First AFSA Conferences on Food Safety and Food Security

Safe food from Farm to Fork

September 15-17, 2012
Rinku Campus, Osaka Prefecture University, OSAKA, Japan

Conference Proceedings

ASIAN FOOD SAFETY AND SECURITY ASSOCIATION

IMPACTS OF ENVIRONMENTAL CHANGES ON EXPANDING FOOD-HEALTH RISKS IN ASIA

Ryohei KADA* [1,2]

[1] Research Institute for Humanity and Nature, Kyoto, Japan [2] Yokohama National University, Kanagawa, Japan

*Corresponding authors e-mail: kada@chikyu.ac.jp

ABSTRACT

Increasing ecological risks and greater impacts of climate change are among the most serious threats to Southeast Asian countries. High economic growth, population increase, industrialization and rapid urbanization have been occurring in the region, which are not only affecting the vulnerability of natural and socioeconomic systems, but also affecting food and health security of the people. In addition, increased human settlements, agricultural activities, and industrial development, ecological risks have caused significant impacts on agricultural, food and water supply on which public health heavily depends.

Food and health risks, which result from both inadequate supply as well as poor quality of food and water, are contributing significantly to the public health conditions. This problem is worsened by reported impacts of a changing climate felt directly by farmers, rural and urban dwellers, often characterized by increased flooding, landslides and drought. The monsoon Asian region is often experiencing flood disasters, following typhoons, or heavy monsoon rains leading to heavy casualties and grave public health issues due to the spread of diseases and submersion and also aggravated by resulting food security problems. We will examine and assess the risks to human health associated with the exposure to heavy metals bioaccumulation in fish products from Laguna Lake. Anthropogenic activities continuously increase the amount of heavy metals in the environment, especially in aquatic ecosystem.

The major sources of contamination in surface waters can be traced to industrial discharges, domestic waste disposal and application of agrochemicals on farmlands. Environmental degradation affects the ability of coupled ecological and social systems to provide critical services that are directly linked to human being. It is considered to be particularly important because the poorest of the poor are dependent on the natural environment for their daily sustenance that is rapidly being eroded by factors such as urban developments, rapid expansion of the population and other economic factors.

Keywords: Food insecurity, Food safety, Environmental degradation, Bioaccumulation of heavy metals, Laguna De Bay.

DECONTAMINATION OF FRESH PRODUCE: WHAT ARE THE CHALLENGES TO ACHIEVING SUCCESS?

*Larry R. Beuchat**

Center for Food Safety, University of Georgia, 1109 Experiment Street, Griffin, Georgia 30223-1797, USA

*Corresponding authors e-mail: lbeuchat@uga.edu

ABSTRACT

Documented outbreaks of foodborne diseases associated with consumption of fresh fruits and vegetables have occurred with increased frequency on an international level in recent years. These outbreaks have been attributed not only to bacterial pathogens, but also to viruses and parasites. Among the types of produce implicated in more than one outbreak in the United States are lettuce, herbs, tomatoes, seed sprouts, green onions, cantaloupes, berries, and mangoes. Changes in agronomic, processing, and distribution practices, together with enhanced epidemiologic, surveillance, and microbiological detection techniques, have undoubtedly contributed to increased awareness and confirmation of these outbreaks. A myriad of sanitizers in both liquid and gaseous forms have been evaluated for their efficacy in killing foodborne pathogens on produce. For various reasons, however, many of these sanitizers have been minimally effective. The challenge is to deliver the lethal form of chemicals in sanitizers to sites on the surface and in subsurface tissues of produce where pathogens may be present. Factors such as the diversity in surface morphology, hydrophobicity of the cuticle, infiltration of pathogens into naturally occurring plant structures and cut tissues, and potential internalization of pathogens through the vascular system are among the hurdles that must be overcome to achieve success in decontaminating produce by sanitizer treatment. What works in reducing pathogens on one type of produce may be considerably less effective on another type. Layered on these challenges is the need to not cause adverse sensorial changes in produce as a result of treatment with sanitizers. Regulatory limits concerning the use of produce sanitizers vary from country to country and must also be considered when selecting sanitizers. While progress is being made to improve the efficacy of produce sanitizers, still much work is needed before strategies can be developed and applied to more effectively reduce the risk of illness associated with consumption of fresh produce.

Keywords: Decontamination, Fresh Produce, Challenges and Achieving Success?

KOREAN PERSPECTIVES ON FOOD SAFETY AND REGULATIONS

Deog-Hwan Oh*

Department of Food Science and Biotechnology and Institute of Bioscience and Biotechnology, Kangwon National University, Chuncheon, Gangwon 200-701, Republic of Korea

*Corresponding authors e-mail:

FOOD SECURITY IN BANGLADESH: ISSUES RELATED TO PRODUCTION AND CONSUMPTION OF SAFE FOODS

Rezaul Karim Talukder*

National Advisor, National Food Policy Capacity Strengthening Programme, Food and Agriculture Organization of the United Nations, Dhaka, Bangladesh

*Corresponding authors e-mail: reza.talukder@nfpcsp.org

ABSTRACT

The average per capita production, availability and consumption of staple food (rice) and average calorie intakes are reasonably satisfactory in Bangladesh. However, distribution of food and calorie intakes across classes of people reflects gross inadequacy of consumption by a large segment of the population. For some essential food items such as pulses, vegetables, meat and milk, average per capita consumption is far less than requirement. In 2010, 31.5% people were moderately and 17.6% were extremely poor. This represented an improvement over 2005 situation when 40% and 25.1% people were moderately and extremely poor respectively. There has been little improvement in the income distribution situation, with Gini concentration ratio remaining at around 0.45 over the past decade.

There has been some improvement in the chronic energy deficiency situation in the country. Micronutrient deficiency, particularly iron, vitamin A and iodine deficiencies still continue to be a public health problem. Infant mortality declined by half over the past two decades. Under-five mortality rate also declined by 60% over this period and the levels of stunting and underweight child have decreased between 2007 and 2011, little change in the level of wasting for children has occurred during this period.

Consumption of unsafe food represents a major threat to public health in Bangladesh. Empirical evidences have shown high to moderate levels of concentration of heavy metals in vegetables grown in some areas of the country. Other studies have shown widespread use of plant growth regulars in vegetable and fruit cultivation. Some studies reported use of ripening agents like calcium carbide in fruits. Use of harmful dyes and chemicals in different fish species was also reported in some studies. Microbial analysis of street foods in Dhaka city showed that bacterial counts in some foods were higher than acceptable limits.

For improving food security and food safety in Bangladesh, policy measures should emphasize intensification of rice production and diversification of the overall agriculture in the country. Access to food should be improved by expanding income earning opportunities in rural areas, particularly for the poor. For improving food utilization and nutritional status, peoples' health status should be improved by preventing parasitic and communicable diseases, improving dietary diversity and ensuring improved food safety measures. Proper implementations of the existing National Food Policy, formulation of a National Food Safety Policy, supported by a Plan of the Action are needed to achieve the desired goals.

Keywords: Food security, production, consumption, safe-food, and Bangladesh

MICROBIOLOGICAL SAFETY OF MEAT AND MEAT PRODUCTS: CHALLENGES AND OPPORTUNITIES.

H. Thipparedd***,** Department of Food Science and Technology University of Nebraska-Lincoln, Lincoln, NE 68583, USA.

*Corresponding authors e-mail:

ANALYSIS OF RISK MANAGEMENT REPORTS IN FOOD SERVICE PRACTICAL TRAINING COURSE

Ikuko Shimada*[1],Hajime Toyofuku[2] Kazuo Hisa [2,3], Satoshi Numata[1], Mieko Kawamura[4]

[1] Laboratory of Food Service Management, Faculty of Nutrition, University of Kochi [2]National Institute of Public Health [3]Osaka Prefectural University Research Center for Food Safety [4] Faculty of Human Life and Environmental Science, University of Kochi. Laboratory of Food Service Management, Faculty of Nutrition, University of Kochi: 2751-1 Ike Kochi City, 781-8515 Kochi, Japan

*Corresponding author's e-mail: shimada@cc.u-kochi.ac.jp

ABSTRACT

The aim of this research is to measure risk factors in food services to organizations and large institutions. Third year students in the Department of Nutrition are enrolled in a Food Service Practical Training Course and receive practical training in various aspects of food services to institutions such as hospitals, nursing homes, schools and large company cafeterias. In a simulated lab that is equipped with machines and tools that are used in real institutions, students prepared lunch according to the manual of sanitary supervision. Students in charge of serving the food for each week generated reports on risk factors involved in food service. A total of 131 reports were submitted during the 5-week-course in the first semester in 2012. The data showed that 58.1% risk were found in 7 areas which are receiving ingredients, food storage, food preparation, cold cooking, heating food, storage of cooked food, and serving food. In those 7 processes, most of risks occurred in food preparation and serving food. In food preparation, students found pieces of gloves in food, misused aprons; and in serving food, pieces of gloves were found in the dish, forgotten use of a proper apron and washing before all dishes were served. These risks occurred due to the students' lack of understanding about hazard analysis and critical control points because of no previous experiences in food service. Further analysis on a larger sample of data is required to conclude the risk factors in implementing HACCP in food service areas.

Keywords: Risk management, Food service, Practical training course, and Japan

ESTABLISHING SYSTEMS FOR FOOD SAFETY AND FOOD SECURITY BASED ON INTEGRITY

Yuichi Kato

1-31-16、Tsukioka Sanjou-city Niigata-Prefecture

*Corresponding authors e-mail: y.kato@qaps.co.jp

ABSTRACT

In recent years, food product and service companies have been strictly responsible for corporate social responsibility in Japan because of growing concerns about food safety and food security. Now, some management systems to keep food safety have been developed and introduced. On the other hand, food companies are required to prevent food accidents by taking them adequately and effectively.

However, no matter how excellent the system is, it depends on the will of people which engage in food product. Therefore, "integrity" is absolutely requisite.

In Japan, many scandals by food disguise have occurred in sequence since 2000. Those scandals brought concern about food safety and security. Many food companies took short views and they forgot the most important mission that they worked for the health and life of many people.

Now, many Asian countries are being modern state with rising populations. In addition, developing to highly-networked information society will change the mind of consumer people in your country. Whoever can know and send information. From now on it is probable many scandals will be occurred, but if your company is based on integrity and establishes systems for food safety to disclose information about your company, that will be competitive advantage in your market.

Next you need the tool for integrity. This is called "7S" and it's an effective method. 7S is an inclusive term, "Seiri, Seiton, Seisou, Senjou, Sakkin Seiketsu and Sitsuke", in Japanese. It is basic method to work rightly in the work place of food companies. 5S is well known in general manufacturing business in Japan. Senjou and Sakkin are required for food companies because of prevention control on invisible bacteria.

Finally, the visible management system for food security is requisite. All management system is effective on foundation with integrity.

Keywords: Establishment, food safety system, food security, 7S and integrity.

PREVALENCE OF MULTIDRUG RESISTANT ZOONOTIC BACTERIA IN POULTRY OF BANGLADESH.

Anwar Hossain

Department of Microbiology, University of Dhaka, Dhaka 1000, Bangladesh

*Corresponding author's e-mail:anwar5533@yahoo.com

ABSTRACT

Zoonotic bacterial pathogens are directly transmissible from animals to humans. Food producing animals can serve as reservoirs of antibiotic resistant organisms (and their genes) through extensive veterinary use of antimicrobials. This is an especially concern in Bangladesh because of concurrent use of antibiotics in the poultry feed, irrational usage of antimicrobials in disease treatment, unhygienic practice in farming and marketing. The study investigated zoonotic pathogenic bacteria involved in poultry on the basis of serotypes, resistotypes, and genotype. The study was extended towards the drug resistant profile against 15 major groups of common antibiotics, and molecular characterization of possible zoonotic bacteria from poultry samples in Bangladesh. The prevalence of *Salmonella* was found to be 21.1% along with various *Enterobacter* spp. which was the second dominant bacteria isolated from poultry. A large number of plasmid-free *Salmonella* and *Enterobacter* isolates were found to be resistant to 10-15 groups of antibiotics. Some of these multidrug resistant (MDR) isolates also depicted typical phenotype for the presence of extended spectrum beta lactamase (ESBL) production. Antibiotic resistance encoding genes such as *VanA* for Vancomycin resistance and *tem*, *ctx*-M and *shv* for ESBL production, were also detected within the isolates Genetic fingerprinting methods and corresponding sequencing of 16S rRNA gene of representative isolates, detected close similarity to *Salmonella. Typhimurium*, *S.Enteritidis*, *S. Paratyphi*, *Enterobacter cloacae* and *Enterobacter hormaechei* within the poultry samples indicating significant zoonotic hazard. The prevalence of MDR-ESBL isolates in poultry along with their zoonotic relevance implicates that the poultry sector in Bangladesh is at serious risk of zoonotic disease transmission. This may have a negative impact on the bulk economy of Bangladesh.

Keywords: Prevalence, Multi-drug resistance bacteria, Zoonosis, Poultry and Bangladesh

DISTRIBUTION OF BACTERIOCIN PRODUCING *BACILLUS SUBTILIS* STRAINS EFFECTIVE FOR CONTROLLONG PATHOGENIC / SPOILAGE GRAM-POSITIVE BACTERIA IN ASIAN COUNTRIES

*Yasuhiro Inatsu**[1)], Yukie Hosotani[1)], Chiraporn Ananchaipattana [1)], Md Mahfuzul Hoque [2)] and Kong Thong[3)]

[1)] Food Hygiene Laboratory, National Food Research Institute, NARO (2-1-12, Kannondai, Tsukuba, Ibaraki 305-8642, Japan) [2)] Department of Microbiology, University of Dhaka, Bangladesh, [3)] Faculty of Agro-Industry, Royal University of Agriculture, Cambodia

*Corresponding authors e-mail: inatu@affrc.go.jp

ABSTRACT

A variety of fermented soybean foods produced in Southeast and East Asia are used for common seasoning. Some of them are fermented without salt and sun-dried for long-term preservation and other are eaten in raw. Unlike Japanese fermented soybeans of the non-salted type (natto), which are fermented using a pure starter strain of Bacillus (B.) subtilis, naturally occurring microorganisms or seeds (a portion of the product) are used to produce fermented soybeans in other Asian countries. Some B. subtilis strains are known to produce bacitracin or other peptide antibiotic such as bacilysin, sublancin168 and bacilysocin. B. subtilis also produce lysozyme-like- enzyme or phenolic derivatives (such as dipicolinic acid and amicoumacin) which are thought to have antibiotic or bacteriostatic activities. Comparing with the bacteriocins produced by lactic acid bacteria, the antibacterial compounds produced by Bacillus however, have not been studied from the perspective of the application for food hygiene.

We collected fermented soybeans from 10 South-East to East Asian countries and isolated Bacillus subtilis strains that produced typical sticky material. One hundred and thirty four fermented soybean foods were obtained from 27 cities in these countries. Of those, 118 samples consisted of non-salted types of food that included Japanese “Natto”, Thai or Laos "Tua Nao", Cambodian “Sieng”, Myanmar or Chinese "Doucha" and Nepalese "Kinema". About one tenth of total B. subtilis isolates exhibited bactericidal activities to broad range of Gram-positive strains including Listeria monocytogenes and Lactic acid bacteria. These strains isolated from different sources exhibited different RAPD-PCR patterns. The active compound produced at late log to early stationary growth phase was heat tolerant and protease sensitive small peptide. Even they could also produce potent antibacterial compounds, dipicolic acid and lysozyme, their levels were similar to that of the type strain of Bacillus subtilis or commercial strains used for natto production in Japan, which have no antimicrobial activity. The strong antimicrobial compound from isolated B. subtilis strains will be able to use for bio-preservation of food such as lightly fermented vegetables.

Keywords: Bacteriocin, *Bacillus subtilis*, pathogens, spoilage microorganisms, Asian countries

SYNERGISTIC EFFECT BETWEEN HINOKITIOL AND SURFACTANTS (OR TERPENE ALCOHOLS) AGAINST SOME BACTERIA

*Yoshikazu Sakagami**, Takahiro Ozaki and Miho Mori

Faculty of Agriculture, Kinki University, 3327-204 Nakamachi, Nara 631-8505, Japan.

*Corresponding authors e-mail: sakagami@nara.kindai.ac.jp

ABSTRACT

Synergistic effect between hinokitiol and each of three surfactants (or terpene alcohols) used frequently in food, cosmetic and environmental field was performed by the evaluation method with microplate. *Staphylococcus aureus* NBRC 13276, *Escherichia coli* NBRC 3972, *Pseudomonas aeruginosa* NBRC 13275 and *Bacillus subtilis* NBRC 3134 were used as the test bacteria. Hinokitiol, three kinds of polyoxyethylene lauryl ether （blaunon EL-1502.2, blaunon EL-1503P and blaunon EL-1509P） and three kinds of terpene alcohol compounds such as α-terpinene, γ- terpinene and geraniol, were used as the test compounds, respectively.

Hinokitiol possessed the inhibitory effect against the test bacteria. Hinokitiol in combination with polyoxyethylene lauryl ether or terpene alcohol was also indicated the inhibitory effect against the test bacteria. Especially, hinokitiol in combination with 2000 μg/ml of blaunon EL-1509P possessed the synergistic effect. MIC value against the test strains became to 15.6 μg/ml. Two range reduction of MIC value (from 62.5 μg/ml to 15.6 μg/ml) was successful. Hinokitiol in combination with 500 μg/ml of blaunon EL-1509P also possessed the synergistic effect. MIC value against the test strains except for *P. aeruginosa* was also 15.6 μg/ml.

In our test results we found the synergistic effect between hinokitiol and the test surfactant. Combination between hinokitiol of natural compound and surfactant (or terpene alcohol) would be suitable for the control of the bacteria, and would contribute to apply the several field such as food, cosmetic and environmental field etc.

Keywords: Synergistic effect, hinokitiol, surfactants, terpene alcohols, and bacteria

EFFECTS OF FUMIGATION WITH PHOSPHINE GENERATED FROM ALUMINUM PHOSPHIDE ON QUALITY OF BROWN RICE AND PALATABILITY OF COOKED RICE

Kazushi Miyatake[1)], Mamoru Matsusaka[1)], Kenji Mikami[1)], and Toshihiko Takeuchi[2)]

1) Technical Research Laboratory, Kokusai Eisei Co., Ltd.

2) Pesticide Residues Inspection Sec. Central Research Laboratory, Japan Grain Inspection Association

*Corresponding authors e-mail: kazushi_miyatake@kokusaieisei.co.jp:

ABSTRACT

Phosphine (PH_3) generated from aluminum phosphide (ALP) is the primary fumigant used to protect the majority of world's grain and a variety of other stored commodities against insect pests. Many studies have reported the results of PH_3 residue analysis in stored grain after fumigation; however few studies have investigated on the effects PH_3 to quality and palatability in rice. The objective of this study was to evaluate the effects of PH_3 fumigation on quality of brown rice and palatability of cooked rice. Brown rice harvested from two different regions in Japan, 2011, packaged in Kraft paper sacks containing 25kg, were inserted in 0.2m^3 gas-tight exposure chamber and fumigated using 0.6g ALP pellet each, which were based on the applied dosage (1.0g/m^3 of PH_3). Fumigations were carried out for five days at mean of 22 degrees and 54% air relative humidity. Following one hour of post-fumigation aeration, each brown rice was subjected to residue analysis test by Japan Grain Inspection Association. Within 72 hours post-fumigation aeration, no detectable residue of PH_3 or less than 0.01ppm was found in each brown rice analyzed which is the limit of quantification, and was investigated in the following tests.

1) Six physicochemical parameters including germination, water content, protein, amylase, hardness and stickiness was evaluated for PH_3 exposed brown rice.

2) The sensory evaluation of cooked rice was conducted was evaluated using panels of twenty professional members to determine the acceptability. Five parameters including appearance, smell, taste, stickiness, and hardness was evaluated. No significant effects of PH_3 fumigation on the quality of brown rice and palatability of cooked rice was observed throughout the study.

Keywords: Phosphine (PH_3), aluminum phosphide (ALP), fumigation, quality of brown rice, palatability, and cooked rice

HIGH ALKALINE IONIZED WATER WILL SAVE FUTURE GENERATIONS

TAMIO MATSUZAWA

E-Plan Co., Ltd., Japan, (EPCO)

E-Plan Co., Ltd., Japan, (EPCO), 1-17-15 Kitahonnmachi, Funahashi-shi, Ciba, Japan

*Corresponding authors e-mail: t-matsuzawa@e-wash.jp

ABSTRACT

Scientifically, high alkaline ionized water (HAIW) with pH more than 11.5 is proven to have unique capability as strong cleaner, sanitizer and deodorizer competitive enough to relative chemical products even if it is nearly 99.9% pure water. E-Plan Co., Ltd., Japan, (EPCO) manufactures state of the art machine to produce HAIW (with pH12.5 above) patented proprietary electrolyte ionizing technology in pursuit of challenging goal to change concept of safety of food products and to make our eating habit more secured.

History of HAIW is obscure and inarticulate. HAIW as water products are sold with naive and misleading catchwords. Almost no HAIW suppliers promote machines to produce HAIW.

EPCO, while promoting HAIW products with brand name of e-Wash, is striving to develop and supply proprietary, smallest, trouble free, easy to operate and least expensive HAIW producing machine to homes and businesses to be widely used. EPCO's objective is to encourage consumers at homes and users at all kinds of industries and businesses to replace as much chemical products they use as possible with HAIW.

Not all vegetable products can be chemical free and not to make 6.0 billon people on this planet starved. Then wash vegetables with a lot of chemical detergent with full of artificial surfactant hazardous to human, and destroying rivers, lakes and environment by discharging chemicals, consequently make ourselves and future generation sick by consuming attached chemical compounds in the vegetables which we are forced to eat if not safely removed.

EPCO believes solution is HAIW, as it contains full of hydroxide ion with 600 oxidization reduction potential (ORP), working as natural surfactant, sanitizer and deoxidizer, will provide better solution for the safety of food products both at homes and businesses.

Keywords: high alkaline ionized water, strong cleaner, sanitizer and deodorizer, and EPCO.

FUNGI ISOLATED FROM INSECTS COLLECTED IN FOOD-RELATED FACILITIES IN JAPAN

Tomoki SUMINO*, Masaki ARAKAWA, Hiromi MIZUHARA and Yusuke MATSUMI

Teisokasei Co., Ltd., 4005-1 Shiohama, Yokkaichi-shi, 510-0863 Mie, Japan

Tel: 059-325-6431

*Corresponding authors e-mail: tomoki-s@teisokasei.com

ABSTRACT

Insects are potential mechanical vectors and carriers of pathogenic microorganisms. The fungi (eumycetes), associated with insects, may be harmful to humans as an allergen and cause contamination in the food industry. A total of 47 dead or live insects comprising 21 different families were collected from 4 study sites (baking factory, rice cracker factory, rice processing factory and central kitchen) in Japan. The fungi that isolated from the body surface of household or industrial insect pests were evaluated. In this study, 10 genera of fungi (*Cladosporium* spp., *Penicillium* spp., *Alternaria* spp., *Aureobasidium* spp., *Rhizopus* sp., *Aspergillus* spp., *Nigrospora* sp., *Phoma* sp., *Curvularia* sp., and *Fusarium* sp.) were isolated from 35 (74.5%) of 47 collected specimens. These isolated fungi are quite common in human environments. Among the 10 genera of fungi, *Cladosporium* spp. were most frequently found in the study sites. There was almost no correlation between insect body sizes and colony forming units (CFU) (Spearman $r^2 = 0.195$, $p = 0.189$). Dead and live insects may provide an ideal environment for the growth of fungi in food manufacturing environments. Therefore, good sanitary practices, such as thorough cleaning, should be implemented to eliminate household and industrial insect pests.

Keywords: Fungi, Insects, mechanical vectors, carriers, pathogenic microorganisms and food facilities.

DETERMINATION OF FUNCTIONAL PROPERTIES IN DIFFERENT BANGLADESHI FRUITS AND VEGETABLES.

Md. Ashek-Un-Nabi Talukder, Ismail Hossain, M. M. Towhidul Islam, A.K.M. Mahbub Hasan and Hossain Uddin Shekhar*

Department of Biochemistry and Molecular Biology, University of Dhaka, Dhaka-1000, Bangladesh.

*Corresponding authors e-mail: hossainshekhar@yahoo.com

ABSTRACT

Functional properties of a food depends on its capacity to act as a natural antioxidant, by scavenging lipid peroxides and also by the ability of the particular food component to bind fat and sugars efficiently. This study was undertaken to primarily screening out the functional properties of different Bangladeshi food. In this study, the antioxidant properties, total phenolic content, flavonoid and lipid peroxide contents of eight commonly used fruits and vegetables were examined. The ethanol extract of fruits including Amra (Hog Plum - *Spondias dulcis*), Jambura (Grape Fruit - *Citrus maxima)*, Anaros (Pineapple - *Ananas comosus*), and Kamranga (Carambola - *Averrhoa carambola*), and the vegetables including Kolmi Shak (Water spinach - *Ipomoea aquatica*), Lal Shak (Red amaranth - *Amaranthus gangeticus*), Data Shak (Stem amaranth - *Amaranthus lividus*), Korola (Gourd - *Momordica charantia*) were examined. Both the fat and sugar binding capacity was found highest in Anaros and lowest in Amra. Mortality rate of Brine shrimp (*Artemia salina*) nauplii in brine shrimp lethality bioassay at different concentration of fruits and vegetables extract showed that Jambura has the highest cytotoxic effect, killing 100% of the brine shrimp at a very low concentration (0.01 mg/mL), compared to the effect of positive control (0.5 mg/mL of the Vincristine sulfate). In contrast, Lalshak showed lowest (0% and 30% mortality) *in vitro* cytotoxic effect at both 0.01 and 0.1 mg/mL concentration. The Lal shak and Anaros extract significantly reduces lipid peroxide (LPO) levels in the liver tissue homogenates. However, regarding the flavonoids content and phenolic content, Kamranga and Lal shak extracts showed highest flavonoid contents, with mean values of 41.36 and 41.26 mg/gm, respectively. Anaros and Jambura showed lowest flavonoid contents, with mean values of 0.5 and 9.3 mg/gm respectively. The phenolic contents as expressed as gallic acid equivalent (GAE) mg/gm extract showed that Kolmi shak has the highest amount of phenolic compounds (59.33 ± 3.72 mg/gm of GAE) and Anaros has the lowest phenolic contents (11.00 ± 1.33 mg/gm of GAE). Therefore, these primary findings revealed enormous potentiality of commonly consumed Bangladeshi fruits and vegetables in health sectors.

Keywords: Functional properties, phenolic content, flavonoid content, lipid peroxide, cytotoxicity, fruits and vegetables, and Bangladesh.

INDUSTRIAL EFFLUENTS ASSESSMENT AND MANAGEMENT FOR BETTER CROP PRODUCTION

G.K.M. Mustafizur Rahman*, Zebunnesa and M. Mizanur Rahman

Department of Soil Science, Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Gazipur 1706, Bangladesh

*Corresponding authors e-mail: mustafiz@bsmrau.edu.bd,

ABSTRACT

Heavy metals in industrial effluents are huge concern among the academician, researchers, general people, media personnel and policy makers. Therefore, a study was carried out to - assess the quality of industrial effluents; evaluate the impact of effluents on rice production and soil chemical properties; and manage the industrial effluents through bioremediation. The substantial amounts of most of the heavy metals (Fe, Mn, Zn, Cu, Pb, Cd, Cr and Ni) were detected in industrial effluents and also in different grid soils of contaminated command area as compared to control grid, where industrial effluent could not reach. Though, the amounts of heavy metals contained in contaminated soils were not beyond the maximum permissible limit (US Environmental Protection Agency Part 503 regulations) but exerted toxic effect on the yield of rice. The concentrations of heavy metals in rice grains were still below the maximum levels as stipulated by the Malaysian Food Act (1983) and Food Regulations (1985). An investigation was also carried out to evaluate the feasibility of bioremediation of industrial effluents contaminated soils by *Trichoderma* suspended solution and *Trichoderma* enriched compost. Satisfactory growth of bacteria and fungi were observed in culture media and availability of toxic metal was reduced in contaminated soils. The reduction of heavy metals was reflected in removal of their availability in treated soil. Significant change was achieved after imposing treatment in contaminated soil. Decreasing trends of the availability of heavy metals clearly confirmed the efficacy of bioremediation through *Trichoderma* suspended solution and *Trichoderma* enriched compost. The judicious remediation of heavy metals of industrial effluent contaminated soil with soil microorganisms is a sound practice for industrial effluents management and using as a healthy organic fertilizer for improving soil health and better crop production.

Keywords: Heavy metals, industrial effluents, rice production and soil chemical properties; and bioremediation.

PHENOLIC COMPOUND ANALYZATION OF THAI PIGMENTED RICE

Wanida Tewaruth[1*], Pramuan Saithong[2], Siriporn Stonsaowapak[2] and Putaluk Khaiprapai[3]

[1]Department of Nutrition and Health, [2]Department of Applied Microbiology, [3]Food Quality Assurance Services Center, Institute of Food Research and Product Development (IFRPD), Kasetsart University, 50 Ngamwongwan Road Chatuchak Bangkok 10900, Thailand

*Corresponding author's e-mail: ifrwnd@ku.ac.th

ABSTRACT

There are many rice varieties in Thailand and some variety was ignore to consume especially the pigmented rice while it may contain some healthy compound. This research was aimed to analyze phenolic compound in four local pigmented rice varieties in Thailand. Four varieties of pigmented rice (*Oryza sativaI* L.) including Sung-Yod rice (SYR), black jasmine rice (Hom-Nil rice, HNR), red jasmine rice (Hom-Dang rice, HDR) and black glutinous rice (Kum rice, KR), were studied for the phenolic compound. The non-polished grains of each varieties were extracted by acidic methanol (85% methanol: 15% 0.1N HCl) mixture for 2 hours. The pallets of each samples were extracted repeatly then two parts of extracted solutions were combined. Each extracted solutions were evaporated and the crude extract were kept at 4ºC. Total phenolic content of the samples were analyzed by Folin-Ciocalteu assay and the phenolic compound for each crude extracts were identified by using reverse phase C-18 column chromatography with high performance liquid chromatography (HPLC). Vanillic acid, caffeic acid, syringic acid, *p*-coumaric acid, gallic acid and ferulic acid were used as standard phenolic compound for HPLC analysis. Total phenolic content, from Folin-Ciocalteu assay analyzation, in crude extracts showed minimum of 578 µg gallic acid/ g and maximum 2346 µg gallic acid/ g on dry-weight basis. The HPLC analysis results revealed that different rice varieties are composed of different major phenolic compound. The major phenolic compound of SYR and HDR rice varieties were ferulic acid, HNR rice varieties was vanillic acid and KR rice varieties was *p*-coumaric acid. Among the four pigmented rice varieties, KR varieties contains highest phenolic compound followed by HNR, HDR and SYR, respectively.

Keywords: Pigmented rice, Phenolic compound, Thai rice, and high performance liquid chromatography (HPLC)

SHELF-LIFE EXTENSION AND INHIBITION OF UNDESIRABLE BACTERIA IN STEAMED MACKEREL FISH PRODUCT BY LACTIC ACID BACTERIA

Pramuan Saithong[1*], Siriporn Stonsaowapak[1], Wanida Tewaruth[2] and Wilai Noonpakdee[3]

[1]Department of Applied Microbiology, [2]Department of Nutrition and Health, Institute of Food Research and Product Development (IFRPD), Kasetsart University, 50 Ngamwongwan Road Chatuchak Bangkok 10900, Thailand

[3]Department of Biochemistry, Faculty of Science, Mahidol University, 272 Rama VI Road, Ratchathewi, Bangkok 10400, Thailand

*Corresponding author,s e-mail: ifrpmst@ku.ac.th

ABSTRACT

Steamed mackerel fish (SMF) is a unique main dish food in Thailand. The SMF exported to Muslim countries has increased steadily. The shelf-life of SMF is very short (less than 3 days) at room temperature (RT) due to the spoilage caused by undesirable bacteria. Therefore, extension of shelf life of SME by reducing the spoilage bacteria will greatly enhance these food products to export in Muslim countries. In this study, *Lactobacillus plantarum* PMU33 and *Lactococcus lactis* WNC20 which, produced bacteriocin (plantaricin W and nisin Z) were able to extend the shelf-life of SME and reduce spoilage at RT. The results showed that mixed strains of lactic acid bacteria (LAB) with the ratio of 1:1 in SMF boiled water + 1% glucose as a medium at 35°C for 72 h, is optimal for bacteriocin producing condition. After 72 h, the pH of LAB liquid culture was lower than 3.12 and the viable cell count reached to $3.0x10^7$ CFU/ml. When SMF was dipped in LAB liquid culture containing initial LAB load was $3.0x10^3$ CFU/g for 3 min, the shelf life extended more than 20 days at RT, while retain its color, flavor and texture. The sensory evaluation of SMF dipped in LAB liquid culture and the SMF collected from market were performed by 10 panel member selected from Institute of Food Research and Product Development, Kasetsart University. The results of the sensory evaluation revealed that the appearance, color, odor, texture and overall acceptability of SMF dipped with LAB liquid culture was more acceptable than the market collected SMF. Therefore, the result of this study suggested that dipping SMF in bacteriocin producing LAB liquid culture for 3 min could be able to extend the shelf life of the products at room temperature and thereby will enhance export marketing.

Keywords: Steamed mackerel fish, Shelf-life extension, Bacteriocin, and Lactic Acid Bacteria.

A CONSIDERATION ON THE "PROCEDURES HOW TO EXPORT FISHERIES PRODUCTS TO EU" LAID DOWN BY JAPANESE GOVERNMENT.

*Ayako OKADA**

Tokyo University of Marine and Science Technology, #1012, 5-3-3 Minatomirai, Nishi-ku, Yokohama, Japan 220-0012.

*Corresponding authors e-mail: okada.is.aya@gmail.com

ABSTRACT

Japan, once being a kingdom of fisheries industry, is now ailing in its entire industry. Besides, shrinking domestic market, due to declining birthrate and aging of society, forces Japanese fisheries business operators to face unavoidable challenges at reinforcing their business and expanding to the world.
Comparing with exporting procedures from other Asian countries to EU, however, it is overall understanding within the industry that exporting from Japan to EU is somehow much more difficult.

In this study, aiming to reinforce the Japanese fisheries industry through expanding their market, a research on the preventing factors from Japanese fisheries business operators' exporting to EU has been conducted through literarily comparing the "Procedures How to Export Fisheries Products to EU" laid down by Japanese government with its original laws, and EU regulations. The results have been verified through interview with Malaysian government officials on this issues and also documental comparisons with the American governmental seafood inspection program. As a result, it indicated that, at the "Procedures How to Export Fisheries Products to EU", some concepts are over-interpreted and some requirements at the original EU regulations are missing, and also it revealed that the inspection system by Japanese officials including the inspectors' training are needed to improve the situations.

Keywords: Procedures, Export, Fisheries Products, Japan and EU.

EVALUATION OF VIRULENCE POTENTIALS OF LOCAL BOVINE *ESCHERICHIA COLI* O157:H7 ISOLATES FOR CAUSING OUTBREAKS IN BANGLADESH

Fazle Rabbi[1], Mahmuda Yasmin[1], Jamalun Nessa[1], Yoshimitsu Otomo[2], and Chowdhury R. Ahsan*[1]

[1] Department of Microbiology, University of Dhaka, Dhaka-1000, Bangladesh; [2] Division of Medical Life sciences, Graduate School of Health Sciences, Hirosaki University, Aomori 036, Japan

*Corresponding authors e-mail: crahsan@yahoo.com

ABSTRACT

Escherichia coli O157:H7 is responsible for many outbreaks worldwide. Until recently, no comparative study between environmental and clinical strains of *E. coli* O157:H7 has been reported in Bangladesh. In this present study, two environmental isolates (CD-11 and CD-17) of bovine origin and a reference clinical strain were investigated for the presence of virulence genes by PCR, VTEC-RPLA, Congo red binding, Sereny's kerato-conjunctivitis, enterotoxic, cytotoxic, and mouse lethal activities. Both CD-11 and CD-17 showed the presence of *eaeA* and *stx*$_2$ genes and were found to be non-invasive as has been revealed by the Congo red binding and Sereny's kerato-conjunctivitis assays. The isolates also produced enterotoxin, cytotoxin and mouse lethality similar to that found with the reference clinical strain. All these results strongly suggest that the environmental bovine *E. coli* O157:H7 isolates have potentials to cause diseases similar to clinical *E. coli* O157:H7 strains, which might lead to any outbreak in Bangladesh.

Keywords: Virulence, Bovine *E. coli* O157:H7 isolates, outbreaks, Bangladesh.

RAPID DETECTION OF *SALMONELLA* IN FOODS USING PCR-BASED DETECTION KIT

*Teresita J. Ramirez**[1], Ma. Teresa M. Perez[1], Susan A. Sedano[1], Arsenia B. Sapin[1], Rachel R. Elano[2], Lydia S. Manguiat[3], Mylele L. Bool[4], Cyril M. Madrid[5], Elizabeth C. Conde[6] and Ruby J. Apilado[7]

[1]National Institute of Molecular Biology and Biotechnology (BIOTECH), University of the Philippines Los Baños (UPLB), College, Laguna,[2] Food Development Center, FTI Complex, Taguig, Metro Manila, [3] Regional Standard and Training Laboratory, DOST Region IV, Los Baños, Laguna, [4]Philippine National Collection of Microorganisms, UP Los Baños, College, Laguna, [5]Progressive Laboratories, 149 Dangay St., Project 7, Quezon City, [6]Lipa Quality Control Center, Lipa City, Batangas. [7]Food and Nutrition Research Institute, DOST, Taguig City

*Corresponding authors e-mail: tessjram@yahoo.com

ABSTRACT

The current study validates a rapid PCR-based detection method and developed at BIOTECH-UPLB in comparison with the traditional AOAC/BAM culture method involving enrichment step and plating in selective media. The kit consisted of reaction tubes containing selected primer set for *Salmonella*. The protocol includes two-step enrichment period, DNA extraction and amplification of DNA in a thermal cycler followed by gel electrophoresis procedure.

Validation of the detection kit was done on both naturally-contaminated processed and artificially-spiked food samples with the assistance of some government and private institutions. Results from 185 non-spiked samples categorized into 14 groups revealed 100% agreement in all the sample categories except with flours, gums and gelatin (90%). This gives specificity value of 1.00 in all food groups except with flours, gums and gelatin (0.86). Of the 459 samples analyzed, perfect agreement was obtained in both high and low inoculum levels in the following food groups/categories: coconut and processed coconut products, dairy products, flours, gums and gelatin and spices. Significant difference (x^2.>3.84) was observed only for the following food groups/categories with low inoculum: bakery products; egg and egg products; and for both high and low inoculum levels for processed fish and sea foods. The kit has sensitivity of 10^4 cells per ml.

Results obtained from the nine collaborating laboratories with 314 total samples analyzed showed agreement values ranging from 81.25 to 100%, with no significant difference between the two methods employed. The kit can be recommended for food products found in this study to be compatible with *Salmonella* DAS™ kit and result can be obtained within 26-28 hours. The PCR-based kit produced definite results without any confirmatory tests and is relatively easy to use over the culture method. The shorter analysis time makes the kit ideal for use in food industry.

Keywords: *Salmonella*, PCR-based kit, DNA-based kit

MOLECULAR CHARACTERIZATION OF INDIGENOUS *BACILLUS THURINGIENSIS KURSTAKI* ISOLATES WITH EFFECTIVE PESTICIDAL ACTIVITY AGAINST *BACTROCERA CUCURBITAE* FROM BANGLADESH

Md. Asaduzzaman Shishir[1], Asma Akter[1], Md. Bodiuzzaman[1] Nasima Aktar[1]Md. Mushfiqur Rahman, [2]Dr. Md. Shakil, [1]Mohammad Ilias, [1]Dr. Shakila Nargis Khan, [*1]*Md. Mozammel Hoq** [1]Department of Microbiology, University of Dhaka , Dhaka -1000, Bangladesh. [2]Atomic Energy Establishment, Savar, Dhaka, Bangladesh.

*Corresponding Authors e-mail: mmzhoq@gmail.com,

ABSTRACT

The indiscriminate use of agricultural pesticides has created serious health and environmental problems in many developing countries including Bangladesh. On the other hand, *Bacillus thuringiensis kurstaki (Btk)* has long been used commercially as pest control agents particularly against lepidopteran vegetable pests. In this study, new potential *Btk*-like isolates were collected from different sources (viz. soil, leaves, insects, stored product dust etc.) and regions of Bangladesh. Acetate selection- heat treatment- lecithinase production and haemolytic activity were initially performed to narrow down the spectrum for selection of *Btk*-like isolates. Specific biochemical tests (Es^+, Sa^+, Le^+, Su^-) were performed to differentiate *Btk* from other subspecies. Based on these tests, of 103 Bt isolates, 38% (39 Bt isolates) were confirmed as *Bt kurstaki* isolates. The 39 isolates were investigated for the presence of *cry1*, *cry1A* and *cry2A* genes by PCR identification with gene specific primers and demonstrated some level of diversity with respect to major genes content in the strains. Nine of the isolates were found to carry all three genes while another nine contained both *cry1* and *cry2A* genes. Twenty nine, 22 and 16 of the isolates contained singly *cry1, cry2A* or *cry1A* gene respectively. Plasmid DNA was purified which ranged from 15-30 kb in most of the isolates which were very similar to the plasmid pattern of *Btk* HD-73. Bioassay was performed with the isolates harbouring Lepidoptera specific *cry1A* genes against vegetable pest *Bactrocera cucurbitae*. Five of the isolates having higher activity than *Btk* HD-73 were considered for determination of LC_{50} and LC_{90}. The results will be a useful basis for developing effective bio-pesticides to decrease the use of hazardous chemicals in Bangladesh agriculture.

Keywords: Molecular characterization, *Bacillus thuringiensis kurstaki (Btk*), pesticidal activity, vegetable pest, Bangladesh

EARTHQUAKE-CAUSED TSUNAMI, INFECTION AND NUCLEAR PLANT ACCIDENT IN JAPAN

*Jin-ichi Sasaki**

Department of Medical Technology, Hirosaki University School of Health Sciences, 2-7-1 Nishi-Aoyama, Morioka, 020-0132, Japan

*Corresponding Author's e-mail: jnsasaki@tk2.so-net.ne.jp

ABSTRACT

At 14: 46 on March, 11th, 2011, Fukushima, Miyagi, Iwate Pref. and surrounding area were hit by the un-experienced huge earthquake with M 9.1, followed by the deadly attack of tsunami waves with an estimated height of 34m. It devastated most of northeastern coast and a number of victims involved deaths and missing counted over 25,000. As aftermath; 1) Infection of outbreaks of *Noro virus, Legionella, Cl. Tetani, Rickettsia* spp. were among the evacuated inhabitants in gymnasiums that were not under good living conditions 2) High levels of arsenic contamination had been detected in mud washed ashore in coastal areas by tsunami. Quantities of arsenic exceeding government safety levels were detected in 36 out of 129 sampling points in the northeast Tohoku region. 3) The most serious catastrophe due to tsunami was explosion of the Nuclear Power Plants in Fukushima that had scattered radioactive materials. Residents living within 20km radius from the power plants explosion were force evacuated to other areas. Residents living in the close area to the exploded power plant were exposed to radionuclides by inhalation or ingestion of contaminated air, drinking water, foods and foodstuffs. Some of the cattle were relocated to safer places to avoid contamination, and unmovable livestock and pets starved to death. We are still in the middle of tsunami's post-effects due to radioactive issues, piles of debris by tsunami, housing problem for evacuates, etc. The present situation of catastrophe and problems that are facing due to tsunami issues which could occur in any place at any time in the world will be focused in this manuscript.

Keywords: Tsunami, Earthquake, Infection of outbreak, Nuclear plant, Explosion

FIRST CASE OF ISO22000 CERTIFICATION IN PCO (IN JAPAN)

*Hiroshi Yokoyama** and Masataro Suzuki

2-5-11, Sato, Naka-ku Hamamatsu-shi, Shizuoka, 430-0807, Japan

Corresponding Author's e-mail: labo@maruma-ec.co.jp

ABSTRACT

Recently, the levels of consciousness to the food safety of consumers are increasing. It is necessary for the companies engaged in food manufacture to provide safer products in connection with it. ISO22000 is a management system for producing safe foods. In this management system, candidate organizations do not limit to the companies which manufacture food directly, but are taking in broadly to the food chain "farm-to-fork" from growing, harvesting, storage, processing, manufacturing, and distributing food for consumption.

We prevent and exterminate the insect pests and the harmful animals as a pest control contractor. However, we aim "comprehensive environmental control" and we try to prevent of the food poisoning by the microbiological control which is the true purpose of pest control in the food manufacture. For the reason, we have the service goods, pest control, food inspection, water quality inspection, feces examination, and consulting service (sanitary training program etc.).

We received ISO22000 certification in a pest control and in a part of food inspection, in connection with the insect fauna investigation which is identification and the countermeasure proposal of the insect captured on the traps, with the prevention and extermination of the insect pests and the harmful animals, and with sanitary diagnosis which is based on check of the food manufacturing environment (microbiological testing for the food and the environment, check of equipment and apparatus, the management state of 5S). The harm factors, called the hazard, to the food in each process of our operation were extracted, and the countermeasures were made. In ISO22000, CCPs (critical control point) and O-PRPs (operation-PRP) are set up. However, we make sanitary environment rather than food. Therefore, there is no CCP in our system and we decided to manage a hazard only by O-PRP.

Keywords: ISO22000 Certification, critical control point, hazard, operation-PRP and Japan

BEHAVIOR OF *LIPOSCELIS BOSTRYCHOPHILA* (PSOCOPTERA: LIPOSCELIDIDAE) UNDER DARK CONDITION

Goro KIMURA[1*)], Akihiro MIYANOSHITA[2)] and Tsutomu TANIKAWA[1)]

[1)] Technical Research Laboratory, IKARI Corporation 579 Chibadera, Chuoku, Chiba 2600844, Japan; [2)] National Food Research Institute, NARO 2-1-12 Kannondai, Tuskuba, Ibaraki 305-8642, Japan

*Corresponding author's e-mail: giken@ikari.co.jp

ABSTRACT

Psocids (Psocoptera) are major pests of stored products. Psocids belonging to the genus *Liposcelis* increasingly infest stored products because of the measurable weight losses, allergic reactions, health concerns, and contamination of food materials with fecal material and exuviae. Many studies have been conducted on management of psocid, but few detailed studies have been conducted on their biology. The objective of our study was to evaluate the dispersal ability of the *Liposcelis bostrychophila* by release and recapture method. After two weeks of release, almost psocids were recaptured by sticky traps within 1.0m from release point. One psocid was recaptured 4.0m distance from release point. No psocids were recaptured 5.0m distance from release point. In addition, the results of capture were not changed after four weeks of release. These results suggest that psocids do not disperse positively under dark condition.

Keywords: Behavior, Psocoptera: Liposcelididae, allergy, health hazard and dark condition

THE FACILITY MANAGEMENT PENETRATED TO THE LIFE CYCLE OF THE INSTITUTIONS AND EQUIPMENTS IS THE MAIN CURRENT IN FUTURE.

Sigeru Nakayama* and Toshiya Kaihara
1-4-22-318, Nakazaki-Nisi, Kita-ku,OSAKA 530-0015 JAPAN
Phone: 06-6131-4572
*Corresponding author's e-mail: k-ao@hera.eonet.ne.jp

ABSTRACT

In low-growth like these days, people's consciousness to the environmental consideration is growing also consumers demand the food-safety and food-confidence. Consumer needs becomes diversity, though the sales life is shortened. Under such circumstances, it is necessary not only to reduce the construction budget but also to focus on the institution as an operational resource when you construct a new building or reform it or repair it. According to this idea, the most important subject to maintain the company sound is how you activate the operational resource efficiently and effectively by cutting down the LCC.

The initial construction cost of ordinary institution is only 1/4 of whole cost from groundbreaking to scrap. In order to reduce the LCC, the company should have the mid-term and long-term prospect, such as ten years or twenty years terms, and also should improve the institutions and equipments' functions suitably and usefully.

Furthermore, those operational resources should be positively renovated to decrease the energy consumption in order to reduce the LCC with the latest technology and within the change in price of energy resources.

Keywords: people's consciousness, environmental problems, consumers demand, food-safety and food-confidence

EFFECTIVE FOOD SAFETY AUDIT FOR RESTAURANTS

*Yumiko HIRAI**

Osaka Seikei College, 1119-4-104, Matsukage Ookubo-cho, Akashi-City, Hyogo, JAPAN

*Corresponding author's E-mail: yumi.pingjing@gmal.com

ABSTRACT

The basics of food hygiene is hand washing. This is an undoubted fact, however, upon restaurant audits, ratio of issues related to food control and kitchen equipment management is much higher than personal hygiene as hand washing, and moreover, its improvement measures require a long time in reality. Therefore, even if personnel keep a rule of personal hygiene such as hand washing, food control and kitchen equipment management issues may cause food borne illness. To perceive the food borne illness possibility, specific audit items and timing becomes the key.

In other words, when, where, and how should the audit take place?. Audit results change in accordance to the criteria. In order to fully understand the audited organization's current situation, we need to define the exact timing and audit items to address the audited organization in question. The findings from the restaurant audits and guidance are as follows:

- Audit is preferred during the actual working hours.
- Key audit point for food control is to check the existence of cross contamination and food temperature.
- Key audit point for kitchen equipment is 5S, especially on cleaning and washing.
- Audit items should be customized accordingly to the target. The same audit format should not be applied under a restaurant category.

Keywords: Food hygiene audit, hand washing, restaurant audits, food control and kitchen equipment management

GEO-REX RAPID ANALYSIS ASSESSMENT OF HEAVY METALS IN THE RICE, PADDY-RICE AND SOILS.

*Akiyoshi SAWABE** [1], Kazuaki NAKAGAWA [1], Ryuji TAKEDA [1], Akira Iida [1], Sadao KOMEMUSHI [2], Satoshi TAMAKI [3] and Koichiro IWASA [3]

[1] Faculty of Agriculture, Kinki University, 3327-204, Nakamachi, Nara-shi, 631-8505, Japan, [2] Graduate School of Engineering, Osaka City University, 3-3-138 Sugimoto Sumiyoshi-ku, Osaka-shi, 558-8585, Japan, [3] Sekisui Chemical Co., Ltd., 2-2 Kamichoshi-cho, Kamitoba, Minami-ku, Kyoto, 601-8105, Japan,

*Corresponding author's e-mail: sawabe@nara.kindai.ac.jp

ABSTRACT

Geo-REX is a powerful tool for analyzing the heavy metals in soils and plants. Since 2005 we developed our new micro cartridge type compact heavy metal measuring system "Geo-REX " that did not use mercury at all to enable soil and plant analyses for on site and measured heavy metals of the whole soil or plant extracts. As for this new instrument, the detection department fits into a microcartridge entirely. After injected a 5ml of sample in a cartridge, it is automatic. A new instrument can change a cartridge at every analysis. Geo-REX can measure noxious heavy metals, Pb, Cd, As, Se, Hg, by exchange of a specific cartridge.

Recently, the cadmium of paddy-rice and the heavy metals of the soils have become an important issue in Japan. In particular, land pollution investigation must be conducted more rapidly. In the official methods, a water dissolution test for 24 hrs is used. Quantitative analysis of heavy metals is performed by Atomic Absorption Spectrophotometry (AAS) or Inductively Coupled Plasma spectroscopy (ICP). However, it takes several days until preliminary treatment and the measurement results are available.

In this study, we compared the official method using AAS or with our new quick heavy metal measuring system based on voltammetry method. Then we considered whether analysis of cadmium on paddy-rice investigation was possible. As for the measurement of heavy metals by microcartridge type electrochemistry analysis machine, measurement was possible in lower than 10ppb which was Japanese reference value easily, and manipulation were simple and easy.

Keywords: Geo-REX, rapid analysis, heavy metals, paddy-rice, plants and soils**.**

DEVELOPMENT OF CHHAIPOV PAAEM (SWEET RADISH) PROCESSING IN KANDAL PROVINCE, CAMBODIA

Dyna THENG*, Bunthan NGO, Lytour LOR, Rithy CHRUN,and Chim CHAY Royal University of Agriculture, Chamkar Daung, Dangkor district, Phnom Penh, Cambodia

*Corresponding Authors E-mail: dyna_rua@yahoo.com

ABSTRACT

This study was designed (i) to identify technical issues and constraints in conventional sweet radish processing; (ii) to analyze microbial quality of sweet radish produced by sweet radish processors and trial products; and (iii) to evaluate the quality of sweet radish and trial products using sensory evaluation. It has been observed that there are some technical issues during the routine processing of sweet radish, including inadequate washing to remove adhering dirt; lack of separation of processing areas and workers living area; peeled radish kept in areas where animals were raised. In addition, other problems reported including, lack of finance, lack of raw materials, lack of processing areas and processing materials, and lack of markets. The microbial analysis results revealed that no significant differences in total microbial counts, fecal coliform and *E. coli* count in the products processed by sweet radish processors in Kandal province and the trial experiment products. No significant differences were also found in the sensory evaluation between the products produced by Kandal province processors and the products produced under experimental conditions. The sensory panelist evaluated color, odor, flavor, texture, and general characteristics of the two sources of processed sweet radish.

In conclusion, the sweet radish produced using conventional practices by the Kandal province processors was regarded as satisfactory, despite some issues and productions constraints, including unhygienic processing conditions. This finding reflects the fact that the salt and sugar used during processing act as food preservatives, which limit the bacterial growth. However, improvement of processing facilities and hygienic conditions further improve the market needs.

Keywords: sweet radish, processing, quality and hygiene

COMPARISONS OF ANTIOXIDANT CAPACITY, PHENOLICS, AND FLAVONOIDS IN ECO-FRIENDLY CULTIVATED AND CONVENTIONAL CULTIVATED RICE

Dalin Ly[1*] and Seong -gene Lee[2]

[1]Royal University of Agriculture, Dangkor District, Phnom Penh, Cambodia, P.O. Box 2696

[2]Department of Biotechnology, Chonnam National University, Gwangju, Republic of Korea

*Corresponding Author's E-mail: dalinely@rua.edu.kh

ABSTRACT

Phytochemicals are extensively found at different levels in various plants and are widely recognized for their role in scavenging free radicals, which are involved in the ecology of many chronic diseases. Secondary metabolites play an important role in plant defense mechanism, and increasing evidences indicate that many are important in human health. In this study, the levels of total phenolic content, flavonoid content and antioxidant activities based on oxygen radical absorbance capacity (ORAC) values in eco-friendly cultivated and conventional cultivated rice are conducted to compare in various extracted solvents: water, 80% acetone, 80% ethanol, and 80% methanol. The data analysis results revealed that the eco-friendly cultivated and unpolished rice were consistently found to have higher level of phenolic content, flavonoid content and ORAC values as compared to conventional cultivated and polished rice. There were positive correlation between antioxidant activity and phenolic content of rice were evident. The correlation coefficient of R^2 = 0.96, R^2 = 0.93, R^2= 0.97 and R^2= 0.96 with water, 80% acetone, 80% ethanol, and 80% methanol extracts, respectively were found. In addition, the correlation coefficients between flavonoid content and ORAC values of rice were also highly related with various extracts (R^2= 0.96-0.98). Among the applied solvent, the water, 80% acetone and 80% ethanol were found more effective for phenolic content, flavonoid content and antioxidant measurements, respectively.

Keywords: Antioxidant capacity, Phenolics, Flavonoids, Eco-friendly cultivated rice and Conventional cultivated rice.

ANALYTICAL SURVEY ON AFLATOXIN B1, OCHRATOXIN A, FUMONISIN B1 AND FUMONISIN B2 OF CAMBODIAN RICE

Dalin Ly[1*], Sarom Men[1], Vibol San[2], Noel Durand[3], Jean-Claude Manez[3] and Didier Montet[3]
[1]Royal University of Agriculture, Dangkor District, Phnom Penh, Cambodia, P.O. Box 2696;
[2]Royal University of Phnom Penh, Russian Federation Blvd. Tek Laak 2 Commune, Tuol Kork District, Phnom Penh, Cambodia, P.O. Box 12157;
[3]UMR Qualisud, Centre de Coopération Internationale en Recherche Agronomique pour le Développement, CIRAD, 34398 Montpellier Cedex 5, France.
*Corresponding Author's E-mail: dalinely@rua.edu.kh

ABSTRACT

An analytical survey of mycotoxins was carried out by collecting 40 paddy rice samples during harvest and storage stage from two large rice producing provinces namely Prey Veng and Takeo of Cambodia. On the other hand, 20 milled rice samples collected from four markets (Kandal, Oreusey, Beungkengkang and Chbar-ampov) in Phnom Penh were also studied. Moisture contents were measured and samples were dried until moisture content raised to 13%, after that the samples were packed in poly-ethylene plastic bag before exporting to CIRAD in France to analyze for aflatoxin B1, total aflatoxins, ochratoxin A, fumonisin B1 and fumonisin B2 using immunoaffinity column and HPLC. These toxins were extracted using a mixture of 80% methanol and 20% water, then the extracts were purified and the quantification was done by HPLC with fluorescent detection column. The analytical results revealed that one sample (1.67%) out of 60 rice samples was contaminated by fumonisin B1 and B2 at 0.8 µg/kg and 0.1 µg/kg, respectively. One milled rice sample was contaminated with aflatoxin B1 and total aflatoxins with the same levels of 0.75 µg/kg. Contamination levels of aflatoxin B1, total aflatoxins, fumonisin B1 and B2 were found in some samples but the amounts of contaminations were below the European Union detection level (regulation No. 1881/2006). Therefore, this study results demonstrated that Cambodia rice (paddy and milled rice) was in good quality and were safe for consumption in local and/or international consumers.

Keywords: Analytical survey, aflatoxin B1, ochratoxin A, fumonisin B1 and B2, Cambodian Rice

PREVALENCE OF FOODBORNE PATHOGENS AND SPOILAGE BACTERIA IN RETAIL FOODS PURCHASED IN THAILAND

Chiraporn Ananchaipattana*[1,2], Yukie Hosotani[1], Susumu Kawasaki[1], Bari Md. Latiful[3], Seiichiro Isobe[1,2] and Yasuhiro Inatsu[1]

[1]National Food Research Institute, National Agriculture and Food Research Organization, 2-1-12 Kannondai, Tsukuba, Ibaraki, 305-8642, Japan

[2]Graduate School of Life and Environmental Science, University of Tsukuba, 1-1-1 Tennodai, Tsukuba, Ibaraki, 305-8577, Japan

[3]Center for Advanced Research in Sciences, University of Dhaka, Dhaka-1000, Bangladesh

*Corresponding Author's E-mail: chiraporna@hotmail.com

ABSTRACT

The prevalence of foodborne pathogens or food spoilage bacteria in retailed foodstuffs that causes diarrheal diseases or quantity / quality loss of foods were determined in this study. Four categories of 137 raw food samples (meat, vegetable, fish or sea food and fermented food) and 133 soy bean curd (tofu) (packaged and unpackaged) were purchased randomly from 14 open markets and 7 supermarkets in Thailand from August 2010 to January 2012. Twelve kinds of foodborne pathogens and food spoilage bacteria were identified using conventional culture methods and/or immunological / molecular biological methods. More than 85% of each raw food samples except for fermented foods was contaminated with coliform bacteria and 53 % of 270 samples were contaminated with Escherichia coli. However, no E. coli O26, O157 or O111 strain was isolated except for one E. coli O157:H7 strain (stx 1 and 2 negative) from 173 E. coli isolates. Sixty seven percent of meat samples were contaminated with Salmonella spp. In contrast, the contamination rate of Salmonella spp. in vegetable (5%), fermented food (9%) or tofu (4%) samples was comparatively low. The contamination rate of Salmonella spp. in meat, fish or sea food and tofu purchased in open markets was higher than those purchased from supermarkets. The frequently encountered Salmonella spp. isolated from all the samples was Salmonella Corvallis (9.6%) and S. Rissen (8.5%). Seven strains of Cronobacter sakazakii were isolate from 5 categories of foods except fermented foods. One strains of Yersinia enterocolitica serotype 0: 5 were also isolated from tofu. Two Listeria monocytogenes strains were isolated from chicken and ground pork samples. The highest contamination rate of Bacillus cereus was observed in fermented food (82%). Ninety one Staphylococcus spp. including 1 S. aureus (coagulase negative) strains were isolated from all the collected samples. The contamination rate of Staphylococcus spp. in fish or sea food and vegetable purchased in open markets was likewise higher than those purchased in supermarkets. Seventy nine percent (79%) of total sample was contaminated with Enterococcus spp. and 5 % of the isolated Enterococcus spp. were able to grow on VR-EF antibiotic agar and were drug resistance strain. One hundred and thirty four Salmonella spp. isolates exhibited resistance to one to thirteen kinds of antibiotics, in 15 antibiotics tested. These results suggested the implementation of good hygienic practices were required to reduce the risk of food poisoning and food spoilage loss.

Keywords: Prevalence, foodborne pathogens, spoilage bacteria, retail foods, Tofu, Thailand.

EFFECT OF VACUUM PRE-COOLING ON QUALITY PROPERTIES OF BROCCOLI AFTER HARVEST COMPARED WITH OTHER CONVENTIONAL COOLING METHODS

Tian Ding, Fen Liu, Xing-Qian Ye, Jian-Wei Zhou, and Dong-Hong Liu*

Department of Food Science and Nutrition, School of Biosystems Engineering and Food Science, Zhejiang University, Hangzhou, Zhejiang 310058, P.R. China

*Corresponding Author's E-mail: dhliu@zju.edu.cn

ABSTRACT

Vacuum pre-cooling technology has potential to be used in post-harvest storage of vegetables by removing field heat rapidly. In the current study, the efficiencies of different cooling methods (vacuum cooling, cooling water, and cold room) and the quality properties of broccolis with pre-cooling treatments were compared. The results indicated that vacuum cooling treatment was the most effective method to extend the shelf life of post-harvest broccolis through the investigation of cooling rate, respiration rate, chlorophyll, vitamin C, reducing sugar, and sensory properties. Besides, by means of applying water-spraying on broccolis during vacuum cooling process, the weight loss was significantly reduced which was slightly higher than that resulted by the other two cooling methods and it did not negatively affect the quality of broccolis. Consequently, vacuum pre-cooling treatment can be applied on vegetables after harvest in the field to maintain the quality during transportation and storage. Also, the application of water-spraying in vacuum cooling technology can considerably reduce the negative influence caused by vacuum pre-cooling.

Keywords: Vacuum pre-cooling, broccoli, post-harvest storage, cooling water.

GROWTH, INACTIVATION AND TOXIN PRODUCTION OF *BACILLUS CEREUS* IN COOKED RICE UNDER DIFFERENT TEMPERATURES

Jun Wang1, Seung-Ya Yang, Hyeon-Kyung Ham, Myoung-Su Park, Xi-Hong Zhao, Joong-Hyun Park, Fereidoun Forghani, Gwang-Hee Kim, Bo-Geum Park and Deog-Hwan Oh*
Department of Food Science and Biotechnology and Institute of Bioscience and Biotechnology, Kangwon National University, Chuncheon, Gangwon 200-701, Republic of Korea
*Corresponding Author's E-mail: deoghwa@kangwon.ac.kr

ABSTRACT

Bacillus cereus is capable of producing enterotoxin and emetic toxin that cause severe nausea, vomiting and diarrhea. The objective of this study was to investigate the effect of temperature on the growth, inactivation and toxin production of *B. cereus* in cooked rice. Inoculated cooked-rice samples were stored at 15, 25, 35 and 45°C for the growth and toxin production of *B. cereus*, while inoculated samples (with/without 2-day storage at 35°C) were treated at 80, 90 and 100°C for inactivation and toxin destruction of *B. cereus*. The results indicated that production of emetic toxin was faster than enterotoxin production (no detection below 15°C) at all the storage temperature (15-45°C) within 72 h. On the contrary, emetic toxin were unable to be destroyed by heat treatment (80-90°C), while enterotoxin was easily to be removed. In addition, *B. cereus* was more difficult to be inactivated by heat treatment after storage since they have already made thermostable spores. This study can provide valuable and reliable information for preventing the food poisoning illnesses and establishment of risk assessment associated with *B. cereus*.

Keywords: Growth, Inactivation, Toxin production, Bacillus cereus, cooked rice

EFFECTS OF SODIUM METABISULFIT AND ETHYLENE RESIN WRAPPING ON BROWNING OF YOUNG SHAPED-COCONUT

Ravy Por*, Borarin Buntong, Sopheap Ek, Kongkruy Chay,Vouchsim Kong
Royal University of Agriculture, Dangkor District, Phnom Penh, Cambodia, P.O. Box 2696;
*Corresponding Authors Email: ravy_rua@yahoo.com

ABSTRACT

This study was conducted (i) to improve storage systems of young shaped-coconut before delivering to markets; (ii) to identify optimal concentration of sodium metabisulfit on young shaped-coconut; and (iii) to introduce suitable packaging preventing browning on young shaped-coconut. The experiment was replicated three times with two factors (the concentration of sodium metabisufit and packaging). Young shaped-coconuts were dipped in sodium metabisulfit (2%, 5%) for 2 minutes before wrapping (MAP) with polyethylene resin (PE Resin) or non-wrap to serve as control. Fruits were evaluated for shelf life, color changes (browning) and quality changes by using of 5-point Hedonic scale, while the data was recorded daily and analyzed of variances using IRRISTART program and Microsoft Excel.

The results had shown that there were no significant differences of color changes (browning) on young shaped-coconuts with wrapping (MAP) or unwrapping *(P >0.05)*. Fruits washing with sodium metabisulfit was effectively reduced the color changes *(P <0.01)* during the storage life. However, there was no significant difference between the concentration of sodium metabisulfit used *(P >0.05)*. In addition, fruits treated with sodium metabisulfit (2%, 5%) with wrapping extended the storage life up to 11 days, if compared to unwashed fruits that could store only 2 days. Fruits unwrapped and washed with sodium metabisulfit (2%, 5%) could be stored only 8 days. Moreover, wrapped fruits had the lowest percentage of weight losses and shriveling; whereas, pH, sugar, and titratable acidity slowly decreased coconuts' water quality in all treatments.

Keywords: quality, sodium metabisulfit, wrapping and polyethylene resin

ANALYSIS AND EVALUATION OF MICROBIAL CONTAMINATION ON RAW BEEF IN SUPERMARKETS IN PHNOM PENH, CAMBODIA

Sarin Neang*, Vouchsim Kong, Rithy Chrun, Borarin Buntong, Kuyhor Te, Vichet Chep
Royal University of Agriculture, Dangkor District, Phnom Penh, Cambodia, P.O. Box 2696;
*Corresponding Authors E-Mail Address: neangsarin@gmail.com

ABSTRACT

Raw beef is a food product that contains variety of proteins that provides good energy and other nutrients for supporting human health. However, this kind of meat is very easy to be spoiled by microorganism, which seriously affects the consumer's health. In addition, in most case, raw beef is popularly consumed raw or lightly cooked, so the level of microbial contamination is high. Interestingly, samples of raw beefs from three supermarkets were taken to be analyzed and evaluated in this study.

This study was designed to (i) determine the presence of foodborne pathogens in raw beef; (ii) compare the prevalence of microbial contamination among the three supermarkets; and (iii) evaluate the sanitary quality of raw beef products. Also, six kind of microorganisms including Total Plate Count, Total Coliform and Fecal Coliform, which represented sanitary quality; and E. coli, S.aureus, and B.cereus, which determined the presence of foodborne pathogens, were analyzed. The results showed that there were no significant differences in Total Plate Counts, Total Coliform and Fecal coliform in the samples taken from the three supermarkets in Phnom Penh city, and they were found in unacceptable numbers in the raw beef products. However, the prevalence of foodborne pathogens including *E. coli, S. aureus* and *B. cereus* were found in acceptable numbers. Furthermore, the samples taken from the second supermarket had the highest level of microbial contamination among the three supermarkets, while the samples from the first supermarket had the lowest level of microbial contamination.

This experimental finding demonstrated the need for sanitary improvement in the beef retails markets and strict sanitary guideline and implementation of these practices could guarantee consumers' health by consuming raw beefs with lowest risk of foodborne pathogens.

Keywords: microbial contamination, foodborne pathogen, sanitary quality and foodborne pathogenic quality

ESTIMATION OF MICROBIAL COUNT IN GROUND PORK USING SMALL COLUMNAR AGAR MEDIUM (SCAM) AND MICROBIAL CALORIMETRY

[1*]Tatsuro Miyaji*, [1]Yoshiki Muramatsu, [1]Shuki Fujimura, [1]Junichi Nakagawa, and [2]Sankar C. Deka

[1]Department of Food and Cosmetic Science, Faculty of Bioindustry, Tokyo University of Agriculture, 196 Yasaka, Abashiri, Hokkaido 099-2493, Japan; [2]Department of Food Engineering & Technology, Tezpur University, Napaam, Sonitpur, Assam-784028, India

*Corresponding author E-mail: t-miyaji@bioindustry.nodai.ac.jp

ABSTRACT

For self-food-hygiene-management in food business, simple method for the estimation of microbial count is desired by the operators. In this study, a new system using small columnar agar medium (SCAM) and microbial calorimetric methods was developed for the estimation of aerobic and coliform bacterial population in ground pork.

For the growth of microorganisms, we developed a novel medium: SCAM, which is composed of ten agar blocks (ϕ10mm×8 mm) containing medium constituent. Ground pork was purchased from local market and used for the study. Emulsified ground pork (200μl) was inoculated to the surface of SCAM medium in a screw cap glass vial (ϕ30mm×65mm). The vials were then kept in micro-calorimeter at constant temperature, and the heat radiated from microorganisms was chased sequentially.

The microbial count was determine by plotting a standard curve, with the ground pork exposed to enrich microbial count for 24hr at 20℃, and the serial dilution of the emulsified samples to prepare a variety of initial microbial counts. In our tested food, adequate correlation between the time required for achieving specific voltage output of the apparatus and initial microbial count in the ground pork deduced from the surface plate method was obtained. To assess the validity of the standard curve, three other ground pork samples were purchased from markets and tested. In the three samples, the ratio of the microbial counts from the colony counting method to those from microbial calorimetry with the standard curves previously obtained from other sample were in the range of 1.3 to 2.5 in aerobic bacteria count and 2.1 to 3.1 in coliform bacteria count, which is in line with the permissible range for the estimation of microbial count.

Keywords: small columnar agar medium (SCAM), microbial calorimetric methods aerobic

bacteria, coliform bacteria, ground pork.

SPECIFIC DETECTION OF VIABLE *E.COLI* O157:H7 CELLS BY COUPLING PROPIDIUM MONOAZIDE WITH LOOP-MEDIATED ISOTHERMAL AMPLIFICATION

Xihong Zhao, Jun Wang, Joong-Hyun Park, Fereidoun Forghani , Myoungsu Park and Deog-Hwan Oh*

Department of Food Science and Biotechnology and Institute of Bioscience and Biotechnology, Kangwon National University, Chuncheon, Gangwon 200-701, South Korea

*Corresponding author's e-mail: deoghwa@kangwon.ac.kr

ABSTRACT:

Traditional molecular detection methods cannot distinguish *Escherichia coli* O157:H7 in viable or dead state. In this study, the loop-mediated isothermal amplification (LAMP) method combined with propidium monoazide (PMA) treatment was developed to selectively detect the viable *Escherichia coli* O157:H7, but not dead cells. Four primers, including outer primers and inner primers, were specially designed for recognizing six distinct sequences on the species-specific *rfbE* gene of *Escherichia coli* O157:H7 genome. PMA penetrated selectively through the compromised cell membranes and intercalated into DNA, amplification of DNA from dead cells was inhibited completely by 3.0μg/mL PMA, whereas the DNA derived from viable cells was amplified remarkably within 1hour by PMA-LAMP. This study offers a novel molecular detection method to distinguish between the viable and dead cells.

Keywords: *E. coli* O157:H7; propidium monoazide; rapid detection; viable cells

DIFFERENCE BETWEEN COLD SPOT AND F MINIMUM VALUE SPOT IN A STILL CAN DURING THERMAL STERILIZATION

Jianwei Zhou*, Donghong Liu[1*] , and Dongdong Li[1]

[1]School of Biosystems Engineering and Food Science, Zhejiang University, Hangzhou, Zhejiang Province 310058, P.R. China

[2] Ningbo Institute of Technology, Zhejiang University, Ningbo, 315100, P.R. China

*Corresponding author's e-mail: dhliu@zju.edu.cn

ABSTRACT

Canning is the most conventional used thermal processing in food industry, as well as aseptic processing. While the liquid food is been heating, because of the existence of convection, the cold spot in the can is moving. Meanwhile, the sterilization value (F) of each point in the can differs with each other. So the cold spot is not always the spot of sterilization minimum value (F_{min}). Cylindrical liquid can of water and different concentrations of CMC (1.0%, 1.5%, 2.0%, and 2.5%) was simulated by solving the governing equations for continuity, momentum and energy conservation, using "COMSOL®" multiphysical coupling field software package which based on finite element method of analysis. Through finding out cold spot of 100 ℃, 105 ℃, 110℃ and 115℃ in the can and the F_{min} spot, temperature and sterilization value were compared. The results indicated that there were obvious differences between cold spot and F_{min} spot. Also, the concentration of 1.5% CMC liquid can be regarded as a critical viscosity. It means if the viscosity of liquid is above the critical viscosity, the traditional thermal sterilization time is satisfied, whether the original sterilization time should be moderately prolonged, especially for thinlyfluid (the sterilization time should be prolonged 2.54% for water), in order to ensuring food safety.

Keywords: Thermal sterilization, Sterilization value, Sterilization time, cold spot, F minimum value spot

DETERMINATION OF BACTERIAL CELL NUMBER TO DIFFERENTIATE *CAMPYLOBACTER JEJUNI* FROM *C. COLI* BY THE SIMPLE HIPPURATE HYDROLYSIS TEST

Miyuki Fujioka*, and Yoshimitsu Otomo,

Hirosaki University Graduate School of Health Sciences, Hon-cho 66-1, Hirosaki, Aomori, 036-8564, Japan.

*Corresponding authors e-mail: mfujioka@cc.hirosaki-u.ac.jp

ABSTRACT

Campylobacter is widely known as one of the most common food borne pathogens which causes acute bacterial diarrhea in humans worldwide and *C. jejuni* and *C. coli* are the predominant bacteria that causes Campylobacteriosis. *C. jejuni* usually hydrolyzes hippuric acid to benzoic acid and glycine and this simple hippurate hydrolysis test is used to rapidly distinguish *C. jejuni* from *C. coli* in many clinical microbiological laboratories. However, sometimes the test gives variable results, which might be due to the inadequate number of bacterial cells taken in the test sample. In this study, we investigated the optimum number of bacterial cells required to perform the test smoothly. A total of 40 *C. jejuni* and 10 *C. coli* strains were included in this study and test bacterial cell suspensions were prepared matching the McFarland unit 0.5, 1, 2, 3, 4, and 5. Ninhydrin was added to the cell suspension and the color change was measured at an optical density of 540 nm. Results showed that the test bacterial suspensions of *C. jejuni* matching McFarland unit 1, 2, 3, 4, and 5, were all positive. On the other hand, bacterial cell suspension of *C. coli* matching more than 5 gave false positive results. Reproducible results were obtained with a bacterial suspension which matched with the McFarland unit 1 and this number of bacteria may be used for the hippurate hydrolysis test to identify *C. jejuni* from *C. coli*.

Keywords: Identification, *Campylobacter jejuni*, hippurate hydrolysis test, *Campylobacter coli*.

PREDICTION FOR GROWTH OF *STAPHYLOCOCCUS AUREUS* AFFECTED BY STORAGE TEMPERATURE IN SAUSAGE

Bo-Geum Park, Myoung-Su Park, Xihong Zhao, Jun Wang, Joong-Hyun Park, Fereidoun Forghani, Gwang-Hee Kim, Deog-Hwan Oh*

Department of Food Science and Biotechnology and Institute of Bioscience and Biotechnology, Kangwon National University, Chuncheon, Gangwon 200-701, Republic of Korea

*Corresponding authors e-mail: deoghwa@kangwon.ac.kr

ABSTRACT

Sausage, which is popular processed meat product, is widely consumed in many countries. The objective of the present study was to investigate the growth of *Staphylococcus aureus* influenced by storage temperature in sausage and develop predictive models. The experimental data at each temperatures (15, 20, 25, 30, and 35℃) were fitted into the primary models. The modified Gompertz model was estimated the best primary model. The growth parameters such as growth rate (GR) and lag time (LT) calculated from the modified Gompertz model with high determination of coefficients (R^2) were employed to develop the square root model as secondary model. In order to verify that the developed model offer dependable prediction for the growth of S. aureus in accordance with storage temperature, bias factor (B_f), accuracy factor (A_f), and root mean square error (RMSE) were estimated. B_f , A_f and RMSE were within the reliable rage. The results described that the established models have enough ability to predict the microbial growth of *S.aureus* in sausage and can be used for risk assessment.

Keywords: *Staphylococcus aureus*, Sausage, Predictive model, Temperature, Evaluation

COMPARISON OF PRIMARY MODELS AND DEVELOPMENT OF PREDICTIVE MODEL FOR GROWTH OF *LISTERIA MONOCYTOGENES* IN SAUSAGE

Bo-Geum Park, Myoung-Su Park, Xihong Zhao, Jun Wang, Joong-Hyun Park, Fereidoun Forghani, Gwang-Hee Kim, Deog-Hwan Oh*

Department of Food Science and Biotechnology and Institute of Bioscience and Biotechnology, Kangwon National University, Chuncheon, Gangwon 200-701, Republic of Korea

*Corresponding authors e-mail: deoghwa@kangwon.ac.kr

ABSTRACT

Listeria monocytogenes can grow at low temperatures such as refrigeration. Accordingly *L. monocytogene* is one of the major food poisoning pathogens in chilled food. This study was aimed to compare three primary models (the modified Gompertz, Logistic, and Baranyi model) and develop predictive models for the growth of *L. monocytogenes* in sausage, which is the most popular processed meat product, as a function of storage temperature (25, 30 and 35℃). The growth data obtained at different temperatures were fitted into the modified Gompertz, Logistic, and Baranyi model to compare the goodness-of-fit using the coefficient of determination (R^2), standard deviation ($S_{y.x}$) and akaike's information criterion (AIC) and to generate growth parameters such as growth rate (GR) and lag time (LT). The growth parameters obtained from the primary model with the best statistical fit were used to develop the square root model as secondary model. The reliability of developed models was evaluated by statistical indices such as bias factor (B_f), accuracy factor (A_f), and root mean square error (RMSE). The results proved that the modified Gompertz model was more reliable than other models and B_f, A_f, and RMSE of developed models were within the reliable range. Therefore the established models can be used as a rapid and efficient method for the microbial growth prediction of *L. monocytogenes* in sausage and also can be regarded as valuable tools for HACCP system during the manufacturing process.

Keywords: *Listeria monocytogenes*, Sausage, Predictive model, Primary model. Secondary model

COMBINATION OF SLIGHTLY ACIDIC ELECTROLYZED WATER, ULTRASOUND AND WATER WASH TO MAXIMIZE THE SANITIZATION EFFECT AGAINST MICROBIAL CONTAMINATION ON LETTUCE

Fereidoun Forghani, Myoung-Su Park, Xi-Hong Zhao, Jun Wang, Joong-Hyun Park, Gwang-Hee Kim, Bo-Geum Park, and Deog-Hwan Oh*

Department of Food Science and Biotechnology and Institute of Bioscience and Biotechnology, Kangwon National University, Chuncheon, Gangwon 200-701, Republic of Korea

*Corresponding authors e-mail: deoghwa@kangwon.ac.kr

ABSTRACT

Microbial contamination of fresh produce is still a major concern to the food industry regardless of all recent improvements in food safety technologies. Among the numerous technologies used slightly acidic electrolyzed water (SlAEW) and ultrasound, are both known as environmental friendly technologies. Although, SlAEW still needs more improvement to be used in food sanitization and ultrasound alone does not effectively reduce microbial numbers in food samples. Hence, the aim of this study was to develop an improved hurdle for fresh produce sanitization using combined treatments of SlAEW (pH 5.4, available chlorine concentration 22 mg/L, oxidation reduction potential 544-592 mV) with ultrasound. Lettuce samples were treated with distilled water (DW), SlAEW, SlAEW followed by water wash (SlAEW+WW), SlAEW with ultrasound (SlAEW+US) and SlAEW with ultrasound followed by water wash (SlAEW+US+WW) at room temperature (24 ± 2 °C), respectively. Following treatments, number of yeasts and molds (YM), total bacteria (TBC) and artificially inoculated *Escherichia coli* O157:H7 were enumerated. The results showed that ultrasound and water wash alone did not significantly increase the sanitation efficacy of SlAEW. However, treatment of the sample with SlAEW and ultrasound simultaneously, followed by water wash (SlAEW+US+WW) resulted in a great enhancement in microbial reduction. This combined treatment resulted in the reduction of 3.7, 4.1 and 3.8 log CFU/g in YM, TBC and *E. coli* O157:H7 respectively. Therefore, there is a great chance that this simple hurdle technology can be used in fresh produce as well as other types of food industry to improve the safety of product. Furthermore, addition of mild heat or other treatments should be investigated. This can result in higher numbers of microbial inactivation with cheap, easy to operate and environmental friendly technology.

Keywords: slightly acidic electrolyzed water (SlAEW), ultrasound, food sanitization, microbial reduction, lettuce

ANTIMICROBIAL SCREENING OF DIFFERENT EXTRACTS OF MAHAGONI SEEDS (*SWIETENIA MAHAGONI*) AND BETEL LEAF (*PIPER BETLE*) AGAINST SELECTED FOOD BORNE PATHOGEN AND SPOILAGE BACTERIA

Jobaer Prodhan*, and Sabina Yeasmin

Department of Genetic Engineering and Biotechnology, University of Dhaka, Dhaka-1000, Bangladesh

*Corresponding authors e-mail address: y_sabina01@yahoo.com

Mahagoni fruits (*S. mahagoni*) a member of Meliaceae is widely used by different tribal communities in South Asia for the treatment of many bacterial and fungal diseases. On the other hand, betel leaf (piper betle) has diverse biological activities, including, antifungal, wound healing, antifertility antiplatelet and anti-inflammatory. This study was designed to see the potential antimicrobial activity of various extracts of mahagoni seed and betel leaf against 5 food spoilage bacteria including *Enterobacter faecalis, Alkaligenes faecalis, Kleibsiella spp, Bacillus subtilis, Pseudomonas putida* and potential foodborne pathogen *including Escherichia coli, E. coli O157, E. coli O157:H7, Citrobacter fruendii Bacillus cereus, Listeria monocytogenes*. The aqueous extract of mehagoni seed were found to have antimicrobial activity against all the foodborne and food spoilage microorganisms tested, compared to ethanol, methanol and acetone extracts. On the other hand, ethanol chloform and acetone extracts of betel leaf showed different degree of antimicrobial activity against all the foodborne and food spoilage organisms tested compared to aqueous extract. The minimum inhibitory concentration was determined as 2 mg/ml for crude mahagani seed extract and 5mg/ml for crude betel leaf extract. Therefore, this study result demonstrated the usefulness of these extract in reducing food spoilage and foodborne pathogens if applied to the products.

Keywords: Antimicrobial activity, Mahagoni seeds, Betel leaf, Foodborne pathogen, and Spoilage bacteria

POTENTIALS OF DIVERSE SAFE AND FUNCTIONAL VEGETABLE PRODUCTION THROUGH ORGANIC METHOD IN THE SMALL SCALE FARMING OF BANGLADESH

M Nazim Uddin*

Olericulture Division, Horticulture Research Centre, Bangladesh Agricultural Research Institute (BARI), Gazipur 1701, Dhaka, Bangladesh

*Corresponding author's e-mail:nazim.68@gmail.com

ABSTRACT

Safe food is the human right and the demand of the safe food is old. Due to the complexity of food and the natural presence of potential hazards, the assurance of food safety is not a simple matter. Almost any single definition of safe food will be overly simplistic, because safe food is a complex, multifaceted concept. According to the World Health Organization/Food and Agriculture Organization (FAO), food is considered safe if there is reasonable certainty that no harm will result from its consumption under anticipated conditions of use (CAC/GL45-2003). The FAO further explains that the goal of any safety assessment is to provide assurance, in the light of the best available scientific knowledge, that the food does not cause harm when prepared, used and/or eaten according to its intended use. The absolute safety of a food or an ingredient can never be guaranteed. However, with appropriate precautions during production and distribution, the risk from any food can be kept to an absolute minimum that is generally acceptable to consumers. Vegetable consumption is increasing in Bangladesh due to growing awareness of health. But the production of vegetables is not enough as is requirement. Moreover, the method of production mostly depend on petroleum based chemical fertilizers and pesticides. Now a days to increase the vegetables production, indiscriminate use of such ingredient make the produced unsafe and hazardous, which is carcinogenic to the public health. Vegetable less toxic substances does not comply the safe but its functional properties also need to be considered. Production method like organic, is only way to ensure the quality, functional properties and safety of vegetables. Moreover, diverse productions of vegetables from same piece of small land may increase the diversity of nutrient and functional food. This paper will focus on how to grow diverse safe and functional food from same land in a growing season in Bangladesh condition.

Keywords: Functional Vegetable, Organic Farming, Diversification, Production, Bangladesh

PROTECTION AGAINST SEED-BORNE DISEASES USING ATMOSPHERIC GAS PLASMA

*Terumi Nishioka**, Yuichiro Takai[1], Shinichi Kusakari[1], Mitsuo Kawaradani[1], Kiyotsugu Okada[1], Hideo Tanimoto[1], and Tatsuya Misawa[2]

[1]Research Institute of Environment, Agriculture and Fisheries, Osaka Prefecture, 442 Shakudo, Habikino, Osaka 583-0862, Japan. [2]Graduate School of Science and Engineering, Saga University, 1 Honjo-machi, Saga, 840-8502, Japan.

*Corresponding authors e-mail: nishioka@mbox.epcc.pref.osaka.jp

ABSTRACT

Potential crop diseases and yield loss occur due to seed-borne plant pathogens; therefore, the control of these pathogens is an important issue in food production. Seed disinfection is one of the basic control measures for these diseases. Plasma treatment has been widely used for the sterilization of medical instruments and treatment of material surfaces, but its application to agricultural products has just started in recent years. In this study, we evaluated the effect of atmospheric gas plasma on the inactivation of two seed-borne pathogens, *Rhizoctonia solani*, which causes damping-off of Japanese hornwort, and *Pyricularia oryzae*, which causes rice blast disease. Atmospheric argon plasma was generated by AC high voltage discharge, and applied voltage to electrodes and gas flow rate were 10 kV and 3L/min, respectively. The mycelium of *R. solani* and the conidia of *P. oryzae* were treated with atmospheric gas plasma: Post treated mycelial growth and conidial germination were measured after an incubation period of 1 to 4 days. Under these conditions, when the distance of the plasma source to the sample surface was 5 cm, no effect was found on the mycelial growth of *R. solani* compared with the non-treated one, even when the treatment time was as long as 15 min. However, when the distance was 3 cm, the inactivation effect of mycelial growth was observed in time depended manner. The 5 -min treatment time at a 3-cm distance decreased the growth rate, and the longer treatment time (10 min) markedly inhibited the growth of *R. solani*. The plasma treatment at a distance of 3-cm for 10 min strongly inhibited the conidial germination of *P. oryzae*, as well. These results indicated that gas plasma treatment from an appropriate distance is effective in inactivating the two plant-pathogenic fungi. Therefore, this technology could be useful in seed disinfection.

Keywords: seed-borne plant pathogens, crop disease, gas-plasma and protection.

FATE OF THE *ESCHERICHIA COLI* CONTAMINATED INTO SOIL OR IRRIGATION WATER

*Yasuhiro Inatsu**, Rachel Ramos Elano [2)], Thongsavath Chanthasombath [3)], Borarin Buntong [4)] and Md Latiful Bari [5)]

[1)] Food Hygiene Laboratory, National Food Research Institute, NARO, 2-1-12, Kannondai, Tsukuba, Ibaraki 305-8642, Japan [2)] National Food Authority Food Development Center, Philippines [3)] Clean Agriculture Development. Centre, Lao PDR [4)] Faculty of Agro-Industry, Royal University of Agriculture, Cambodia, [5)] Center for Advanced Research in Sciences, University of Dhaka, Bangladesh

*Corresponding authors e-mail: inatu@affrc.go.jp

ABSTRACT

Pathogenic bacteria contaminated into raw vegetables have been recognized as a risk of foodborne illnesses. Recent researches have pointed that the contamination of these bacteria may be occurred from irrigation water, agricultural materials (such as manure) or entrance of animals into farms. The adaptation of good agricultural practices (GAP) is thought to be effective to reduce the risk of the contamination. However it is difficult to reveal the exact effectiveness of GAP on increasing the safeness of the outputs. The systematic collecting and analysis of field samples may give good evidence of it. However, it is rather difficult to conduct this work especially in developing countries due to the lack of research resources. Conducting suitable preliminary studies may helpful to reduce cost and man power required for experiments. From this view point, we have performed pilot study about the fate of *Escherichia* (*E.*) *coli* artificially contaminated into several kinds of soils or water with these soils (as a model of irrigation water).

Eighteen *E. coli* strains isolated from Japanese meat and vegetable samples (which showed different RAPD-PCR pattern) was contaminated into 100 gram of each of 4 kind of soils or 100 mL of water that contained 5% (w/v) of each of these soils. The pH and water contents of soils were 6.2-6.6 and 14-31%, respectively. These samples were leaved outside (27-33^{o}C) during July to September 2011. The log reduction of inoculated *E. coli* in water (6.5 log CFU/mL) after 4 weeks was 4.1 to 1.8 log CFU/mL. The log reduction of inoculated *E. coli* in soil (3-6 log CFU/g) was 0.5 to 2.9 log CFU/g in the same period. No relationship with the log reduction and initial load of strains was found. From these results, keeping collected field samples in hot environment should be avoided to prevent the change of original contamination level of bacteria.

Keywords: *E. coli*, contamination, soil, irrigation water and GAP

EMPOWERING RURAL WOMEN FOR FOOD AND NUTRITION

Ferdouse Islam*

Olericulture Division, Horticulture Research Centre

Bangladesh Agricultural Research Institute (BARI), Gazipur 1701, Bangladesh

*Corresponding authors e-mail: ive_bari@yahoo.com

ABSTRACT

Empowering women has multiple benefits for women themselves and for their families and communities. To economic condition of Bangladesh, the contribution of women to their household food supply and nutritional status – the study seeks to assess. The research is emphasizing on -to improve the understanding of the important contribution of women in household and valuing their potential role on food security and nutrition in existing status. Improvement of the household food security refers to the expanding availability and accessibility of nutritional food on sustainable basis. In this regard this study has indicated that women in rural, play a crucial role in improving their household food security, as they contribute to food production, enhance dietary quality and consumption diversity. Agricultural production unit (farm, home garden and livestock products) with supplemental resources (processed and preserved food items) and substitute resources (fishing and wild food products) represent the available resources for the household food consumption in rural areas. Along with others off-farm income generating activities (making handicrafts items) and other possible income sources (old woman honorees, pension, ornaments, remittance from migrants, and savings sources) provide household with income to afford foods. In developing countries, rural women play different roles in guaranteeing food security for their households and communities. Women are usually responsible for growing and preparing most of the food consumed in the home and raising small livestock, which provides protein. Rural women also carry out most home food processing, which ensures a diverse diet, minimizes losses and provides marketable products. Women are more likely to spend their incomes on food and children's needs - when a woman controls the household budget. Women, therefore, play a decisive role in food security, dietary diversity that's covered good nutrition. But having an adequate supply of food does not automatically translate in to the adequate levels of nutrition. So, efforts to improve food safety must take into account existing gender roles in the food chain - training for women in production, nutrition and decision making aspect can make an immediate contribution to household in food assurance which ensure nutrition and good health.

Keywords: Empowering women, food production, nutrition, and decision making

ASSESSMENT OF *E.COLI* AND *SALMONELLA* IN CHINESE CABBAGE SUPPLY CHAIN IN CAMBODIA

Vinit Set*, Yasuhiro Inatsu[2)], Borarin Buntong[1)], Sopheap Ek[1)], Thong Kong[1)],Vouchsim Kong[1)]

1) Royal University of Agriculture, Dangkor District, Phnom Penh, Cambodia, P.O. Box 2696; 2) Food Hygiene Laboratory, National Food Research Institute, NARO, Tsukuba, Japan.

*Corresponding authors e-mail: setvinit@yahoo.com

ABSTRACT

Contaminations of *E.coli* and *Salmonella* on vegetables are the major cause of bacterial foodborne diarrhea in humans worldwide. Fresh vegetables normally carry natural non-pathogenic epiphytic microorganisms, but during growth, harvest, transportation and further handling the produce can be contaminated with foodborne pathogens from animals and human sources. In most cases, these products are consumed raw or lightly cooked, so that their microbial content may represent a risk factor for the consumers' health, which is a food safety concern. This study aimed to identify and compare the number of *E.coli* and *Salmonella* in Chinese Cabbage Supply Chain. Three replicates of samples were collected from farms, wholesalers, and retailers following by three supply chain actors/processes. By this three supply chains actor, 9 samples at farms, 9 samples at wholesalers, and 9 samples at retailers had collected for experiment. *E.coli* was confirmed by inoculating into sterile EC medium then streaking on EMB agar and identified by TSI and LIM agars. Furthermore, *Salmonella* was confirmed by inoculating in to sterile BGLB medium tube then streaking on selective agar DHL agar and identified by TSI and LIM agars. The results showed that the contamination of *E.coli* was found in average of 11.9×10^2 CFU/g (or 3.1 log CFU/g) in farms, 27.33×10^2CFU/g (or 3.4 log CFU/g) in the wholesaler, and 9.64×10^2 CFU/g (or 2.3 log CFU/g) in retailer. For the number of *Salmonella*, it was found in average of 11.73×10^2 CFU/g (or 3.1 log CFU/g) in farm, 15.33×10^2 CFU/g (or 3.2 log CFU/g) in wholesaler, and also 10.27×10^2 (log=3.0119) CFU/g in retailer. *E.coli* and *Salmonella* were found in highly number in the wholesaler comparing to the other two actors in supply chain which may be cause of poor hygiene conditions in their practice. Therefore, improving practice in this chain should be strongly taken into consideration before the produces continue supplying to the retailer as well as to the consumer.

Keywords: *E. coli*, *Salmonella*, Chinese cabbage, Cambodia and supply chain.

IMPACT OF VULNERABLE GROUP DEVELOPMENT PROGRAM ON FOOD SECURITY IN KUSHTIA SADAR UPAZILA OF BANGLADESH

Shahoriar Ferdous*, Md. Safiul Islam Afrad[2]*, Md. Abdul Muttaleb[3], Md. Mizanur Rahman[4]
Department of Agricultural Extension and Rural Development, Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Gazipur, [3]Bangladesh Rice Research Institute, Gazipur, [4]Dept of Soil Science, BSMRAU, Gazipur-1706
*Corresponding authors e-mail: afrad69@gmail.com

ABSTRACT

The main objectives guided the present study are to assess the socio-demographic characteristics of the beneficiaries' of vulnerable group development (VGD) program and its impact on the beneficiaries along with related factors. The study was conducted in sadar upazila of Kushtia district in Bangladesh. Data were collected from seventy selected beneficiaries of VGD program by employing simple random sampling technique using semi structured and pre-tested interview schedule. Data revealed that majority of the beneficiary were middle aged (average 33.36 years) with poor education (average 2.21 years), medium family size (average 4.97), day labor (70%), very poor monthly family income (61.40% less than 2000.00), Muslim (81.40%), politically affiliated (88.60%) and involved with NGOs (58.60%). Due to the involvement of VGD program, overwhelming majority (91.40%) of the beneficiaries stated that amount of food support was sufficient for 15-20 days of a month that enhanced 15.24% more day's food security. On the other hand, number of meal per day increased 32.48% after being involved with the VGD program. However, food security and number of meal per day increased significantly with the involvement of VGD program. Poor quality of supplied food (77%), politically biased beneficiary selection system (77%) and underweight (77%) of delivered food were the problem as stated by the beneficiaries. The main problems mentioned by the beneficiaries were low grain quality (80%), political biasness in selecting beneficiaries (75%). Suggestions raised from the beneficiaries were improving the quality of grain (85%) and selecting the actual persons without any bias (65%).

Keywords: Food security, impact, vulnerable group development, Kushtia, Bangladesh

EFFECT OF FOUR SELECTED CHEMICALS ON THE INCIDENCE AND SEVERITY OF *MUNGBEAN YELLOW MOSAIC VIRUS* AND ITS RELATION TO THE SEED YIELD OF MUNGBEAN

A.H. M. Mahfuzul Haque*, Mohd. Mostafa Kamal[2] and Abdul Mannan Akhanda[3]

[1, 2]Pulses Research Centre, Bangladesh Agricultural Research Institute (BARI), Gazipur 1701, Bangladesh, [3]Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Salna, Gazipur 1706, Bangladesh

*Corresponding authors e-mail: mahfuzprc@gmail.com

ABSTRACT

A field experiment was conducted at Bangladesh Agricultural Research Institute, Joydebpur, Gazipur, Bangladesh during March to June 2008 for the management of *Mungbean yellow mosaic virus* through four selected chemicals on BARImung 4. The four selected chemicals were Furadan 5G (carbofuran), Dursban 20EC (chloropyrifos), Ripcord 10EC (cypermethrin) and Admire 200SL (imidachloprid) At 50 DAS the lowest disease incidence and severity was recorded for Admire received plants and the highest was found in control. A strong positive correlation existed between the population of whitefly and *Mungbean yellow mosaic virus* incidence while negative correlation performed by *Mungbean yellow mosaic virus* incidence and total seed yield. The total seed yield was highest in the Admire treated plants and the lowest was found in the control plot. All the chemicals performed better in reducing disease incidence and severity comparing with control but Admire (imidachloprid) achieved the best results in which disease incidence was reduced by 30.86% and the yield was increased by 20.06%.

Keywords: Mung bean, yellow mosaic virus, seed yield, selected chemical and Bangladesh

SEROPREVALENCE SURVEY OF *TOXOPLASMA GONDII* IN SWINE IN NORTHERN JAPAN

Kanako Yamanouchi*, Kazuyuki Kida, Masahiro Kumagai, Jin-ichi Sasaki, Takashi Inaba
Department of Parasitology, Hirosaki University School of Health Sciences
66-1 Honcho, Hirosaki 36-8564, Aomori Japan
*Corresponding authors e-mail: tnappa@cc.hirosaki-u.ac.jp

ABSTRACT

Infection rate of *Toxoplasma gondii* in humans is estimated to be at 10-15% in Japan, and that in the world is at 33%, respectively. Most of the infected adults are asymptomatic attributed to the immune system's contribution. However, women newly infected with *Toxoplasma* gondii during pregnancy can pass the organisms to the fetus that leads later to congenital toxoplasmosis, miscarriage or stillbirth. Number of congenital toxoplasmosis in Japan is estimated to be more than 130 cases per year. Encephalopathy due to toxoplasmosis occurs at 10% in the AIDS patients as a representative leading cause of death. General routes of transmission of *Toxoplasma gondii* to humans are: ingestion of oocysts shed from the final host feline, ingestion of cysts in the muscle of infected livestock, or vertical transmission to the fetus through placenta. Serological survey on toxoplasmosis was carried out to determine infection rate in pigs in northern Japan, because pork is one of the most commonly consumed meats in Japan. Number of subjects provided for analyses was 481 sera collected from the slaughter house (meat-processing plant) in Hirosaki, Japan. Criteria applied for analyses were the latex agglutination and ELISA using the *Toxoplasma*-specific IgG antibodies. Positive sera in pigs were at 6% (29/481) in prevalence. Further, epidemiological distribution pattern on *Toxoplasma gondii* was created by referring for breeding and feeding conditions in the pig farms. The results obtained indicate that Toxoplasma gondii is still circulating among pigs in northern Japan. It is necessary to note the pregnant woman who doesn't have the toxoplasma antibody especially.

Keywords: *Toxoplasma gondii*, Seroprevalence, swine, ELISA, Latex agglutination.

EMERGENCE OF MULTIDRUG RESISTANT ZOONOTIC *SALMONELLA* FROM POULTRY OF SAVAR, BANGLADESH.

Munawar Sultana*, Md. Showkat Mahmud, S.M. Sabbir Ahmed and M. Anwar Hossain

Department of Microbiology, University of Dhaka, Dhaka-1000, Bangladesh

*Corresponding author's e-mail: munamicro@yahoo.com

ABSTRACT

Salmonella infection is one of the major constraints of poultry farming that hindered its development in Bangladesh. A study was conducted to investigate salmonellae involved in poultry infection on the basis of five variable farm code, serotypes, resistotypes, and plasmid profiles. The study was extended towards the drug resistant profile against 28 common antibiotics and molecular characterization of *Salmonella* poultry isolates of Savar, Bangladesh. The prevalence of *Salmonella* was found to be 21.1%. A large number of plasmid-free *Salmonella* isolates were found to be resistant to 10-15 groups of antibiotics. The very high unanticipated level of multidrug resistance (MDR) of the isolated *Salmonella* against 28 commonly used therapeutic antibiotics is probably due to widespread use of and easy access to various antimicrobials in the poultry, veterinary, and public health sector in Bangladesh. PCR of eighty four isolates using *Salmonella* specific primers ascertained 79, 32 and 3 isolates to be *inv*A *sefA* and *fliC* gene positive. Amplified Ribosomal DNA Restriction Analysis (ARDRA) profile using *Alu* I restriction endonuclease digestion of nearly full length 16S rRNA gene of the eighty four isolates gave three different restriction types indicating no single source of infection. Sequencing of representatives of each ARDRA groups detected close similarity to *S. Typhimurium*, *S. Enteritidis* and *S. Paratyphi* within the poultry samples indicating significant zoonotic hazard. Presence of identical restriction types in isolates of 5 different farms indicates the possibility of intrafarm transmission of these bacteria. Emergence of such multidrug drug resistant zoonotic *Salmonella* isolates is indicative of devastating situation of poultry farms in Bangladesh questioning the proper control and management of this economic sector in Bangladesh.

Keywords: *Salmonella Typhimurium, Salmonella Enteritidis,* MDR, plasmids, ARDRA, 16S rRNA gene sequence.

ANTIGENIC VARIATION OF CAPSID PROTEIN VP1 OF FOOT-AND-MOUTH DISEASE VIRUS PREVALENT IN SOUTH ASIAN REGIONS

S. M. Sabbir Alam*, Md. Ruhul Amin, Munawar Sultana and Md. Anwar Hossain

Department of Microbiology, University of Dhaka, Dhaka-1000, Bangladesh.

Corresponding author's e-mail:* sabbir.alam.mb@gmail.com

ABSTRACT

Foot and mouth disease virus (FMDV) includes seven distinct serotypes and is highly contagious infecting mainly cloven-hoofed animals. Serotype Asia1 occurs mainly in Asian regions. FMDV capsid protein VP1 is responsible for inducing a protective immune response. This study performs an in silico approach to determine antigenic heterogeneity within several antigenic sites of VP1. A total of 47 VP1 sequences from independent FMDV isolates from different countries of South Asian regions were selected and retrieved from the NCBI database. Sequences were aligned by EBI ClustalW program. In the absence of experimentally derived 3D structure data, the structure of VP1 protein of FMDV type Asia1 was modeled using a homology modeling approach. Several antigenic sites which may have a role in virus neutralization have been identified using both literature mining and computational predictive methods and then mapped onto the protein 3D structure. Variations at these antigenic sites were then analyzed by calculating the protein variability index. Amino acid substitutions at those sites were also identified and compared. It was found that antigenic variability that occurred during the past twelve years is not equally distributed at each VP1 antigenic site. Although several sites are more variable than other sites, interestingly for most antigenic sites, amino acid variability is lower than expected and fewer types of amino acid substitutions were evident. Three antigenic peptides have been identified as the most conserved epitopes for the past twelve years. This study revealed that although antigenic variability is high for FMDV for the past twelve years, only a few antigenic types have circulated in the South Asian region. This emphasizes a possibility to formulate improved synthetic vaccines for controlling foot-and-mouth disease in that region.

Keywords: FMDV, VP1, homology modeling, antigenic variability

MOLECULAR CHARACTERIZATION OF MULTIDRUG RESISTANT -EXTENDED SPECTRUM B-LACTAMASE PRODUCING ZOONOTIC *ENTEROBACTER* SPP. FROM POULTRY OF BANGLADESH

Shuvro Prakash Nandi*, Munawar Sultana, Md. Showkat Mahmud and Md. Anwar Hossain

Department of Microbiology, University of Dhaka, Dhaka-1000, Bangladesh

*Corresponding authors e-mail: shuvro.micro19@gmail.com

ABSTRACT

Enterobacter spp. especially *Enterobacter cloacae* are frequent cause of neonatal sepsis in humans. In this study, the occurrence and characteristics of multidrug resistant-extended-spectrum β-lactamase (MDR-ESBL) producing *Enterobacter* spp isolated from live and dead poultry of Savar, Bangladesh were investigated. Between May 2009 and June 2011, 106 samples derived from live and dead birds were collected of which 22 presumptive *Enterobacter* isolates were screened through phenotypic (morphological, cultural and biochemical) detection. Antibiogram against 10 commonly used antibiotics revealed that all isolates were resistant to Amoxicillin, Ampicillin, Penicillin, and Erythromycin. Furthermore, resistance pattern showed by the isolates were Nitrofurantoin (19, 95%), Gentamycin (11, 55%), Streptomycin (18, 95%), Sulfonamides (13, 65%), Tetracyclines (15, 75%) and Ciprofloxacin (12, 60%). Genetic fingerprinting methods RAPD (randomly amplified polymorphic DNA) and ARDRA (arbitrary ribosomal DNA restriction analysis) distributed the 22 MDR *Enterobacter* into four groups. Three genetically related groups were found to be plasmid free having isolates resistant to 10 antibiotics. One distinct group of *Enterobacter* with four isolates contains a common 2.7 kb plasmid, encoding bla_{TEM1} gene. The genotypically diverse groups belonged to either *Enterobacter cloacae* or *Enterobacter hormaechei* on the basis of 16S rRNA gene sequence analysis indicating their zoonotic potential. The prevalence of MDR-ESBL *Enterobacter* among poultry and its zoonotic relevance implicates not only the poultry but also the consumers and handlers are at risk. Therefore, urgent intervention is required to limit the emergence and spread of these bacteria as well as prudent use of antibiotics among farmers in Bangladesh.

Keywords: *Enterobacter* spp., MDR, ESBL, bla_{TEM1}, 16S rRNA gene, Zoonosis.

FMD VIRUS GENOTYPING TOOL

Arafat Rahman*, Mohammad Arif Ashraf [2,3], S M Sabbir Alam[1,2], Farjana Khatun [2, 4], Saddam Hossain[2], Mosharraf Hossain[2], Fokhruz Zaman[2], Munawar Sultana[1], M. Anwar Hossain[1]

[1]Department of Microbiology, University of Dhaka, Dhaka, Bangladesh; [2]Bio-Bio-1 Bioinformatics Research Foundation, Dhaka, Bangladesh;[3]Deparment of Biochemistry and Molecular Biology, University of Dhaka, Dhaka, Bangladesh; [4]Department of Pharmacy, East West University, Dhaka, Bangladesh

*Corresponding authors e-mail: ac.arafat@gmail.com;

ABSTRACT

Foot and Mouth Disease Virus (FMDV) is an extremely contagious and rapidly evolving picornavirus infecting cloven-hoofed cattle, which was first recorded in Europe in 1544. FMDV endemic in Bangladesh causes annual loss approximately US $125 million declining meat and milk productivity of cattle. FMDV has 7 distinct serotypes (A, O, C, Asia-1, SAT-1, SAT-2 and SAT-3) and about 61 sub-types. Immunity against one type does not confer protection against other types. It is essential to develop a novel vaccine against FMDV specific for circulating topotype in Bangladesh. So far 4 serotypes (A, O, C and Asia-1) and 1 sub-type (A22) have been identified in Bangladesh. A web-based genotyping tool can reduce the cost and time of wet-lab based serotyping experiments. FMDV genotyping tool uses a sliding window based local alignment scoring algorithm to detect genotype of a query sequence. This tool is developed in Python programming language using different standard library packages. Windowed subsequences of a query sequence are scored by BLAST2 program against a set of reference sequences. 3 whole genome sequences from each 7 serotypes of FMDV are used to make the reference dataset. A graph is generated by plotting these scores against window index. Testing with FMDV genome sequences collected from NCBI shows that VP region of query sequence have highest score similarity with known serotypes of FMDV. VP region variability can be compared with reference sequences by the plot too. Genotype(s) of a region in query sequence can be inferred by looking at the best score from particular reference sequence represented by color bar in the output. This tool will also help to determine isolate's recombination pattern and quasi-species detection. FMDV web based genotyping tool can be used for quick identification of FMDV necessary to ensure food safety.

Keywords: Foot and Mouth Disease, FMDV, Genotype, Serotype

SURVEY THE EFFECT OF THE EXTRACTION FROM THE SEED OF *ANNONA SQUAMOSA* L WITH ETHANOL AND THE CHITOSAN ON THE *ZIZIPHUS MAURITIANA* LAMK STORAGE

Dam Sao Mai*, Lam Thi Thuong, Trinh Xuan Ngo

Institute of Biotechnology and Food Technology - Ho Chi Minh University of Industry, 12 Nguyen Van Bao Str., Ho Chi Minh City, Vietnam

*Corresponding authors e-mail: damsaomai@yahoo.com

ABSTRACT

***Ziziphus mauritiana* Lamk** belongs to Rhamnaceae. Z. mauritiana L. consists of 81 – 97% pulp and easy to spoil (about 4-5 days in the natural environment). The seed of ***Annona squamosa* L** consists of annonaceous acetogenins which affects on some bacterium, fungi and insects.

This survey focuses on the *Ziziphus mauritiana* L storage when it was using the extraction from the seed of *Annona squamosa* L with ethanol 95% and the chitosan. The quality of *Ziziphus mauritiana* L under the storage time was tested via the reducing weight, the reducing sugar, vitamin C and total soluble solid. The storage temperature was 25°C. The control samples were tested when using only the extraction from the seed of *Annona squamosa* L with ethanol 95% or using only the chitosan.

The best result was when the samples were stored under the condition of 120g/L of the extraction from the seed of *Ziziphus mauritiana* L combining with 1% chitosan in 8 days. After 8 days storage, the surveyed products lost 9.31% weight; had 5.06% reducing sugar, 0.0167% vitamin C, and 8.86% total soluble solid.

Keywords: *Annona squamosa* L, *Ziziphus mauritiana* L, chitosan, storage, annonaceous acetogenins

SURVEY THE BETACYANIN EXTRACTION FROM THE FLOWER OF PURPLE *BOUGAINVILLEA* OF VIETNAM AND THE STABILITY OF THIS PIGMENT

Dam Sao Mai*, Nguyen Thi Thuan, Le Thi Nhu Trinh, Ta Thi Nguyen Trinh, Trinh Xuan Ngo

Institute of Biotechnology and Food Technology - Ho Chi Minh University of Industry, 12 Nguyen Van Bao Str., Ho Chi Minh City, Vietnam

*Corresponding authors e-mail: damsaomai@yahoo.com

ABSTRACT

Purple Bougainvillea is grown in everywhere in Vietnam. Especial in the South of Vietnam, *purple Bougainvillea* is in flower in all year. Betacyanin which is extracted from flowers of this tree is a natural color. This pigment can be applied in the food processing industry. Our research is focus on the optimality of the pigment extraction from *purple Bougainvillea* of Vietnam and survey the stability of this pigment in different condition.

The experiments showed that when the solvent is water use for betacyanin extraction, it obtained more betacyanin than when using methanol or ethanol solvent. The best rate of the flower of *purple Bougainvillea* and the optimal solvent is 1 : 5. The optimal condition of the anthocyanin extraction is: pH = 6, at the temperature of 30°C, for 30 minutes.

The results also showed the stability of the betacyanin of this flower. The color of the researched flower pigment gradually reduced from 20 to 95°C. This betacyanin is stability in the pH range from 4 to 7. The addition of 0.15% vitamin C will increase the color fastness. So it is suitable for using in beverage industry.

Keywords: *purple Bougainvillea*, betacyanin, pigment extraction, pigment stability

SURVEY THE PECTIN EXTRACTION FROM THE DRIED RIND OF MANGOSTEEN (GARCINIA MANGOSTANA) IN VIETNAM

Dam Sao Mai*, Ho Thi Kim Yen, Nguyen Thi Hoang Truc, Trinh Xuan Ngo

Institute of Biotechnology and Food Technology - Ho Chi Minh University of Industry, 12 Nguyen Van Bao Str., Ho Chi Minh City, Vietnam.

*Corresponding authors e-mail: damsaomai@yahoo.com

ABSTRACT

Mangosteen (*Garcinia mangostana*) is grown much in Vietnam. Many researches showed that this rind has many active components. In Vietnam, till now, the rind of mangosteen is thrown away. Besides this, mangosteen is harvested only from June to September. It is difficult to store the fresh rind of mangosteen for a long time. So research on pectin extraction from the dried rind of mangosteen is necessary in Vietnam.

This survey focuses on the condition of pectin extraction from the rind of mangosteen. The optimal condition of pectin extraction was received when H_2SO_4 was used as solvent; the rate of the rind and solvent was 1:15; pH = 2; the extraction temperature was 90^oC; the extraction time was 2 hrs.

The received pectin had the moisture of 4.64%, DE = 70.429%, MI = 10.209%, and the viscosity was 2.4324 N.s/m^2.

Keywords: Rind of mangosteen, *Garcinia mangostana*, pectin, extraction

PROBLEMS IN PLANTING THAT SIGNIFICANTLY AFFECT THE QUALITY AND SAFETY OF FRUITS AND VEGETABLES IN VIETNAM

Dam Sao Mai*, Trinh Xuan Ngo

Institute of Biotechnology and Food Technology - Ho Chi Minh University of Industry, 12 Nguyen Van Bao Str., Ho Chi Minh City, Vietnam

*Corresponding author's e-mail: damsaomai@yahoo.com

ABSTRACT

At present, in Vietnam vegetables cultivation is done by the two modes: self-sufficiency and goods production. The second mode is applied in the areas: mono-cultivating, multi-cultivating and high-tech vegetables cultivation.

In Vietnam there is nearly the half of the fruit and vegetable growers use fertilizer, purchased seed, or pesticides, though the proportion varies by commodity, region, and expenditure category. Among vegetable farmers, 34 % buy vegetable seed, 47% use fertilizer on their vegetables, and 22% report using pesticides to their vegetables. Pesticide use on vegetables is more common in all of Vietnam.

All traders in Southern Viet Nam used storage during the past year, while only about 69 % of traders in the North used storage facilities. Few traders have chilled or frozen storage facilities. Just less than 3 % of traders have refrigerated storage. These are mainly exporters in Southern Viet Nam.

In recent years, much food poisoning happened in Vietnam, because of pesticides in vegetable and fruit. So we need the projects to do the survey and to train the farmer for modern cultivation of vegetables is underway like the high quality vegetables. It is also necessary to have the production management, trademark, and distribution network.

Keywords: Vegetables, fruits, cultivation, food safety, and farmer

CHANGE OF MICROBIAL AND PHYSICOCHEMICAL CHARACTERISTICS IN THE RAW MATERIALS OF SAENGSIK BY WASHING WITH SLIGHTLY ACIDIC ELECTROLYZED WATER (SAEW) DURING STORAGE

Gwang-Hee Kim*, Myoung-Su Park, Xi-Hong Zhao, Jun Wang, Joong-Hyun Park, Fereidoun Forghani, Ha-Na Kim, Bo-Geum Park, Deog-Hwan Oh.

Department of Food Science and Biotechnology, Kangwon National University, 192-1, Hyoja 2-dong, Chuncheon, Kangwon-do, 200-701, Republic of Korea

*Corresponding author's e-mail: kgh0531@kangwon.ac.kr

ABSTRACT

We investigated changes of microbial and physicochemical characteristics in the raw materials of Saengsik, brown rice, barley, carrot, potato, kale and Angelica Utilis Makino, by washing with slightly acidic electrolyzed water (SAEW) during storage. To confirm the microbiological effects of treated washing solutions, tap water (TW) as a control, sodium hypochlorite water (NaOCl, 150 mg/L) and SAEW (HOCl, 30 mg/L), and change of chromaticity we stored raw materials of Sangsik for 5, 10, 15, 20, 25 and 30 day at storage temperature 4, 10, 15, 20, 25 and 30℃ as self-life study. The maximum reduction of 1.45 and 1.51 log CFU/g was achieved by SAEW than NaOCl treatments against total bacteria and coliform respectively following each different storage temperature and storage period in the raw materials of Saengsik. There was significant different ($P > 0.05$) between the SAEW and NaOCl treatments efficacy. The lightness (L), redness (a), and yellowness (b) values of the raw materials of saengsik were not definitely affected by SAEW treatments, except b value of kale and Angelica Utilis Makino increased by SAEW treatments than NaOCl treatments. Consequently, comparing treated samples to untreated controls showed that SAEW treatments extended the shelf-life of raw materials of Saengsik at different temperatures with reduce of microoganisms and marginal changes of chromaticity. Data indicate that the SAEW washing is an effective means of maintaining the quality and enhancing the shelf-life of raw materials of saengsik could be effectively used as pasteurization step and maintained ingredients of Saengik without affecting the other properties during storage.

Keywords: Saensik, slightly acidic electrolyzed water, sodium hypochlorite water, storage, change

LENTIL RELAY CROPPING IN THE RICE-BASED CROPPING SYSTEM: AN INNOVATIVE TECHNOLOGY FOR LENTIL PRODUCTION, SUSTAINABILITY AND NUTRITIONAL SECURITY IN CHANGING CLIMATE OF BANGLADESH

Md. Omar Ali*, M.I. Zuberi[2] and Ashutosh Sarker[3]

[1]Bangladesh Agricultural Research Institute (BARI),Joydebpur, Gazipur, Bangladesh,

[2]Department of Botany, Rajshahi University, Rajshahi, Bangladesh , [3]International Centre for Agricultural Research in the Dry Areas (ICARDA), New Delhi, India,

*Corresponding authors e-mail: omaraliprc@gmail.com

ABSTRACT

Bangladesh is one of the most populous and poverty affected country in the world. To meet high demand of food against her blooming population, highest emphasis has been given to cereal production, as the population suffers from protein malnutrition. The soil condition is poor in nutrients and water content. However, growing of legumes helps in improving the soil condition and lentil (*Lens culinaris*) as a food legume has a role in human food, animal feed and sustainable agriculture. Among the pulses, lentil is mainly grown after the harvest of monsoon-rice in the winter season (October-April) in Bangladesh. But in most cases, lentil cultivation, after the monsoon-rice harvesting is delayed in medium high-medium low lands and further aggravated by higher infestation of diseases and insect pests and forced maturity, resulting in lower yields. It was also identified that global climatic changes led to more frequent high temperature during the end of crop cycle. In this perspective, lentil relay in rice field has a great opportunity which ensures timely sowing and best use of residual soil moisture. Various combinations of seed rate, fertilizer application and rice straw height along with different lentil varieties were attempted in the present study. It was observed that lentil varieties, BARI Masur-4, BARI Masur-5 and BARI Masur-7 planted with a rice straw height under 30 cm, at a seed rate of 50 kg/ha and with a fertilizer level at 30-60-30 kg/ha of N-P_20_5-K_20 produced a lentil seed yield of 2070 kg/ha. Hence, by inclusion of lentil in the monsoon rice field, lands could be brought under lentil cultivation to enhance lentil production, provide human nutrition and also to ensure soil health improvement for sustainable production

system.

Keywords: Lentil relay, innovative technology, sustainability, nutritional security, climate change.

EFFECTIVENESS OF MORINGA SEED POWDER, SCALLOP POWDER AND OTHER COMMERCIAL POWDERS IN THE PURIFICATION OF POND WATER

Sharmin Zaman*, Sabrina Sultana[2], Anowara Begum[2,] Marufa Zerin Akhter[2] and Latiful Bari[1]

[1]Center for Advanced Research in Sciences, [2]Department of Microbiology, University of Dhaka, Dhaka-1000, Bangladesh.

Corresponding authors e-mail: sharmin_micro@yahoo.com

ABSTRACT

Water turbidity is not a direct indicator of health risk; however, turbidity can provide food and shelter for pathogens as well as promote their re-growth in a distribution system and can interfere with the detection of bacteria and viruses in drinking water. In this study, moringa seed powder, ultra-K® powder, FS® powder and scallop powder were used individually or in combination to examine their antibacterial and coagulation properties in pond water. In addition to this treatment, attempts were also taken to convert treated water to drinking water through a 3 step natural bio-sand filtration process. This method would be very useful for areas of Bangladesh with scarcity of drinking water or areas prone to flooding. Results showed that moringa seed powder alone has strong coagulant and antimicrobial effect at low doses. On the other hand, 0.01% scallop powder has strong antimicrobial activity under typical environmental conditions. However, combination of these two powders showed effective coagulating and antimicrobial capacity to reduce the turbidity and inactivate the number of inherent microorganisms respectively, including coliform and *E. coli* within 5 minutes. Similar experimental findings were observed when the mixture of moringa seed powder and sodium hypochlorite was used. On the other hand, both the commercial ultra-K and FS powder showed strong coagulant and antimicrobial effect within 1 min of application. When this treated water passed through natural bio-sand filtration (charcoal, stone and sand), the resulting water became potable. This small scale work was done in the laboratory and there is a need to scale-up this method to ascertain the reproducibility of the results. The present study suggests that moringa seed powder and scallop powder are naturally available, cost-effective, and nontoxic antimicrobial agents that have potentials to convert pond water to drinkable water.

Keywords: Pond water, moringa seed powder, scallop powder and water purification

FOOD SECURITY AND NUTRITIONAL STATUS OF RURAL HOUSEHOLDS' IN SOME SELECTED COASTAL REGIONS OF BANGLADESH

Dr. M.A. Rashid*

*Agricultural Economics Division, BARI, Gazipur, Bangladesh

Corresponding author's e-mail:rashid_veg@yahoo.com

ABSTRACT

The study was conducted Khulna, Bagherhat and Satkhira districts based on the highest coastal areas of Bangladesh. To address the food and nutritional security and its determinant factors among coastal people in study areas, a total of 9 (nine) upazilas in the three districts of Bangladesh were selected. It was also identified their livelihood risks and coping strategies during stressed situations. The study based on a sample of 450 coastal households revealed that the production of rice could meet their demand for 6 months followed by leafy vegetables (3 months) and chili (1 month). Most of the households (55%) were food secured whose calorie intake (2801kcal/capita/day) was much higher than the national average (2318 kcal/capita/day). Majority of the food-insecure households were calorie deficient than that of food-secured household in the study areas. For food secured households, among various food items, rice supplied 71.33% of the total daily calorie intake followed by, edible oil (7.72%), sugar (5.58%), vegetables (5.18%), potato (3.65%), pulses (2.44%), and spices (1.85%). The similar results were also observed for food insecured households. Logit model revealed that farm size, farm income, off-farm income, and household crop production had positive and significant impact to attaining food security of the coastal households. Besides, the food nutrient intake was higher for large households compared to others. Flood, heavy rainfall, reduction of land productivity, crop damage by rat, lack of modern technology, salinity problem and high price of inputs were found to be livelihood risks for the coastal households. To meet their demand for food and other necessities during various stress situations they used previous savings; sold own assets; sold poultry and livestock; moved elsewhere to find work; borrowed money from relatives or others. Different social safety net programs may also be more effective support to the vulnerable coastal households during stressed situations.

Keywords: Food security, rural household, nutritional status, costal area, and Bangladesh

ROLE OF *MAR* OPERON IN ACQUISITION OF RESISTANCE TO QUATERNARY AMMONIUM COMPOUNDS IN *ESCHERICHIA COLI*

*Takuya MAEDA** and Takao SATO[2]

[1]Department of Pharmacy, School of Pharmacy, Hyogo University of Health Sciences,1-3-6 Minatojima, Chuo-ku, Kobe, 650-8530, Japan; [2]Department of Life Science, Graduate School of Bioscience and Biotechnology, Tokyo Institute of Technology, 4259 Nagatsuta-cho, Midori-ku, Yokohama, 226-8501, Japan.

Corresponding author's e-mail: maedat@huhs.ac.jp

ABSTRACT

In the modern societies, various techniques to control harmful microbes, such as using biocides, are essential to enjoy our comfortable life. Quaternary ammonium compounds (QAC), cationic surfactants, have been widely used as biocides for medical, industrial and domestic purposes because of their low toxicity or wide antimicrobial spectrum. However, such a repetition of daily use has also brought about spreading of resistant bacteria. Therefore, this study was done to clarify the resistance mechanism to QAC and to get resistant bacteria under control. *Escherichia coli* NBRC12713 resistant to a QAC, *N*-dodecylpyridinium iodide (P-12), was bred in the laboratory and characterized comparing with a normal strain. As for the resistant strain, the cell surface was more hydrophilic, and the amount of lipopolysaccharide of outer membrane was increased. It was suggested that *E. coli* acquired the resistance to QAC by controlling the adsorption/ binding reaction between cell and QAC. The proteomic analysis showed that QAC leads to overexpression of drug efflux pumps and the proteins related to organic solvent resistance. Then, the role of *mar* operon that closely relates to multidrug resistance or expression of stress proteins, in resistance to QAC in *E. coli* was studied. Minimum inhibitory concentration (MIC) of P-12 against the MarA (transcription activator)-overexpressing clone (80.0μM) was higher than MIC of the host (*E. coli* BL21 DE3) without a vector (26.2μM). Therefore, it was indicated that overexpression of MarA closely relates to resistance to QAC. Furthermore, since a point mutation to stop protein synthesis was found in *marR* gene of the resistant strain, it is implied that MarR (transcription repressor) inactivation leads to high-level resistance to QAC. In order to elucidate how mutation in MarR affects the binding to QAC and resultantly to discuss what a role *mar*

operon plays in acquiring biocide-resistance, bioinformatic analysis is now in progress.

Keywords: Quaternary ammonium compounds (QAC), cationic surfactants, biocides, medical, industry and domestic purposes

"FOOD HYGIENE 7S" - METHODOLOGY FOR PROMOTING FOOD SAFETY AND SECURITY

*Sadao KOMEMUSHI**, Hisashi SUMINO, Takashi KOUGAMI and Kunio TOMIJIMA

Graduate School of Engineering, Osaka City University, Food Safety Network, c/o Ikari Syoudoku Co.LTD., 1-4-8 Kyutaro-cho, Chuo-ku, Osaka, Japan

Corresponding authors e-mail: volvo.s80.classic386@gmail.com

ABSTRACT

"Food Hygiene 7S", hereinafter called 7S and proposed by Food Safety Network in July 2004, is the most effective methodology for food business operators to improve their implementation levels of food hygiene. The 7S, derived from an industrial jargon 5S, consists of 7 words starting with S, "Seiri" <shifting>, "Seiton" <systematic arrangement>, "Seisou"<sweep>, "Senjyou" <scrub>, "Sakkin" <sanitation>, "Shitsuke" <self-discipline>, and "Seiketsu" <Cleanliness>, adding "Senjyou" <scrub> and "Sakkin" <sanitation> to the 5S. While 5S mainly focuses on the efficiency improvements, 7S is designed to create a prerequisite condition of cleanliness at food factories with microbial level.

Recently PAS220 has been introduced in order to support management system specified at ISO22000 and to assist in controlling food safety hazards. And not only the requirements specified at 7.2.3 of ISO22000 but also other aspects relevant to manufacturing operations; i) rework; ii) product recall procedures; iii) warehousing; iv) product information and consumer awareness; v) food defense, bio-vigilance and bioterrorism are added to PAS220.

Considering the similarities between PAS220 and 7S in terms of their concepts and contents, which convinced us with the significances of 7S, the FSN has been propagated 7S methodologies among many food factories, their workers, and consultants in food hygiene field through the corresponding courses of 7S. And as results, the case studies of 7S at food factories have been already published 5 times in our annual journals (Vol.1 to 4).

*Food Safety Network (FSN) Established in 1997 as a study group of experts in the fields of food safety, food hygiene, food security and so on. FSN's remarkable accomplishments are exampled as annual meetings (16 times), workshops (58 times), factory tours in Japan (37 times) and at foreign countries (11 times), corporation salons (40 times), lectures (24 times), and publication of periodical bulletins (now No.100). Furthermore, the journal articles (more than 20), books (22 volumes) and other publications (CD and DVD) have been created during these 15 years.

Keywords: Food Hygiene 7S, Food Safety Network (FSN), Methodology, Promotion, Food Safety and Security

FOOD HYGIENE 7S IN PEST CONTROL EXAMPLES

Tamio KANAYAMA*

Engineering Department, TOYOSANGYO Co., Ltd, 3-19-20shinyashiki-cho, kita-ku, Okayama 700-0986, Japan

*Corresponding authors e-mail: t-kanayama@to-yo-s.co.jp

ABSTRACT

Food Hygiene 7S (Seiri- sorting out, Seiton- systematic arrangement, Seisou- sweep, Senjou- scrub, Sakkin- sanitation, Shitsuke- discipline, Seiketsu- cleanliness) is a management method to develop and maintain the 'Cleanliness' of the food manufacturing. 'Cleanliness' means not only clean to look at, but bacteria are non-existence or reduced to the level which will not suffer under the influence of food safety, and the object of Food Hygiene 7S is the cleanliness of microbial level. Food Hygiene 7S corresponds to the pre-requisite programs in HACCP or the PRP in ISO22000, and it's exactly the foundation to achieve food safety. In addition, activities based on Food Hygiene 7S make possible to control of insects and rodents, because sorting-out or systematic-arrangement deprives their hiding and living space, or setting the easy environment to sweep deprives their feed. If all of the engaged people carry on this activities at their workplaces, they will get visible effect, their attitude will change, and it will make continuous improvements at the manufacturing scene. So we explain cases and real impact of activities utilizing Food Hygiene 7S.

Keywords: Food Hygiene 7S, management method, HACCP and ISO22000

A RELATION WITH THE FOOD HYGIENE 7S SEEN FROM PEST CONTROL

Koji OKUDA*, Tomoyuki KAWAI, Hiroshi TERAI, Takao YAMAZAKI, Yosio KAWAGUTI

Teisokasei Co., Ltd., 2-334-2 Nonami, Tenpaku-ku, NOGOYA 468-0045 Aichi, Japan

Corresponding authors e-mail: k-okuda@teisokasei.com

ABSTRACT

The Prerequisite Program (PRP) is one of the most important programs to run HACCP and “Pest Control” is also included in it. In manufacturing sites, the employee of the spot is doing "production of clean manufacturing environment" according to the Sanitation Standard Operating Procedure (SSOP) and rules which are originally defined for each manufacturing site. As a result, the problem of pest control and the causes of contamination also decrease. Therefore, it could be said that the activity can prevent the hazard by the food poisoning bacteria which cannot be seen or chemical substances, and the other hazard by visible foreign substances, such as insects, human hair, and so on. The Food Safety Network advocates that "Food Hygiene 7S", which made the keyword seven S, namely Seiri, Seiton, Seisou, Senjyou, Sakkin, Sitsuke, Seiketsu.

The food hygiene 7S is hygiene controlling activity aiming at the cleanliness of microbial level. We introduce that the activity of the food hygiene 7S becomes a foundation of the chemical-less pest control.

Keywords: Food Hygiene 7S, Prerequisite Program, Sanitation Standard Operating Procedure HACCP and pest control

INSECTS WHICH OCCUR IN FOOD FACTORIES AND ITS CONTROL METHODS

*Hiromi MIZUHARA**, Hiroshi TERAI, Tomoki SUMINO, Masaki ARAKAWA

Teisokasei Co., Ltd., 4005-1 Shiohama, Yokkaichi-shi, 501-0863 Mie, Japan

*Corresponding authors e-mail: hiromi-m@teisokasei.com

ABSTRACT

At food factories or pharmaceutical factories, serious damages may be given to their company brand image by only one contamination. Insects could be one of the foreign substances with a high possibility of contamination to products in the process of manufacture. Insects frequently found in food factories are roughly divided into two types. One is insects which invade factories by flying or crawling, and the other is that can occur inside factories repeatedly. I introduce insects which can occur for generations in the manufacturing area of food factories and its effective control methods.

Insects which occur in manufacturing area feed on mold, dust, food waste, scum, sludge, stored food such as grain as food sources. Moreover, insects which prey on such insects may occur and settle in factories. To rid the arias of the food sources is one of the best solutions to solve these insect problems. In addition, alcohol-based formulations, hypochlorous acid water, and other chemical agents should be used together depending on the situation.

Keywords: Insects, food factories, chemical agents and control methods

THE PRACTICE CASE OF FOOD HYGIENE 7S ACTION IN AKAFUKU CORPORATION

*Motoki YAMAGUCHI**, Tatsuo TANAKA

2015 Asama-cho, Ise City, Mie Pref, Japan

*Corresponding authors e-mail: yamaguchi@akafuku.co.jp

ABSTRACT

Akafuku was established about 300 years ago in 1707 as a tea house in Ise to welcome those visiting the Ise Grand Shrine, and has achieved great results in systematical management of hygiene aiming for company-wide constitutional improvement in the wake of restarting operation in 2008; the efforts are based on 7S action for food hygiene. The food hygiene 7S action comprises seven Japanese phrases regarding food hygiene, that is, seiri, seiton, seisou, senjou, sakkin, shitsuke and seiketu, and each means disposition, arrangement, sweeping, laundering, sterilization, training and cleaning, which are implemented so as to eliminate even microbe. The hygiene management is promoted by preventing microbe's growth, decreasing and killing them. In Akafuku, 7S committee is set up as a promotion organization, whose members are company president as a chairman, representatives of each department and external specialists; it proceeds according to annual plan. The concrete examples of 7S action are as follow, i) reporting the current state of company-wide hygiene management, ii) informing the main improvements related to HACCP or PRP, iii) improving through indication at 7S patrol or on voluntary basis in each department, the number of improvements is as much as 400 cases per year. Moreover, food hygiene 7S action also works for implementing HACCP system and prerequisite program (PRP) on ISO22000 certainly and effectively. In fact, Akafuku gained approval by Mie Prefecture HACCP method introducing institution in 2010, and furthermore certification of ISO22000 in 2011.

Keywords: Hygiene practice, food hygiene 7S, HACCP, ISO22000, and Akafuku Corporation

CROSS-CONTAMINATION AND TRANSFER RATES OF BACTERIA ON THE CUTTING BOARDS

Michiru Kishimoto*, Chiaki Kojima, Ayaka Maeda, Ayako Morinaga
57 Takenoyama,Iwasaki-cho,Nissin-city,Aichi-pref.,JAPAN 470-0196
Nagoya University of Arts and Sciences
*Corresponding authors e-mail: mkishi@nuas.ac.jp

ABSTRACT

To quantify transfer of bacteria by cross-contamination during cooking operation, we investigated the rate of transfer from cutting board to ready-to-eat food and other cookware. The study was designed to simulate the real cooking procedures and performed using cutting board that was inoculated with *E. coli* .The cross-contamination contributes to certain fraction of foodborne illness. The recovery rate of swabbing was confirmed by using nonpathogenic *Escherichia coli* strain JCM1649. Cutting boards, contaminated with different concentrations of *E. coli*, were swabbed by sterilized cotton stick. Transfer rates in the following experiments were calculated by taking into account of the recovery rate, which was 30.5%. From cutting board, 2.07~3.59% *E. coli* was transferred to boiled spinach by cutting procedures. And from cutting board, 0.67~1.21% was transferred to shredded cabbage, 0.11~0.20% was transferred to kitchen knife or tong by cutting or grasping procedure.

This study demonstrated quantitatively the transfer of bacteria from cutting board to cooked spinach, shredded cabbage, knife and tong. The data can be used in quantitative risk assessment of the foodborne pathogens.

Keywords: Cross-contamination, cutting board, transfer bacteria, and quantitative risk

HOW TO ADVANCE THE HYGIENE SUPERVISION IN FOOD SERVICE COMPANIES "REBUILDING OF DYSFUNCTIONAL SYSTEM"

Yuji Ino*

Japan Institute of Foods Ecology Co, Ltd, 1-9 Onohama-cho, Chuo-ku, Kobe 651-0082, Hyogo-ken, Japan.

*Corresponding authors e-mail: y.ino@jife.co.jp

ABSTRACT

There are four kinds of patterns from which the hygiene supervision in food service companies becomes dysfunctional.

1. Power Type; 2. Dependent Type; 3. Decorated Type; 4. Haywire Type

- Proposal of Hygiene Supervision of “Game Committee Type:

Problem of game committee type hygiene supervision: Many of the hygiene supervisions lose substance, because they are stuck in a rut, respond at the inspection, fall of motivation or skill of employees, and so on. In this presentation, I show the example in the hygiene supervision carried out at our company that consists of not only the indication but also the improvement after supervision and process to improve the systems. It starts with scoring the state of hygiene control at each store pursuant to “Quantitative Food Hygiene Supervision“, and giving the recognition of the goals to the every staff.

Step 1: Rethink of Attitude

- It changes the score of checkpoint according to a risk level.
- A demerit mark is given to un-improving point.
- Improved point and superior point are picked up in the report.

Step 2: Keeping High Motivation Level

- Superior stores at the hygiene supervision are commended.

Step 3: Share the result and poor point among the all store.

Step 4: Rulemaking

- Company-wide hygiene supervision regulation is made.

For hygiene supervision, it becomes major work to prove the hygiene control at each store appropriate.

Keywords: hygiene supervision, food companies, hygiene control and dysfunctional system

INACTIVATION OF *ESCHERICHIA COLI* AND INFLUENZA VIRUS ON SOLID SURFACES BY ULTRASONIC FOGGING WITH PH–CONTROLLED SODIUM HYPOCHLORITE SOLUTIONS

*Satoshi FUKUZAK*I* and Hiromi URANO

Industrial Technology Center of Okayama Prefecture, 5301 Haga, Kita-ku, Okayama 701-1296, Japan

*Corresponding authors e-mail: satoshi_fukuzaki@pref.okayama.lg.jp

ABSTRACT

The bactericidal and virucidal efficacy of ultrasonic fogging with pH-controlled sodium hypochlorite (NaOCl) solutions was studied against *Escherichia coli* and influenza virus (Flu V) on solid surfaces in a confined space. The NaOCl solutions of pH 6 and 10 containing free available chlorine (FAC) of 2 to 1,000 mg/*l* were fogged at a rate of 2-3 ml/min, and fine fogged droplets (avr. 4 μm) were discharged by filtrated-compressed air at a rate of 0.01-0.05 m^3/min. When the NaOCl solution of pH 10 was fogged, relatively small variations in FAC concentration and pH of the droplets were observed at the contact solid surfaces compared with the NaOCl of pH 6. As a result of direct contact with the fogged droplets of NaOCl solutions, the ratio of *E. coli* survival and Flu V infectivity on the filter decreased depending on the product of the FAC concentration in the fogged droplets and the exposure time. The rate of killing *E. coli* was found to depend on the concentration of undissociated form (HOCl) at the final pH of the droplets. This suggests that HOCl is the more potent form as the bactericidal agent. On the other hand, OCl^- was also effective in inactivating Flu V, perhaps due to the reduction of hemagglutination activity although HOCl was twofold active than OCl^-. These results indicate that fogging with pH-controlled NaOCl solutions is effective in disinfecting solid surfaces with attached bacteria and viruses.

Keywords: Inactivation, *Escherichia coli,* influenza virus, solid surfaces, ultrasonic fogging and sodium hypochlorite solutions.

DETECTION OF EGGS AND CYSTS FROM IMPORTED VEGETABLES IN JAPAN

Yoshihiro Ohnishi*

Department of Veterinary Medicine, Division of Veterinary Science, Graduate School of Life and Environmental Sciences, Osaka Prefecture University.

*Corresponding authors e-mail: ohnishiy@vet.osakafu-u.ac.jp

ABSTRACT

In Japan, many foods are imported from many foreign countries. The safety of these imported foods is protected but limited by the quarantine. On the other hand, the amoebic dysentery with *Entamoeba histolytica* is specified in the law. The reported cases are increasing from 1999 and reach a peak of 871 cases in 2008. One of the infection sources is considered to be contaminated with cysts on the fresh vegetables imported.

This study was carried out detection cysts of *E. histolytica* and eggs from the fresh vegetables imported. The 533 samples of the imported vegetables were purchased from Dec. 2009 to Mar. 2011. After the imported vegetables were washed with 2L of 0.01M phosphate buffered saline solution with 0.05 % Tween 20 solution, the sediments were collected for detection. As a result, several kinds of cysts, having one to four nuclei, were detected from some of the imported vegetables by the combination methods with formalin-ether method and iodine staining. By PCR, DNAs of *E. histolytica* were also detected from some of the imported vegetables. Therefore, the cyst having 4 nuclei was suspected to be that of *E. histolytica*. In addition, the eggs, larvae and adults of *Paragrolaimus* spp. and *Cruznema* sp. were detected from washing solution by formalin-ether method. The larvae of *Strongyloides stercoralis* were not detected by the culture method.

Therefore, the imported vegetables are quite dirty. The prevention of infection was considered to wash the imported vegetables well and carefully before eating fresh one. (This study was supported by research grant of Urakami Zaidan and Food

Foundation in 2009)

Keywords: Imported vegetables, *Entamoeba histolytica*, *Paragrolaimus* spp., *Cruznema* sp.

WOMEN IN CHILD NUTRITION: BANGLADESH PERSPECTIVE

Farjana N Khan
Horticulture Research Centre, Bangladesh Agricultural Research Institute
Gazipur, BANGLADESH
*Corresponding authors e-mail: khan_farjana@yahoo.com

ABSTRACT

Child nutrition is a great concern in Bangladesh like elsewhere in the third world countries. Due to poor economic condition, majority of our people cannot afford to ensure intake of right amount of nutritious food. As adequate nutrition is a prerequisite for attaining good health, quality of life, and national productivity so, proper feeding practices during infancy and childhood are essential for maintaining proper nutrition and health. In Bangladesh, millions of children suffer from one or more forms of malnutrition including low birth weight, stunting, underweight, vitamin A deficiency, iodine deficiency, anemia and many other disorders. Women can play a vital role to minimize the nutritional problem by maintaining their own health, thereby giving birth to a healthy child and raring them properly. A mother is the principal provider of the primary care that her child needs during the first six years of its life. The type of care she provides depends to a large extent on her knowledge and understanding of some aspects of basic nutrition and health care. The relationship between the nutrition knowledge of the mothers and the nutritional status of their children is much stronger. Providing nutritious food, maintaining proper health, supplementing the diet with fruits and vegetables are few major areas where role of women is paramount in all societies with few exceptions. Thus we see a managerial role by women in the field of food security in our society which in turn can ensure better nutrition for their child. This paper focuses on women's contribution in the family and society to minimize the nutritional problem of child in Bangladesh. Different authentic secondary sources have been consulted to develop this paper. Besides, a good number of women scientists and intelligentsia were interacted in fine-tuning

the paper. The findings of the paper are expected to at least arouse interest for further study in the same field and would help formulate policy guidelines in curbing the menace of nutritional problems.

Keywords: Women, child nutrition, nutritional status, Bangladesh