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Extraction of hyaluronic acid from bacterial culture

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Hyaluronic acid (HA) is a polysaccharide of biological origin found along with connective, epithelial and neural tissues. It has wide applications in the real world, such as in skin care products. It is a vital component in many cosmetic formulations. It has humongous medical importance and they are as follows: it acts as a lubricating agent, helps in increasing the viscosity of the synovial fluid and aids in the preservation of bone strength. In addition, HA has been widely used to treat osteoarthritis and reduce bladder pain. Further, HA has various sources of origin from which it can be extracted. For example, bone broth, soy foods, flax seeds, walnuts, olives, chicken feathers and some bacterial species. One such method from which HA can be effectively isolated is from the bacteria,Streptococcus pyogenes. Hyaluronic acid is an extracellular product that is found in the capsule of the bacteria and can be extracted by bacterial fermentation process. As streptococcus pyogenes is a pathogenic organism, the bacteria must be filtered for endotoxins prior to the inoculation in a nutrient broth. The best hyaluronic acid producing colonies can be selected by incubating the culture in blood agar or other appropriate nutrient rich mediums. The bacterial cultures need to be maintained in pyrogen-free conditions and fermented under anaerobic conditions in a medium containing CO2. Following the fermentation process, trichloroacetic acid is added to the fermentation broth so as to kill the bacterial cells and to mediate easy separation of the cells, which in turn facilitates HA extraction. Once the bacterial cells are killed, they are carefully removed along with other fermentation by-products, hence increasing the feasibility of extraction of HA. The isolated HA then undergoes purification in order to be used in various skin care products.

Keywords: Hyaluronic acid, Streptococcus pyogenes, Polysaccharide, Anaerobic conditions, Fermentation

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