

**USE OF THERMOCHROMIC PIGMENTS TO  
DEVELOP A FRESHNESS INDICATOR FOR  
FREEZE STORED FOODS**

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## ABSTRACT

Freezing is used for the purpose of preserving perishables and results in fewer undesirable changes in qualitative and organoleptic properties than other methods of preservation. Use of indicators to maintain the freshness of these freeze stored foods has numerous advantages in the sense of marketing. The potential of sensor technologies, indicators (including integrity, freshness and time-temperature (TTI) indicators) and radio frequency identification (RFID) are evaluated for potential use in meat and meat products. Thermochromic pigments have a greater contribute for time temperature indicators they are the substances which change the color due to temperature changes. Use of thermochromic pigments, to develop a freshness indicator is one of the modern trends of marketing, hence the purpose of this thesis to find the suitable mixture of pigments, which can be used to detect whether poultry and meat products are properly refrigerated under freezing conditions. A photoactivated time-temperature indicator is based on a leuco base system. This is developed by thermally insensitive, white ("inactive") leuco base (or a mixture of such leuco bases) is mixed, preferably in a polymeric matrix, with a material that generates acid upon exposure to light. Photoexcitation, preferably by UV or near UV light, causes the formation of a thermally sensitive, color- forming ("active") product. Following this activation step, a progressive color development occurs at a rate that increases with temperature. The best solvent mixture for the polymeric gel is ninety five ethanol in water mixture, and dried, UV activated labels readily develop deep green color from fainty gray color, when the temperature exceeds 12<sup>0</sup>C after four hours. Fifty percent of reflectivity at 632 nm was obtained after 4 hours at 12<sup>0</sup>C. The indicator is useful for monitoring the freshness of perishable products, particularly those stored at sub ambient temperature.