society of Scientists and Technologists (JSST)

INFORMATION ON STUDENTS

Currently, there are eighteen (18) postgraduate students doing research at the Biotechnology Centre; ten (10) PhD candidates and eight (8) MPhil candidates. These include two new students, Miss Rani Jagnarine and Miss Cheryl Green.

Miss Jagnarine is an MPhil candidate, whose work will examine “Micropropagation of Aloe (*Aloe barbadensis*), Fever grass (*Cymbopogon citratus*) and Pimento (*Pimenta dioica*) and mineral, microbial, biochemical and bioactive analysis of their cultivated microplants and derived products” while Miss Green is pursuing a PhD degree and will look at “Chemical and histological analysis of turmeric (*Curcuma longa*) rhizomes as they develop in the field and under tissue culture conditions”. Both students are supervised by Dr. Sylvia Mitchell.

Three (3) students were awarded postgraduate degrees as follows:

McLaughlin, Pamela. 2007. Genetic diversity, distribution and phylogeny of whitefly-transmitted geminiviruses from Antigua, Barbados, Belize and St Kitts & Nevis. (PhD) Supervisor: Dr Marcia Roye.

Amarakoon, Icolyn. 2007. “Molecular Characterization and phylogeny of geminiviruses infecting the weeds *Macroptilium lathyroides* and *Rhynchosia minima* in Jamaica” (PhD, awarded with high commendation). Supervisor: Dr Marcia Roye.

Bahado-Singh Perceval S (PhD) 2006. “Glycemic indices of Caribbean foods and application in dietary lifestyle intervention for management of type II diabetes mellitus”. Supervisor: Dr. Andrew Wheatley.

Prizes Awarded

Dr. Bahado-Singh won first prize for his poster presentation entitled “Effect of Low Glycaemic Index Foods in the Management of Hyperglycaemic, Cardiovascular and Nephropathological Disorders in Type II Diabetics” at the UDOP 13th International Diabetes Conference held March 1-4, 2007 in Montego Bay, Jamaica.

Dr. Cliff Riley received the 2006 SRC/JPS Young Scientist of the year award.