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Energy efficient technologies for lignocellulosic ethanol production

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Abstract

Currently, biofuels are the most significant alternative fuel aiming to provide clean power for transport, in case sustainable production technologies are employed. Due to the increased tendency of turning over the existing agricultural land to biofuel production, lignocellulosic feedstock is gaining increasing support against the use of first generation feedstock such as sugar cane, corn, wheat or sweet potatoes. However, despite the existing pilot plants, energy intensive technological processes like pretreatment and distillation, as well as high cost of enzymes, still prevent market roll-out of production facilities, extensive researches being conducted in order to find economically feasible alternatives.

New close to market techniques, with improved performance in terms of energy and resources, are discussed: the relatively recent SPORL pretreatment, reported as the most effective in size-reduction energy consumption; pretreatment by means of extrusion - a technique in which biomass undergoes continuous mixing, heating and shearing, thus suffering physico-chemical disintegration; energy saving pass-through distillation that performs at room temperature, which also offers indirect advantages like the possibility of yeasts and enzymes recovery, and simplified exploitation and maintenance of the distillation equipment. The above mentioned subjects are selected based on their reported performances as well as on their market potential and estimated technical and economic feasibility.