ABSTRACTS

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P3-26.13

MICROBIAL SUCCESSION OF COCOA FERMENTATION

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The production of chocolate flavour requires fermentation of the sweet and mucilaginous pulp surrounding seeds of cacao plant *Theobroma cacao*. The fermentation is complex involving microbial activity in the pulp and biochemical reactions within cotyledon. The succession of micro-organisms during cocoa fermentation in Bahia (Brazil) was established. Yeasts, the primary colonizers, increased population during the first 12h, then remained almost constant in the next 12 h but decreased progressively during the alcoholic phase of fermentation. They are followed by lactic acid bacteria which reached a peak at the time when the yeast population was in decline. These bacteria exhibited the fastest growth rate during the 16-48h period of fermentation and were present in greater numbers - but not necessarily in biomass - than yeasts for a short period of time. As aeration of the fermenting mass increased and the temperature rose above 37°C, acetic acid bacteria became the dominant organisms until 72 h of fermentation. Thereafter aerobic, spore-forming bacteria dominated the microbial population to such an extent that they formed over 80% of the microflora. The activity of yeasts against cocoa pulp pectin will be discussed. Experiments are in progress to evaluate the formation of acids and alcohols produced by yeasts during fermentation.

P3-26.14

THE EFFECT OF CHEMICAL PRESERVATIVES ON THE MICROBIOLOGICAL STABILITY OF SMOKED FISH

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The aim of this research was to study the effect of chemical preservatives (Potassium sorbate, Hungarian powder, and Sodium benzoate) on the surviving microflora of hot smoked tilapia (Tilapia rendalli) during cold storage (10°C +/-1°C) for 29 days. The results showed that the treatments were similar in three experiments. The data indicated that during the storage,bacterial, molds and yeasts numbers decreased significantly with some tendency to reach equilibrium in the surviving microflora. After 29 days, it was recorded 19,9 x 10 CFU/g, 28 x 10 CFU/g, 68,2 x 10 CFU/g and 37,4 x 10 CFU/g to control, potassium sorbate, hungarian powder, and sodium benzoate respectively in the final numbers for yeasts and molds. The major genera found among molds were *Aspergillus*, *Mucor* and *Penicillium*. Total and fecal coliforms were detected, but *Staphylococcus aureus* and *Salmonella spp* were absent in all samples from each treatment. The results indicated that the use of sodium chloride is enough and the best to smoke fish.

P3-26.15

STRATEGIES OF THE YEAST *ZYGOSACCHAROMYCES BAILII* FOR SURVIVAL IN WEAK ACID-PRESERVED FOOD AND BEVERAGE

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Zygosaccharomyces bailii is one of the most dangerous food spoilage yeast, typical of low pH products with high sugar content and weak acid preservatives. Aiming at the elucidation of possible mechanisms underlying the high resistance of that yeast species to such environments in the presence of ethanol, studies on the toxic effects of acetic acid and other weak acids on growth, respiration/fermentation and cell viability, were developed. At low pH, the presence of ethanol, acetic, benzoic or sorbic acids in the medium inhibited both the specific growth rate and the specific respiration/fermentation rates, the degree of the inhibition being dependent on the nature and concentration of the compound. However, the toxic effects were significantly lower than those obtained for *Saccharomyces cerevisiae*. Those compounds also affected negatively the viability of *Z. bailii*, causing a shift of the lethal temperatures to lower values. The concentrations of acetic acid, above which those effects were measurable, at pH 3.0, were 2.5 % (w/v) for *Z. bailii* and 1.0% (w/v) for *S. cerevisiae*. The toxic effects of the acids described above were correlated with the type of mechanism underlying their transmembrane transport. Glucose or fructose grown cells of *Z. bailii*, formed a saturable transport system for acetate able to accept benzoate, sorbate and pentanoate. A carrier for acetate shared by formate and propionate was also found in cells grown in a medium with acetic acid, ethanol or glycerol. Thus, unlike *S. cerevisiae*, in *Z. bailii* acetic acid and other weak acids entered the cell by a mediated transport system even in glucose grown cells. In consequence ethanol inhibited the transport of acid in this yeast, instead of enhancing it as observed in glucose grown cells of *S. cerevisiae*. Such a behavior could explain the presence of *Z. bailii* in acidic media with glucose and ethanol like those often found in food and beverage products in which *S. cerevisiae* can no longer survive.

P3-26.16

GROWTH AND MYCOTOXIN PRODUCTION OF FUNGI UNDER MODIFIED ATMOSPHERES.

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The effect of atmospheres containing 20%, 40% and 60% CO_2 in balance with N_2 and < 0.5% O_2 as well 80% CO_2 with 20% O_2 on the growth of Mucor plumbeus, Fusarium oxysporum, Byssochlamys fulva, Byssochlamys nivea, Penicillium commune, Penicillium roqueforti, Aspergillus flavus, Eurotium chevalieri and Xeromyces bisporus was studied. The mycotoxins tested were: aflatoxin, patulin, cyclopiazonic acid and roquefortine C. Among the nine fungal species examined four groups could be distinguished: (i) Group I, species which did not grow in 20% CO_2 <0.5% O_2 (E. chevalieri and X. bisporus); (ii) Group II, species which grew in 20% CO_2 < 0.5% O_2, but not 40% CO_2 < 0.5% O_2 but grew in 80% CO_2 with 20% O_2 (P. roqueforti and A. flavus); (iii) Group III, species which grew in 20%, 40% and 60% CO_2 < 0.5% O_2, and also 80% CO_2 with 20% O_2 (M. plumbeus, F. oxysporum, B.fulva and B. nivea); (iv) Group IV, species which grew only in 80% CO_2 with 20% O_2 (P. commune). Mycotoxin production was decreased in all modified atmospheres.