Relationship of physical & chemical parameters on the microbial spoilage of dried fish in storage

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Abstract

Studies were conducted to find the interrelationship between the physical, chemical parameters and its correlation with bacterial, fungal growth in dried fish. Kattawa (Talang), Hurulla (Trenched-sardine), Halmasa (Anchovy) samples were packed and stored under Air-conditioning and ambient temperature respectively. Samples were tested twice a week for three months and analyzed for water activity, moisture, salt, total bacterial and fungal counts. Temperature and Relative Humidity was measured continually.

During Air-condition ($22^0 \pm 2^0$C) storage fungal growth of Talang had a strong correlation to moisture (r=0.8) as it increased significantly ($p < 0.05$) from 38.93 to 68.45%. In Trenched Sardine and Anchovy, bacterial and fungal growth showed a negative interrelationship (r=0.7) while the latter in Trenched Sardine was negatively correlated to water activity (r=0.9) and both salt and water activity also inversely correlated to storage time (r=0.8). In Anchovy fungal growth depend upon salt (r=0.8) and Moisture(r=0.7) while it changed significantly from 17.160 to 14.267 only up to 4th week.

Under ambient temperature ($30^0 \pm 2^0$C), moisture in Talang, Trenched Sardine changed drastically 38.267 to 18.767 % and 32.833 to 23.70 % respectively and it had a strong correlation to bacterial population (r=0.9) during storage. Also the fungal population in Talang increased with the reduction of water activity (r=0.8). The bacterial count in Trenched Sardine also had a positive correlation with salt level (r=0.8) as salt content reduced from 14.733 to 10.9% during 12 weeks. Anchovy when stored under ambient temperature its water activity reduces with the storage time (r=0.9) and the changes in bacterial and fungal populations, the pattern observed was a strong negative correlation (r=0.9).

Behavior of dried fish spoilage indicates no common pattern for microbiological & chemical deterioration with storage can be derived but the changes are more species related. The trends in bacterial and fungal growth indicated a decrease in bacteria with the increase of yeast and moulds in all samples, but no strong correlation can be established as expected. Results indicate microbiological spoilage is more related to chemical composition and water activity changes. it is more suitable to store dried fish under ambient temperature with suitable packing as changes in moisture, salt, water activity is in favour of controlling bacteria, yeast and mould growth

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