National Conference on Recent Advances in Science, Engineering, Humanities, and Management (NCRASETHM - 2024)
28th January, 2024, Banquet, Noida, India.

CERTIFICATE NO : NCRASETHM /2024/C0124148

IMPACT OF PHOTOSENSITIZER AND BLUE LIGHT ON INACTIVATION OF FOODBORNE PATHOGENS

SAJESH T

Research Scholar, Ph. D. in Food Technology
Mansarovar Global University, Bilkisganj, Sehore, M.P.

ABSTRACT

The impact of photosensitizers combined with blue light on the inactivation of foodborne pathogens is a promising innovation in food safety. Photosensitizers are compounds that, when exposed to specific wavelengths of light, generate reactive oxygen species (ROS) capable of damaging microbial cell structures and inactivating pathogens. Blue light, typically in the wavelength range of 400–480 nm, is particularly effective in this context because it activates certain endogenous or added photosensitizers, such as riboflavin, curcumin, or chlorophyll derivatives. When applied to foodborne pathogens, this technique disrupts cell membranes, damages DNA, and interferes with metabolic processes, leading to microbial death. Unlike traditional chemical sanitizers, this method does not leave harmful residues, making it an attractive solution for minimally processed foods. Studies have shown its effectiveness against pathogens such as Escherichia coli, Listeria monocytogenes, and Salmonella on food surfaces and in liquid food matrices. Additionally, the photosensitizer-blue light combination can be optimized to target specific pathogens while preserving food quality. Its non-thermal nature ensures minimal impact on sensory and nutritional properties. However, factors such as light penetration, photosensitizer concentration, and the type of food matrix need to be carefully considered to maximize efficacy and ensure consumer safety.