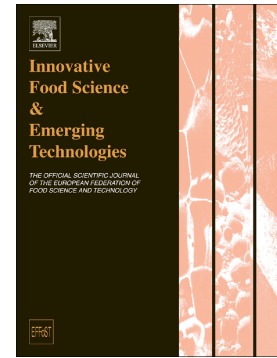


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Food Processing Industry Energy and Water Consumption in the Pacific Northwest

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Abstract

The food processing industry is one of the largest consumers of energy and water in the manufacturing sector. It is vital that conservation measures are taken to reduce the use of electricity, fuel, and water for producers to have long-term, sustainable growth. The Pacific Northwest (PNW) region includes some of the largest food processors in the United States, particularly with products such as fruit and vegetable preserves, apples products, potato products, and milk. Energy and water consumption in PNW food processing facilities are quantified as well as techniques to increase efficiency and reduce waste. Mechanical drive systems and refrigeration consumes the most electricity in the industry and the implementation of energy management plans has the largest potential to save electricity in PNW facilities. Heating and cooling process needs are the largest consumers of energy in the food processing industry. Implementing cogeneration/trigeneration technology, replacing of older equipment, capturing waste heat, and reusing wastewater can have significant impacts on both energy and water consumption. Novel, emerging technologies such as membrane separation, high-pressure processing, microwave assist, ultrasound, pulsed high electric fields, ozone, and hydrogen/electricity generation have significant potential to benefit the food processing industry by increasing efficiency and allowing companies to stay competitive in an industry where sustainable practices are becoming increasingly important to the public.

Key words: FEW Nexus; Food processing industry; Emerging technologies; Energy saving; Water consumption; Dairy process.

1. Introduction

The food processing industry has a vital role in the northwest region of the United States, employing over 71,000 people and producing over \$31 billion in goods [1]. Transforming raw livestock and agricultural products into a widely diverse range of products for consumption, the food industry consists of many sub industries/sectors such as fruit and vegetable products, baked goods and grains, dairy products, meat packing, etc. Products are prepared in a variety of ways such as canning, freezing, cooking, pasteurizing, and many others. Food processing industries are often among the largest for states they are located in, such as Oregon where they represent

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