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## Review Article

# Review: Biofuel production from plant and algal biomass

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## ABSTRACT

Biofuels are the promising alternative to exhaustible, environmentally unsafe fossil fuels. Algal biomass is attractive raw for biofuel production. Its cultivation does not compete for cropland with agricultural growing of food crop for biofuel and does not require complex treatment methods in comparison with lignocellulose-enriched biomass. Many microalgae are mixotrophs, so they can be used as energy source and as sewage purifier simultaneously. One of the main steps for algal biofuel fabrication is the cultivation of biomass. Photobioreactors and open-air systems are used for this purpose. The formers allow the careful cultivation control, but the latter ones are cheaper and simpler. Biomass conversion processes may be divided to the thermochemical, chemical, biochemical methods and direct combustion. For biodiesel production, triglyceride-enriched biomass undergoes transesterification. For bioalcohol production, biomass is subjected to fermentation. There are three methods of biohydrogen production in the microalgal cells: direct biophotolysis, indirect biophotolysis, fermentation.

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## Introduction

To maintain all vital processes at the proper level human organism needs about 100 J per second (Fig. 1a). Human body receives the energy from food. About 30 times more energy is used on average to make our life more comfortable [1,2]. It puts challenges for humanity: search of energy sources, development of energy production techniques, and construction of infrastructure to facilitate energy use.

It is possible to define three general areas of energy consumption (Fig. 1b):

- Maintenance of electrical devices;
- Fuel for vehicles or motorized instruments;
- Space heating, maintenance of cooking systems.

Contemporary energy faces with problem.

World population is rising. In addition, the number of power devices per head is rising, too. Hence, worldwide

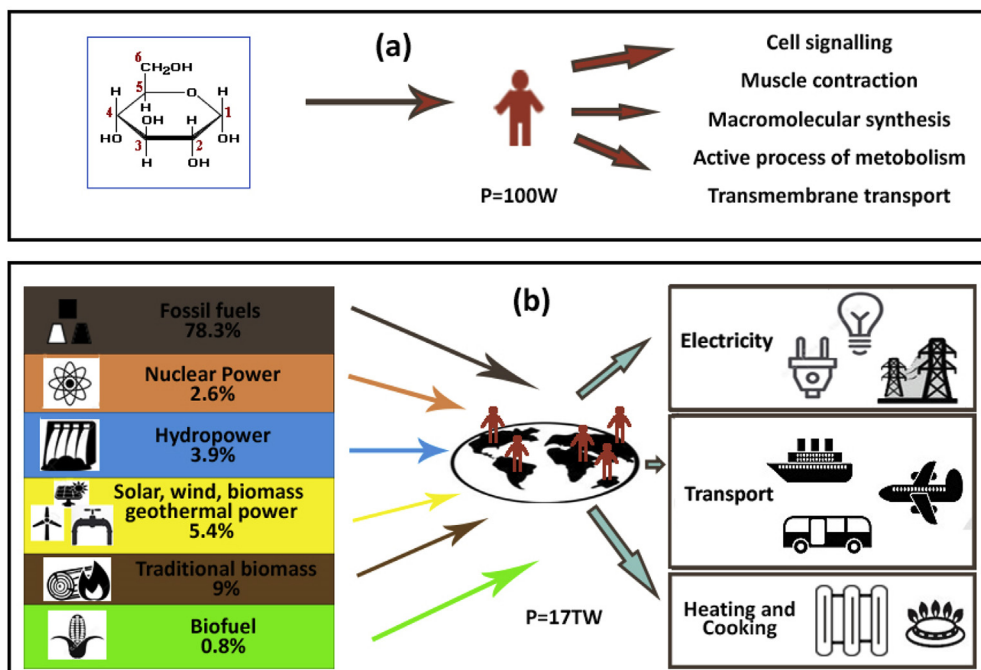


Fig. 1 – External energy sources and its scopes of application for (a): the human body; (b): the human community. P – power consumption. Data from Refs. [1,2].

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