Can Dean Flow UV-C Systems Improve Retention of Ascorbic Acid in Immunity Shots?

Ultraviolet (UV-C) technology has emerged as a promising non-thermal method for preserving bioactive compounds in functional beverages such as immunity shots unlike heat pasteurization. Heat pasteurization accelerates the oxidation and degradation of heat-sensitive bioactive compounds. Therefore, this study evaluates the application of Dean flow UV technology in treating orange-ginger immunity shots, focusing on its efficacy in retaining bioactive compounds. Optical properties, including absorption coefficients, were assessed using a double-beam spectrophotometer connected to a single integrating sphere. UV light transmission was quantified from absorption coefficients (42.55 ± 0.07). Immunity shots (raw) were treated at a flow rate of 515 mL/min with a fluence of 30 mJ/cm² with De>100. Results demonstrated a retention of 92% of ascorbic acid ($p<0.05$), as quantified using reverse phase high-performance liquid chromatography. The findings highlight that UV-C technology effectively treats immunity shots while retaining essential bioactive compounds, such as ascorbic acid, making it a viable alternative to conventional thermal treatments. This study underscores the potential of Dean flow UV technology for industrial applications in producing functional beverages with preserved nutritional and bioactive properties.

Keywords: UV-C Systems, Dean Flow, Ascorbic acid, UV-C, Bioactives