

Nondestructive Quality Evaluation of Abbot Kiwifruit Applying Electronic Nose
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ABSTRACT

Nowadays, nondestructive quality evaluation of various agricultural products is being developed and made use of. Throughout the present study, application of an electronic nose system (for the quality assessment of kiwifruit (Abbot variety)) is being discussed. Through electronic nose system, when coupled with Artificial Neural Network (ANN) and Principal Component Analysis (PCA) techniques, it was possible to successfully sort out the unripe, half-ripe, ripe, over-ripe and spoiled kiwifruits (Abbot cultivar). The analysis of the main components of two @ parameters covered about 99 percent of variance in the data, and made possible a distinction of the different stages of fruit ripening with no overlapping. The success rate for ANN was found to be 100%. Minimum vs. maximum mean square errors were respectively obtained for the half-ripe vs. spoiled samples as 0.02523 & 0.00198. Stiffness as a quality indicator for the fruit was determined, and predicted by use of electronic nose data. Analysis of the results indicated that kiwifruit firmness following its harvest (unripe, half-ripe, ripe and overripe) benefits from significant differences of at 5%. A Prediction of the fruit's firmness, from the criterion of aroma at different stages of fruit's ripening was made, applying ANN (with an obtained coefficient of 0.995). Electronic nose system was finally proved as a reliable tool for the monitoring of kiwifruit in storage conditions.

Keywords: Gas sensors; Electronic Nose; Nondestructive evaluation; Artificial Neural Network (ANN); Principal Component Analysis (PCA)

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Planning and Scheduling Barley Production Mechanization Project Employing the PERT Network: Case Study Alborz Province

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ABSTRACT

Operations involved in agricultural mechanization projects must be carried out within short and definite time periods, and in known succession, otherwise one would be confronted with extra expenses arising from delay, which would end up with a decrease in the product's yield too. To prevent such expenses in agricultural systems, proper scientific programming as well as scheduling is indispensable. The nature of agricultural mechanization projects (from the view point of implementation of a series of definite operations within probable time periods) is more in match with that of Program Evaluation and Review Technique (PERT) as compared with other Network Technologies. This was why PERT Networks was employed for programming and timing of the project of mechanization as related to barley production in the Province of Alborz, Iran. As regards the mechanized production of the crop barley, the needed data were gathered through researcher's observation of example fields, and as well through questionnaires filled up by the regional farmers. The operational measures were determined. The Work Breakdown Structure (WBS) diagram of the project was planned and drawn. PERT Network of the project was finally prepared and analyzed. The shortest possible time needed for the mechanized production of barley is estimated at about 228.2 days. Taken into account a probability of 99%, the project of mechanized production of barley is completed within less than 240 days (barley cultivation completion period). Considering a probability of 95%, the production period would amount to 231.45 days. Results indicate that one is able of getting answers, regarding statistical questions as through PERT Network's Model and as related to the project. A clear vision is opened up to the project manager to make timely decisions as regards the expected advance of the project to finally produce the mechanized product within the scheduled time, and as well with the desired productivity.

Keywords: PERT network; Planning and scheduling; Agricultural mechanization; Alborz Province

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Acid Production Potential, Acid and Bile Tolerance of *Lactobacillus* Strains, Isolated from Traditional Sourdoughs

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ABSTRACT

A study of the biochemical characteristics and metabolic activity of Lactobacilli is necessary for selecting strains to be used as starter cultures for baking of bread. Throughout the present study, biochemical characteristics, acidification and probiotic properties of Lactobacilli strains (*Lactobacillus plantarum*, *L. curvatus*, *L. paralimentarius*) isolated from traditional sourdoughs were evaluated. All the three Lactobacilli strains revealed growth at 15°C and at different levels of NaCl (2, 4, 6.5%) and at different pH levels (4.4, 9.6). *Lactobacillus plantarum* was of the potential to be grown at 45°C. The Lactobacilli strains were of the capacity to ferment a large spectrum of carbohydrates. *Lactobacillus plantarum* and *L. curvatus* were of the capacity to ferment pentoses (xylose and arabinose). *Lactobacillus curvatus* and *L. paralimentarius* did not ferment rhamnose. The strains of lactobacilli were finally found to show a proper acidifying capacity following 9 h of incubation at 30°C, and at pH values of between 4.5 and 4.9. The results also showed that *Lactobacillus plantarum* and *L. paralimentarius* are of the probiotic potential as according to acid and bile tolerance tests.

Keywords: Acidic Resistance; Bile Resistance; Sugar Fermentation; Acidification

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Effect of Guar and Carboxy Methyl Cellulose Gums on Chemical, Dough Rheology, Organoleptic and Staling Properties of Chapatti Bread

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ABSTRACT

Chapatti is a highly consumed bread in the countries of Southeast Asia. It, in fresh form, is of a tender texture, but within a few days past of storage, it becomes hard in texture, and non-elastic. The effects of guar and of CMC gums at two levels of 0.25 and 0.5% on quality of the bread were investigated throughout the present study. Based upon the obtained results, gum addition at different levels led to an increase in bread's moisture and ash contents. It improved such properties of the dough as rheological ones, water absorption, developmental time, resistance, dough softening, as well as its Farinograph quality. Organoleptic properties, including taste, color of crust, chewiness, texture, uniformity of baking; breakage and stretch of crust as well as symmetry were improved as compared with control. Also such properties as either resistance to stretch, or ability to stretch, (resistance stretch / ability to stretch) and also staling rate of samples decreased with gum's addition. The samples treated with guar gum (at a concentration of 0.5%) led to the most desirable results.

Keywords: Chapatti bread; Guar; Carboxy Metyhyl Cellulose; Rheological properties; Organoleptic properties

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The Effect of Accelerated Ripening, by the Aid of Encapsulated Protease and Lipase, on Texture of Brined Cheese

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ABSTRACT

The effect of accelerated ripening with the aid of encapsulated protease and lipase on such physicochemical properties as fat and moisture, texture and microstructure of brined cheese was investigated. It was found that addition of lipase increases hardness by reducing fat globules diameter and increasing casein matrix junction. It was also found that it decreases brittleness, due to fat degradation which is responsible for plasticizing effect. The number and mean diameter of the fat globules which were entrapped in casein network were affected by levels of added lipase. Encapsulated protease decreased hardness and brittleness of brined cheese through casein degradation into its low molecular weight peptides and amino acids.

Keywords: Accelerated ripening; hardness; brittleness; brined cheese

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Physical and Mechanical Properties of Biodegradable Edible Film Obtained from Salep

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ABSTRACT

In this study the feasibility of using salep as a new film-forming material was studied. The mechanical properties, water vapor permeability and thickness of salep films incorporated with glycerol were determined. Increasing the content of dry material of salep from 1% to 3%(w/v) increased values for tensile strength and elongation at break from 16.16% and 18.85 MPa to 70.15% and 24.50 MPa respectively. Also values for water vapor permeability, decreased and then went on an increase. Surface and dorsal sides of Salep edible films were studied through Scanning Electron Microscopy to explain structure properties. The study finally revealed that the salep benefited from a good potential to be used in producing edible films of desirable specifications.

Keywords: Salep; Edible film; Mechanical properties; Water vapor permeability; Scanning Electron Microscopy

An Investigation of the Effect of Ultrasonic Process on the Inactivation of *Saccharomyces cerevisiae* in Red Grape Juice

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ABSTRACT

Response Surface Methodology (RSM) was employed to find out the optimal conditions for ultrasonic treatment in achieving a maximum inactivation rate of yeasts' and total desirable content of anthocyanins during ultrasonic processing of red grape juice. Temperature in 3 levels (25, 37.5, 50°C), time at 20, 30, 40 minutes, and frequency (0, 67.5, 135 kHz) constituted the parameters the effects of which were studied. Experiments were designed according to central composite design with 3 levels including central and axial points for each of the mentioned parameters. In these experiments 2 mL of solution containing 0.5 McFarland (OD=0.13) were added to 100 mL of red grape juice. Results showed that linear and quadratic effects of all the 3 parameters (temperature, time and frequency) significantly affected ($p < 0.05$) the inactivation rate and anthocyanins content. Analysis Of Variance (ANOVA) was carried out to obtain the regressions for each response and for different model inputs. The most suitable conditions were found to be 37.25°C, 20 minutes and 35 kHz.

Keywords: Inactivation; Optimization; Red grape juice; *Saccharomyces cerevisiae*; Ultrasonic process

Modeling of Involved Phenomena in UF White Cheese Ripening Following its Dry Salting

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ABSTRACT

Ripening is among the most important processing stages in production of cheese. Throughout the ongoing research a comprehensive study of UF cheese (as the major industrial cheese produced in Iran) ripening, was carried out in which mass and heat transfer, as well as changes in quality and sensory properties were simultaneously considered and then a mathematical model developed to take them into account and describe them. To this end, lipolysis, proteolysis, texture and sensory property indexes of cheese samples were initially determined, and then the appropriate kinetic model to describe changes in these indexes developed. Using the heat transfer model and the relationships obtained between acid value and flavor, texture and Non-protein Nitrogen (NPN), as well as taste and general acceptance, a comprehensive mathematical model was developed to describe the non-aligned movement of salt and water, using Fick's second law, heat transfer making use of Fourier's second law, plus changes in quality characteristics as a function of internal and external factors in UF cheese during its ripening and salting process, through an application of MATLAB software. Lipolysis, proteolysis, texture and sensory property indexes, as well as salt, moisture and temperature profiles were then predicted. A comparison of the experimental vs. predicted data indicated a high correlation between the experimental values and those predicted by the model.

Keywords: Mass Transfer; Heat Transfer; Lipolysis; Proteolysis; Mathematical model

Changes in Qualitative Properties of Potato Stick during Pre-drying and Frying

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ABSTRACT

Due to storage problems, transport, and especially price fluctuations of fresh potato, production of such ready-to-use products like French fries has become of particular interest. One of the important steps in product processing is pre-drying. Sticks of 0.8*0.8*8 cm dimensions were prepared, blanched in hot water of 75°C for 10 minutes and then dried at four different following air temperatures of 50, 60, 70 and 80°C to moisture content of 70%. Finally, frying at 180°C for 4 minutes was performed. Color and texture were evaluated during the pre-drying process, whereas color, texture and oil uptake of samples were investigated following their being fried. The results showed that drying temperature was very much effective on product texture while no difference being observed in color and oil uptake of potato sticks. The most acceptable quality is expected to be obtained when drying the product at 70°C to a moisture content of 75%.

Keywords: Color; Texture; Oil uptake; Potato

Effect of Pre-fermentation and Freezing Temperature of Sangak Dough on the Yeast Activity and on Sangak Final Bread Volume

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ABSTRACT

The impact of freezing rate and degree of pre-fermentation on Sangak frozen dough and on its bread was assessed. The pre-fermentation was applied for a period of between zero to 120 min and the corresponding secondary fermentation between 120 to 0 min, respectively, to come up with a total fermentation time of 120 min. The pre-fermentation dough was formed in a flat shape and then frozen within -20, -25 and -30 °C of freezing temperature. It was followed by one day storage at -18 °C. Following storage period, a second fermentation (in some cases there were no second fermentations) was applied and in order to finish the fermented dough it was baked. Sangak frozen dough quality was assessed by detecting yeast survival and the gassing power following thawing. Characteristics of the frozen dough bread were evaluated by an evaluation of the density, after bread being baked. Results showed that viability of yeast initially increased and then decreased by an increasing in freezing rate, so that the highest viability was observed at -25°C. Maximum yeast viability was observed at a short pre-fermentation (30 min). A direct relationship was observed between gassing power and the yeast viability. The lowest bread density was obtained with the highest freezing rate accompanied by a short pre-fermentation.

Keywords: Bread density; Gassing power; Sangak bread; Yeast viability