

**Title** Establishment of kinetic models based on electrical conductivity and freshness indicators for the forecasting of crucian carp (*Carassius carassius*) freshness

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#### **Abstract**

To study quality changes in cold chain circulation, kinetic models were developed to predict the freshness of crucian carp at different temperatures during storage. Electrical conductivity (EC) and freshness indicators (Total volatile basic nitrogen, Total aerobic count and *K*-value) at 270, 273, 277, 282 and 288 K were accessed to investigate the relation between the crucian carp's freshness and storage condition (storage temperature and storage time). The kinetic models were developed based on Arrhenius equation. Activation energies ( $E_A$ ) of EC and Total aerobic count (TAC) are 97.75 and 105.93 kJ mol<sup>-1</sup>, and corresponding rate constants ( $k_0$ ) are  $5.25 \times 10^{16}$  and  $5.70 \times 10^{18}$ , respectively. Relative errors between predicted and values of EC are all within  $\pm 5\%$ . The kinetic model established through EC can accurately describe the changes of crucian carp's quality during the storage within 270–288 K. The kinetic model established based on TAC can accurately forecast crucian carp's early freshness.