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## **A study to develop a technique which can serve as an alternative to holozoic mode of nutrition in animals and humans:A green human approach**

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### **Abstract**

Evolution has made men capable enough to live and flourish on earth and exploit earth and the universe at various levels. As assumed, we are not alone in this universe. There are many chances of occurrence of life on other planets. The existence of life will be depending on the mode of utilization of the energy sources by the organisms. As sun is considered as the primary energy source, since beside water and oxygen, it enable the organisms to perform the major task of generation of energy through biological process Photosynthesis. Through this article it has been tried to throw some light on using the solar energy in an extraordinary form, different from the original way we know till yet. This might be strange to us, but can serve as an basic tool to enhance our knowledge and to think about a different mode of food production and energy generation by living organisms. It is focussed on making some animal species and humans to act as partially autotrophic in nature. This can serve as a major tool to solve the problem of energy and food crisis which seems inevitable for the growing world population within next 50-100 years. Hereby I am summarizing my idea in a very simple form. Hope this idea will be a bit useful for the mankind.

**Keywords:** Holozoic mode, nutrition, animals, humans

### **Introduction**

Earth was formed nearly 4.5 billion years ago. After that it took billion of years for the planet to evolve and enhance itself to sustain any life form. As believed the origin of life occurred from small bio molecules which later converted and flourished into different life forms i.e Monera, Protista, Fungi, Plantae and Animalia. The best thing was that nature was having a time of billions of years resulting into formation of millions of life forms and various species, out of which many have got extinct. The top most of them are Humans (*Homo sapiens sapiens*). Humans rule this planet by surviving under different locations in different environmental conditions on earth. This is so because our basic needs are fulfilled here. There are enough natural resources to sustain our life at various levels. The major part of these needs is the Energy. This energy is in the form of nutrition and food we take by different means. Like many other organisms on earth we follow the *heterotrophic* mode of nutrition. We take organic food (*holozoic*), digest it by our elementary canal and ultimately use the energy after digestion through absorption in forms of glucose and ATP. Indeed, we humans have evolved in such a way to be heterotrophic in nature and take energy through holozoic mode by eating food, The question is whether this way of nutrition is the only way to maintain a energy balance in a body by us or even by other animals on earth. Definitely, it is true to a large extent, but what about if the conditions arrive of scarcity of food or even unavailability of food similarly to a condition on any other planet like Mars, where there is complete unavailability of food on which we are planning to survive. For this condition we should opt for some alternative energy source.

This can be done by developing a way of overcoming the heterotrophic mode of nutrition to a large extent. The process will enhance some animals or humans to become independent on major food sources to a large extent, also enabling to solve the problem of food crisis to a large extent which is to be come in future for sure for the rising population. After more than a decade of development of photovoltaic cell, still we are restricted for utilizing the solar energy as a source of electrical and mechanical energy only. It would be rather great to develop systems so as to utilize this solar energy by living systems i.e. animals. These systems can be developed either directly making the dermal and epidermal layer of an animal to act as an absorber of light and acting as a element which can perform photosynthetic reaction directly by utilizing bodies internal metabolites as raw materials for the energy synthesis. The process needs great inputs and manipulations at the biological level. For this a second alternative can be opted which may be less complex and can be experimentally done with more

effectiveness. It comprises of growing of a photosynthetic micro organism with symbiotic relationship on the epidermal or dermal layer of a model organism acting as a host. It can be a plant ,algae or lichens. Lichens being the most potential organisms to grow on variable types of surfaces are the most preferable.

Lichens are the most developed group of micro organisms consists of symbiotic origin of both algae and fungi. Algae part serve as the source of photosynthetic reaction and energy synthesis , while the fungal component is attached to the surface getting itself nourished and also provide the moisture and nutrients to the algae by absorbing them from the surface. The algal part of the dual organism may comprises of cyanobacterial cells which are photosynthetic in nature, and as in plants they can reduce the carbon dioxide into energy molecules of glucose and fructose so as to provide energy directly to both the symbionts . Thus together a chain of energy production is initiated by both organisms.

So by utilizing this process and enabling it for further symbiosis with the animal models a simple protocol can be set up so as to make this experimentally possible.

### **Materials and methods**

The methodology of the process is summarised as:

STEP 1: The initial step involves growing and developing some algae/lichens on different types of biomass of animal tissues basically of dermal and epidermal origin .The main motive is to get any algae/lichens species that can survive and grow in controlled form on the tissue of an animals , beside without harming or degrading it.

STEP 2 : The physiological properties of the algae/lichens are to be studied so as to enhance its growth as a photoautotroph. By using genetic engineering, genetic modification can be made in such a way so that the algae/lichens can utilize the light energy to a large extent, also it can withdraw useful elements , moisture from the skin or hairs or body fluids of the host organisms without harming it as in a symbiotic manner.

STEP 3: Next step will be to isolate those species which can grow to a large extent on the epidermal or dermal layer of the host model organism in a mutual relationship *i.e* without harming the host organism. This is quite complex and can be manipulated as by using a artificial layer made of any natural polymer which can bind with the epidermis layer.

STEP 4 : It is the major step governing the biochemistry and metabolism of the whole process. It consists the mechanism of the utilization of energy by the host organism. Since the lichens are a symbiotic group of algae and fungi in which the task of energy production by photosynthesis is done by the algae which later transfers that energy in form of a sugar molecule or an amino acid or even directly as a ATP to its partner fungi.

The main objective of this whole system is to transfer this energy through any source into the host either directly from the algae or from the fungus part of the lichen which is directly attached to the host.

STEP 5 : This is the most complicated task involving the transfer of the energy components directly in to the circulatory system of the host *i.e* into blood so that it can be used by the host as a energy source.

### **Future Perspectives and Conclusion**

Food is the major source for the survival for any organism on the earth whether plants, animals or humans. In recent past there had been a sudden boom in growth of world's population due to decreased mortality rate because of good medical facilities and upgraded lifestyles of humans. But this uncontrolled increment had led the world to suffer with the problem of insufficient food availability. With such a drastic increasing rate of population humans have to face a severe problem of food crisis within next 50-100 years . To get rid of this problem either we have to enhance our Agricultural practices to a very large level or either we should opt some alternative energy sources at any cost. Beside this the technique can have a important role in space exploration programs in the future.

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