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(54) Title: DISINFECTION THROUGH PACKAGING

(57) **Abstract:** Method and system for disinfection and sterilization through packaging (DTP) are disclosed. The method and system are useful for the treatment of solids, liquids, gases or a combination thereof without damaging said packaging, or their content using high peak power pulsed radiation unit having a high intensity source of light. Said method and system present invention are especially beneficial for disinfecting and sterilizing water-based packaged products, and for granting biosecurity to modern agro-food production lines, biomedical preparation processes such as used for the production of vaccination, and for the production through packaging of opto-pro-biotic or OPB compounds for the enhancement of the human immune system (acquired immune system, or MHC type I, II, III). The methodology of the present invention is especially beneficial for agro-food production, for biomedical fields, and for bottled water or flavored water and beverages. More specifically, the present invention facilitate the disinfection or photo-treatment of liquids and gases after they have been filled into the packaging, and the packaging is closed already, or the packaging will be closed prior or after treatment. The evolutionary step of the method according to the present invention facilitate final polishing, or processing (by light) for increasing the safety, bio-security, and chemical purity of bottled water or packaged liquids or gases or combination. The methodology of the present invention eliminates the need to transfer the liquid or gas, or solids, or combination through a plurality of stages, or through cumbersome distribution systems requiring substantial attention to bio-compatibility, and biological, and chemical cleanliness and purity of origin of components therein (in the packaging). Furthermore, the methodology of the present invention facilitates the provision of a single step for purification, disinfection, sterilization, oxygenation, dissociation, or reduction, elimination, or equalization of unwanted species of biological, or chemical origin without the need to open the package and treat the content separately. More specifically, the present invention discloses a novel methodology for photo-treatment through packaging without causing molecular migration or damaging to said packaging or their content therein. The competitive advantages of the methodology of the present invention, as well as instruments, or devices using the method, is the capability to ensure purity, freshness, integrity, and naturally of single and multi-components compounds, liquids, gases or solids or any combination thereof by transferring light through packaging for photo-treatment through packaging enhancing the quality levels through out the life of processed products by the method of the present invention for disinfection and sterilization, oxidation, and reduction, dissociation and photo-treatment through packaging DTP (disinfection Through Packaging). Especially beneficial for bottling industries and for the biomedical field.

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