se sacrificaron anónimamente. En Moscú, en la Plaza Roja, al pie de la roja Muralla del Kremlin, arde el fuego eterno en memoria de los millones de personas que entregaron sus vidas y la hazaña de cada uno es inmortal [5]. *Nada será olvidado. Nadie será olvidado.*

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Студ. А.О. Михайловский
Науч. рук. ст. преп. С.И. Шпановская
(кафедра межкультурных коммуникаций и технического перевода, БГТУ)

CELLULOSIC ETHANOL

Cellulosic ethanol is chemically identical to first generation bioethanol (i.e. CH3CH2OH). However, it is produced from different raw materials via a more complex process (cellulose hydrolysis).

Pretreatment is the first step of the cellulosic bioethanol process. The purpose of pretreatment is to make the cellulose more susceptible to being broken down so that it is ready for the enzyme hydrolysis step. Pretreatment does this by partially removing the lignin and hemicellulose, which block the cellulose inside the cell wall [1].

The pretreatment step can be done by using acid, alkali, organic solvents, heat treatments, etc. Some options for pretreatment are steam explosion, liquid hot water, lime-ammonia and acid treatment [2].

Enzyme hydrolysis usually occurs immediately after the pretreatment step. Enzyme hydrolysis is the process used to convert polysaccharides (cellulose and hemicelluloses) and their oligomers (molecules with a few single sugar units) into simple sugars, which can be fermented by bacteria or yeast. The high cost of enzymes is currently the greatest challenge in this processing step. Although current world-leading enzyme suppliers have reduced the price of enzymes about 20- to 30-fold, the cost for enzymes is still the most expensive part of the entire bioethanol process. An important approach to reduce the cost for enzyme hydrolysis is to develop an efficient pretreatment method to reduce the enzyme dosage and enhance the yield of simple sugars. Sugar yield is typically less than 20% without pretreatment, whereas yield after pretreatment often exceeds 90 % [3].

Conventional fermentation is the process that converts the sugars from sugar-rich feedstocks (fruit juices, pomace and grains, such as corn and sweet sorghum) into alcohol in the brewing and beverage alcohol industries. In a cellulosic bioethanol process, fermentation is used to convert the single sugars obtained from the enzyme hydrolysis step (glucose from cellulose and xylose from hemicellulose) to fuel ethanol. Organisms such as yeast or bacteria are used to convert these simple sugars to ethanol. In order to keep distillation costs low, the appropriate microorganism is selected based on the need to achieve high ethanol yield while also with standing inhibition from accumulating toxic substances and autointoxication from increasing ethanol concentration.

The fermentation step usually follows enzymatic hydrolysis, as a separate step. This procedure is known as separate hydrolysis and fermentation (SHF). However, the most commonly used technique is called the simultaneous fermentation (SSF) process, which is carried out by combining fermentation and enzyme hydrolysis in the same step. Normally, higher ethanol yield can be achieved with SSF, which can be attributed to the reduction of inhibitory end-products (glucose and cellubiose).

Ethanol is used as alcohol in common usage and now is also used as transportation fuel. The largest single use of ethanol as a fuel is as a motor fuel and fuel additive. The blending of ethanol makes the fuel mixture burn more completely and reduces pollution emissions. However, the energy content of ethanol is approximately 33 % lower than gasoline. Blending must be done very carefully, and it is usually done locally. Ethanol easily absorbs water if underground pipes have any leaks. It can also absorb water vapor if there are any loose seals. Water does not mix with oil and phase separation will occur. Water contamination may result in engine damage and reduction of fuel efficiency.

Producing fuel ethanol from inedible and abundantly-available cellulose biomass offers an important opportunity to sustainably produce alternative transportation fuels. This would be extremely beneficial from economic and environmental standpoints. Although significant progress has been made to reduce the manufacturing costs, widespread commercialization of this technology has not been realized. Before bioethanol can become an economic alternative for transportation fuel, there will need to be more efficient pretreatment methods, further reduction of biological enzyme costs, and development of more efficient genetically engineered microorganisms.

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Студ. В.И. Ропот
Науч. рук. ст. преп. С.И. Шпановская
(кафедра межкультурных коммуникаций и технического перевода, БГТУ)

SNOW AS AN INDICATOR OF THE ENVIROMENT

The cryosphere [1] consists of water in the solid form at the Earth's surface and includes snow, sea ice, glaciers and ice sheets. Since the 1990s the cryosphere and its components have often been considered as indicators of global warming because rising temperatures can enhance the melting of solid water.

Changes in the cryosphere are often easier to recognize than a global temperature rise of a couple of degrees: many locals and tourists have hands-on experience in changes in the extent of glaciers or the duration of winter snow cover on the Eurasian and North American continents. Contemporary sedimentation processes also play a significant role in shaping urban environmental quality. In addition to natural factors, such as weath-