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SHORT ABTRACTS

EXTENDING THE SHELF LIFE OF CITRUS FRUITS USING IRRADIATION AND/OR WITH OTHER COMBINATION TREATMENTS I. "BALADY" ORANGES

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Abstract—Irradiation process (0, 1.50, 2.50 kGy) with or without other combination treatments before irradiation, i.e. soaking in $CaCl_2$ solution or waxing were used in this study to investigate the effect of such treatments on the shelf life of "Balady" orange fruits at room temperature.

Marketable properties (browning, decay and texture) in addition to the organoleptic evaluation of firmness, appearance, odour, colour and taste were detected. Results showed the preferability of waxing treatment before irradiation processes.

On the other hand, statistical analysis of the organoleptic evaluation revealed that the shelf life of untreated sample (control) was 20 days at room temperature, while samples that exposed to the different suggested treatments rejected after 30 days under the same conditions.

KINETICS OF RADIATION SOFTENING OF CARROT

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Abstract—A limiting factor in irradiation of horticultural crops is the softening it causes in fruit or vegetable tissue. To better understand the softening problem we studied the kinetics of radiation softening of raw carrot tissue using modern texture measuring equipment. Diced carrots were irradiated between an array of Co^{60} pencils at an average rate of 1.6 kGy per hour to give a series of doses ranging from 0 to 30 kGy and firmness was measured in a back extrusion cell mounted in a universal testing machine. A plot log (extrusion force) versus dose showed two distinct regions; the first is a rectilinear plot with a steep negative slope for doses up to about 15 kGy, and the second is also a rectilinear plot with a shallow negative slope beyond 15 kGy. 67% of the firmness is lost with the first 15 kGy but only 4% of the firmness is lost with the highest 15 kGy increase in dose. This two-stage softening rate curve is consistent with the model of two first-order rate processes. Thermal softening of carrot also shows two stages of softening when cooked. Therefore, the kinetics of irradiation softening is quantitatively similar to the kinetics of thermal softening of carrot.

EFFECT OF ELECTRON IRRADIATION ON HATCHABILITY AND BROILER PERFORMANCE OF HATCHING EGGS

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Abstract—The bacterial contamination of hatching eggs represent losses for embryonic mortality and mortality during the first weeks of chicken's life and in addition produces delay in the chicken growth. Irradiation studies have showed that 1 kGy doses of the growth of *Salmonella enteritidis* diminished 2 log in the bacteriologic population. The effect of two doses of electron irradiation in broiler breeder hatching egg was evaluated in this study. Fresh, whole, intact eggs were irradiated with electron beam source at either 1 kGy, 2 kGy as well as a non-irradiated group. After the irradiation the groups were taken to commercial hatchery and were incubated in standard conditions. The hatched chickens were reared during 7 weeks under commercial conditions and the performance was analysed.

The hatchability rate did not show the significant differences between the groups of egg irradiated and the control group ($P > 0.05$). And the parameters such as average weight, feed conversion and week feed consumption did not show significant differences between the groups of eggs irradiated and the non irradiated group either ($P > 0.05$).

The results that the electron irradiation on hatching eggs did not cause any effect on hatchability and broiler performance.

GAMMA IRRADIATION OF PEANUT KERNEL TO CONTROL MOLD GROWTH AND TO DIMINISH AFLATOXIN CONTAMINATION

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Abstract—Peanut kernel inoculated with *Aspergillus parasiticus* conidia were gamma irradiated with 0, 2.5, 5.0 and 10 kGy using Co^{60}. Levels higher than 2.5 kGy were effective in retarding the outgrowth of *A. parasiticus* and reducing the population of natural mold contaminants. However, complete elimination of these molds was not achieved even at the dose of 10 kGy. After 4 wk incubation of the inoculated kernels in a humidified condition, aflatoxins produced by the surviving *A. parasiticus* were 69.12, 2.42, 57.36 and 22.28 μ/g, corresponding to the original irradiation levels. Peroxide content of peanut oils prepared from the irradiated peanuts increased with increased irradiation dosage. After storage, at each irradiation level, peroxide content in peanuts stored at $-14°C$ was lower than that in peanuts stored at an ambient temperature. TBA values and CDHP contents of the oil increased with increased irradiation dosage and changed slightly after storage. However, fatty acid contents of the peanut oil varied in a limited range as affected by the irradiation dosage and storage temperature. The SDS-PAGE protein pattern of peanuts revealed no noticeable variation of protein subunits resulting from irradiation and storage.

QUALITY STUDIES ON IRRADIATED VEGETABLES

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Abstract—The effects of gamma-irradiation on texture, colour, appearance and enzyme or microbial activity of cauliflower, celery, potatoes and yams were investigated. Results from the texture profile analysis of the samples, with a computerized Instron, showed a change in most textural parameters with an increasing dose. There were some differences in the Hunter colour values and the appearance noted between the irradiated samples and the controls of the first three vegetables, which were accentuated during refrigerated storage up to two weeks. In the case of yams, neither irradiation or storage affected the colour, appearance and nutritional content of the product appreciably. There were significant decreases in enzyme activities (polyphenol oxidase, pectinesterase) after irradiation of cauliflower, celery and potatoes. For potatoes this may be an advantage to food processors; potatoes irradiated with less than 5 kGy maintained their colour for up to 3 h after slicing. In the case of yams, irradiation at low doses resulted in a marked decrease in microbial flora which may be of commercial significance.

DNA "COMET ASSAY" FOR RAPID DETECTION OF IRRADIATED FOOD

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Abstract—Since treatment with ionizing radiation causes DNA fragmentation, microgel electrophoresis of single cell ("comet assay") can be applied as a simple and rapid tool for identification of irradiated foods. The DNA "comet assay" has been employed successfully in the past to frozen meats (chicken, pork, beef) and its application is now being extended to a variety of other food items, such as fish, fruits, legumes, seeds and even spices. The electrophoretic separation requires only a few minutes, and after visualising DNA by silver staining, the DNA fragmentation pattern observed in a simple transmission microscope may indicate a possible irradiation treatment. Suspected samples may subsequently be analyzed by the more sophisticated (expensive) and validated techniques.