NEWSLETTER

GAFooN German Alumni Food Network

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Abstract : Suchada Vearasilp (Chian Mai University, Thailand)

"USING RADIO FREQUENCY HEAT TREATMENT TO CONTROL Aspergillus flavus IN MAIZE (Zea mays) SEED"

The effectiveness of using Radio Frequency (RF) to control fungal in agricultural products has been trialed for years, but the results are not promising recorded on their application techniques. The recent efforts by the Research Institution of the Post-harvest Technology Chiang Mai Thailand aims to overcome the technical barriers for this purpose. Their recently studies have been reported that RF heat treatment at 75ºC for 3 min can decreased infection of Trichoconis padwickii in rice seed to 18% (Janhang et al., 2005), RF treated the temperature of 85ºC for 10 min can reduce the percentage of Fusarium semitectum infection in corn seed from 96 to 2% (Vasanacharoen et al., 2006) as well as using RF at 65°C for 5 min in barley seed can control seed borne fungi whereas its germination capability still maintain as 78% (Akaranuchat, 2007). However, in this experiment RF heat treatment on maize inoculated by Aspergillus flavus was studies.

The artificial A. flavus were inoculated in maize seed with initial seed moisture content of 15% and treated with RF application (27.12 MHz) at 80, 85 and 90ºC for 1 min and 3 min. The percentage of A. flavus infection was determined by agar method and aflatoxin contamination was also analyzed. It was found that the temperature of 90ºC for 1 and 3 min could completely eliminate the fungi infection. The maize qualities were not significantly affected.

Abstract : Elena Blume

"BIOLOGICAL CONTROL OF POST-HARVEST DISEASES: A SUSTAINABLE AND EFFICIENT POST-HARVEST TECHNOLOGY FOR DEVELOPING COUNTRIES"

With the increasing concern of the population towards healthier lifestyles, the demand for fruits and vegetables is increasing and the markets for these produce are expected to expand considerably in the near future. This will also demand for technologies to reduce post-harvest losses that are estimated to be over 30% and to assure the quality and safety of the products. These losses arise from several physical, chemical and biological factors that affect specially products of perishable natures such as vegetables and fruits. Moreover, in developing countries several factors such as inefficient crop production, harvesting and handling methods, poor processing techniques and inadequate methods of storage and distribution, owing to poor road and transportation systems, make the challenge to provide safe products to consumers even bigger. In trying to diminish the biological damage to fresh produce and to reduce the application of pesticides that have consistently left residues in fresh products, the research and practical use of biological control of post-harvest diseases has increasing around the world.

In developed countries, several products have been developed and are being commercialized such as Aspire, Biosave, Blight Ban, Serenade, Trichodex, etc. In Brazil, several organisms have been identified as efficient antagonists such as isolates of the bacterium Bacillus spp., the yeasts Pichia guilliermondii and Cryptococcus laurentii, and the fungus Trichoderma spp. with a control efficiency of post-harvest roots of small fruits, apples, grapes, peaches, etc. varying from 30 to 100%. To increase commercialization of these organisms research needs to be done in their production, formulation and delivery, as has been done in developed countries, as well as a change on the way biocontrol organisms are seeing by regulatory agencies that considerer them as a pesticide for registration purposes. Biological control represents an important tool to promote sustainable agriculture, being environmentally friendly and of low input. In my presentation I will show results of biological control of post-harvest diseases from research and industry perspectives and discuss its role in sustainable agriculture.

Report of Summer School in Georg-August University Göttingen 14th-21st March 2009

"Post-harvest technologies High Tec for Food Security & Food Safety"

The summer school was started on Sunday, 14th March 2009 at Department of crop Sciences Section of Quality of Plant Products by opening remark and introduction to the summer school which was performed by Prof. Elke Pawelzik, as the coordinator of the summer school in Goettingen. The participants comed from Philippines, Benin, Pakistan, Indonesia, Brazil, Thailand, Kenya, Egypt, and Sudan. The contributions of alumni were conducted after the opening remark. The first session before lunch was performed by 4 presenters. After lunch the session was continued by 7 presenters. The topics of the contributions consisted of organic farming, technical development of drying techniques, usage of tropical plants as biological insecticides, and also the quality level of some agricultural products.

The second day (15th March 2009) was started by field trip to Das Backhaus – Die Biobaecker in Gleichen. In this factory, the participants received very useful and important information about the raw materials of bio products, the processing of bread and also the trend of bio-bread consumption. The storage of the raw material of bio products, the processing of bread and also the trend of bio-bread consumption. The storage of the raw materials were also demonstrated during the visit and also the shop of this bakery

The presentations of alumni was continued after the lunch, which was performed by 5 presenters and their topics were from modeling system in food industries, usage of Radio Frequency heat treatment in controlling the insects and to prolong the rice shelf
life, and the methods to avoid the pod borer in cacao plant.

The third day (16th March 2009) was fulfilled by the visit to Leibniz-Institute for Agricultural Engineering (ATB) in Potsdam-Bornim. In this institute, the participants were received and supervised by Dr. Thomas Hoffmann (Head of Post-harvest Technology department). After short introduction about ATB, the participants visited some departments at ATB such as pilot plan of hemp production (natural fiber), biotechnology for producing lactic acid bacteria and its product development, production and use of bio-energy sources and the field of hemp and other useful plants which can be used as raw materials as bio-energy sources.

The fourth day (17th March 2009) was carried out by the presentation of seven participants. The topics were from education of producers and consumers of foodstuffs, quality standard of food due to the public health, quality of tea fermentation, drying of feed from hay, appropriate technology for drying, production of non-wheat bread and quality development of horticultural products.

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Report of Summer School in Georg-August University Göttingen 14th-21st March 2009

"High Tec for Food Security & Food Safety"

After the presentation the participants discussed about the content, method of delivery and opportunity to build the joint or collaborative researches in the future. The day was ended by visiting the laboratories and facilities of department of Crop Science – section of quality of plants products.

The fifth day (18th March 2009) was conducted department of crop sciences –section agricultural engineering. The session was opened by Prof. Wolfgang Luecke, who is the head of this section and also vice president of Georg-August University. After the opening session, some presentations and laboratory visits were conducted. The topics were Usage of Radio Frequency Identification (RFID) for traceability of grains and development of an electronic nose for detection of Fusarium in wheat, and utilization of solar energy for disinfestations of grain. At the afternoon the program was continued by presentation and practical demonstration of Dr. Markus Boeckelmann, official expert of the Agricultural Chamber of Nordrhein-Westfalen. He explained about the development of drying techniques and the energy management.

The sixth day was started by excursion to Agrargenossenschaft Ahrenshausen and was led and supervised by Johannes Jung, M.Sc.Agr.

Abstract : Arinafril, N. Naalim, L.Suryani, W. Garinas, G. Zehnder

"INSECTICIDAL PROPERTIES OF TROPICAL PLANTS ON THE GROWTH OF RICE WEEVIL (Sitophilus oryzae)"

Plants have been known as organisms that are rich in chemical sources. Besides producing primary metabolites, such as carbohydrates, amino acids, proteins, et cetera, plants also produce a very diverse range of secondary metabolites, such as flavonoids, alkaloids, terpenoids, et cetera. Many of these substances are known as chemical defence for plants from their enemies, so that they are able to protect themselves from insect pests and pathogens attacks.

Since plants have evolved highly elaborate chemical defences against pest attacks, they provide a source of bioactive substances which may be used as novel and safer crop protecting agents. Use of bioactive substances from plant extracts as safe insecticides is well-known since ancient and has enormous intuitive appeal. The toxic principles from plants with insect pest control properties act as larvicides, ovicides, repellents, antifeedants, oviposition deterrents, and insect growth regulators. Application of plant extracts as natural insecticides emphasizes its great potential in crop pest management. Natural insecticides are low cost, local availability and safe to the environment.

One of the alternatives is by using botanical pesticide which is environmentally safe, since botanical pesticide is biodegradable, so that relatively safe either for human or for environment. A constraint of botanical pesticide use in Indonesia is lack of publicity such as extension and explanation to the farmers/users. The use of botanical pesticide, especially to be used individually should not be registered, meanwhile for trading commercially is needed the requirements regarding physico-chemistry characteristic and toxicology. The use of botanical pesticide in Indonesia has good prospect. Indonesia has 37.000 species of identified plants, and 18.000 – 20.000 species of unidentified plants.

Insecticidal activities of some tropical plants that are abandoned in many parts of Indonesia have been studied studied and discussed.

Abstract : Alvaro Amarante and Jean-Louis Lanoiselle

"COMBINED EFFECTS OF BLANCHING AND FREEZING ON THE CELLULAR STRUCTURE, STRUCTURE AND COLOUR OF GREEN BEANS"

"..showed double first order inactivation kinetics, indicating the presence of thermoresistant and thermolabile isoenzyme."

This work studies the combined effects of blanching, using either peroxydase (POD) or lipoxygenase (LOX) as indicators, and different freezing conditions on the final quality of green beans. POD is traditionally used in the industry as blanching indicator, whereas LOX is reported in recent literature as the main enzyme responsible for flavor deterioration. Both enzymes showed double first order inactivation kinetics, indicating the presence of thermoresistant and thermolabile isoenzymes. The time-temperature blanching conditions for the freezing experiments were chosen arbitrarily to reach an indicator residual activity of 10%. The blanching temperatures used were 70, 80, 90 and 100°C. POD showed more thermoresistant behavior than LOX in all temperatures tested. The kinetic parameters were determined for both enzymes. After blanching, the samples were submitted to four freezing conditions: a) nitrogen vapor, b) blast freezing, c) natural convection, and d) natural convection inside polystyrene boxes. The freezing rate was measured by means of thermocouples placed in the center of the green beans pods and by fluxmeters adhered to their surfaces. The quality of thawed samples was evaluated by: a) light microscopy of thin cut transversal sections of the pods, b) axial compression tests by application of constant constraint of 2 N and, c) evaluation of color variation using the CIELAB color space. HTST blanching protocols contribute to minimize color and texture deterioration. The higher the freezing rates, the better the cellular integrity was obtained and, consequently the firmer the texture. Color is not significantly affected by the freezing rate

Abstract : C. Onyango and M.G. Lindhauer

"PRODUCTION OF BREAD FROM NON-WHEAT FLOUR CAN REDUCE WHEAT CONSUMPTION IN SUB-SAHARIAN AFRICA: THE KENYAN EXAMPLE"

Bread consumption in Kenya has increased steadily from 2 to 30 kg/person/year between 1963 and 1998 (UNECA 1998). This phenomenon can be attributed to the fact that bread is a compact source of energy in a ready-to-eat form, inexpensive and convenient to handle, use and store. However, as Kenya's population is increasing at 2.5% per annum, demand for bread will continue to rise although the agroclimatic conditions in the country are not ideal for wheat production. Kenya can decrease her demand for wheat by upgrading the processing of traditional cereal and root crops (such as cassava, millets and sorghum) into a variety of ready-to-eat foods such as gluten-free (wheatless) bread.

The production of bread from non-wheat flours is a technological challenge since these flours lack gluten. Consequently the bread has a low volume and poor crumb and crust characteristics. Options to improve the organoleptic quality of gluten-free bread include pregelatinisation of the flours prior to baking, addition of chemically modified starches, vital gluten or gluten-substitutes such as emulsifiers, enzymes or hydrocolloids. The additives imitate some functions of gluten and result in the production of gluten-free bread with an acceptable volume, soft crumb and regular texture.

The aim of this study is to improve the organoleptic quality of gluten-free bread from gelatinised cassava starch and sorghum flour. Baking ingredients and conditions were varied to obtain bread with optimal volume and crumb and crust characteristics. Thereafter different cellulose-based derivatives (microcrystalline cellulose, carboxymethylcellulose, methyl cellulose, hydroxypropylmethylcellulose and hydroxypropylcellulose) and emulsifiers (glycerol monosterate, sodium stearoyl-2-lactylate, diacetyl tartaric acid esters of mono- and diglycerides and calcium stearoyl-2-lactylate) were added to investigate their influence on the texture and rate of staling of the gluten-free bread, which were measured as force in compression (expressed in grams) of 20 mm thick slices using the TA-XT2i Texturometer. Fundamental differences, of the batters, due to the different additives will by explained dynamic oscillation tests performed on a controlled stress-strain rheometer.

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