



VODE U INDUSTRIJI PIVA - NAPOJNE VODE, PROCESNE, TEHNOLOŠKE I OTPADNE VODE

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Sažetak:

Voda je jedna od osnovnih sirovina za proizvodnju piva. Kvalitet napojne vode jedan od važnijih faktora dobrog kvaliteta piva. Iako je kvalitet proizvoda, odnosno piva ključan faktor za proizvodnju, u ekološki održivom razvoju i uz primenu ekoloških principa upadljivo je velika potrošnja vode u pivskoj industriji. Poznat je podatak iz literature da je prosečna potrošnja vode od 5 do 8 L/L piva (finalnog proizvoda koji je spreman za korišćenje i u odgovarajućoj je ambalaži). Analizirajući potrošnju vode kod tehnoloških procesa u pivarama najviše vode se troši za čišćenje i dezinfekciju. Od ukupne potrošnje skoro 50% se potroši na ove procese. Voda koja se koristi za proizvodnju piva, predstavlja 25% od ukupne potrošnje. Veliki deo vode završi u otpadnoj vodi. Prema istraživanjima koje su radile pivare u Evropi za 1hL piva nastaje 2,2 do 3,3hL otpadnih voda. U cilju ostvarivanja ekološke održivosti, kao i usled rasta troškova za pripremu vode za piće i obradu otpadne vode procesna industrija nalazi se pred izazovima da pronađe nove načine za smanjenje potrošnje vode i za smanjenje proizvodnje otpada. Osim izmene procesne tehnologije postoji više pristupa za smanjenje potrošnje vode za piće koji se mogu realizovati. Prvi je ponovna upotreba odnosno regeneracija vode. U ovom radu je predstavljen niz mogućnosti ponovne upotrebe vode u šaržnim procesima za konkretan primer pivare. U prvom delu su identifikovani kritični procesi u tehnološkom procesu proizvodnje piva uz poređenje potrošnje vode i predlozima za ponovno korišćenje vode. Potrošnja vode bi se mogla smanjiti ponovnim korišćenjem izlaznog toka kod postupaka koji obuhvataju pranje (mašine za pranje boca, za pranje sanduka), prikupljanje i bolju raspodelu vode za ispiranje punjača za pivo.

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Ključne reči: voda, proizvodnja, otpad, regeneracija.



WATER IN THE BEER INDUSTRY - FEED WATER, PROCESS AND WASTE WATER

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Summary:

Water is one of the basic raw materials for beer production. The quality of the feed water is one of the most important factors of beer quality. Although the quality of the product, i.e. beer, is a key factor for production, in ecologically sustainable development and with the application of ecological principles, a large consumption of water is of concern. It is known from the literature that the average consumption of water is 5 to 8 L/L of beer, for the final product that is filled and packaged. Analyzing total water consumption in technological processes in breweries, the highest amount of water is used for cleaning and disinfection. Almost 50% of the total consumption is spent on these processes. The water used for beer production represents 25% of the total consumption. A large part of the water ends up in waste water. According to research conducted by breweries in Europe, 2.2 to 3.3 hL of waste water is produced for every hL of final beer. In order to achieve environmental sustainability, as well as due to the increase in costs for the preparation of drinking water and wastewater treatment, the process industry is facing challenges to find new ways to reduce water consumption and reduce waste production. In addition to changing the process technology, there are several approaches to reducing drinking water consumption that can be implemented. The first is reuse, ie regeneration and re-regeneration of water. This paper presents a series of water reuse possibilities in batch processes for a concrete example of a brewery. In the first part, critical processes in the technological process of beer production are identified, with a comparison of water consumption and suggestions for water reuse. Water consumption could be reduced by reusing the effluent in processes including washing (bottle washing machines, case washing), collection and better distribution of water for rinsing beer fillers.

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