

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
 FACULTY OF SCIENCE
 DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY

PROJECT TITLE

QUANTITATIVE DETERMINATION OF LACTIC ACID
 IN MEATS AND MEAT PRODUCTS

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NAISON CHINYAMA

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 PROF.DR. T. DJAROVA
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ABSTRACT

Lactic acid (LA) is a parameter that can be used to assess meat quality. It has a major influence on meat maturation, tenderness and storage qualities. LA can be used as a decontaminant in the meat industry. LA concentration in meat and meat products can be determined by either enzymatic methods using lactate dehydrogenase (LDH) or nonenzymatic methods, but the former are expensive. In this survey LA concentration was determined using a simple quantitative method.

The concentrations of LA in beef, mutton, pork, chicken, ostrich, Colcom French Polony and different sausages (Colcom Vienna, Cambridge, Beef and Oxford) were explored. These samples were stored at temperatures of 25°C, 4°C and -20°C for different times (24 hours, 48 hours and 14 days). The initial LA concentration in beef, mutton, pork, ostrich and chicken meat were found to be 52.39mM/kg, 54,63mM/kg, 17,03mM/kg, 55,08mM/kg and 170, 12mM/kg wet tissue respectively. An initial LA concentration of at least 136.00mM/kg sample was obtained for all the sausages and polony. LA concentration of sausages were significantly higher ($p < 0.01$) than of beef, ostrich and mutton. LA content of the ostrich was the lowest compared to all other meats and meat products ($p < 0.01$). There was a general increase in LA concentration for each sample with storage at a particular temperature; after 14 days at 4°C the LA concentration of beef increased from 52.39mM/kg wet tissue to 373,33mM/kg wet tissue.

The results comply with the fact that LA concentration of meat types is a function of glycogen level in the tissue prior to slaughter. The glycogen level is influenced by the species, muscle type, variability between individual animals and treatment of animal prior to slaughter. The increase in LA concentration at 4°C was attributed to accidental contamination by lactic acid bacteria which by either homolactic or heterolactic fermentation produces lactic acid. Growth of these lactic acid bacteria differs at different temperatures. A marked increase in LA concentration was noted at 4°C, after 14 days, as compared to at -20°C. Microbial proliferation seem to be inhibited at -20°C.

The LA concentration of sausages was found to be a function of the amounts of lean meat and cereals included in their manufacture.

The correlation coefficient (R) between the LA concentration and pH at a particular temperature with time course was found to be generally negative, reflecting that high LA concentration is associated with a decrease in pH. No difference was found between the two spectrophotometers; they shared the mean absorbance of 0,37.