

formal relationship with Taiwan was discontinued after 1978, Taiwan continued to play an important role for Japan, particularly since the late 1980s, when Japan sought to strengthen its ties with the so-called newly industrialized countries of Asia (South Korea, Taiwan, and Singapore, as well as Hong Kong when it was a British colony). These were all seen as areas capable of providing high-quality goods for the Japanese market and consequently as sites for direct investment by Japanese firms. Efforts to solidify relations with Southeast Asia advanced in the late 20th century. Southeast Asian nations—particularly Indonesia—became recipients of extensive Japanese development aid. Japan also made efforts to work with Vietnam and Cambodia. The Japanese government also sought to address lingering animosities that existed toward Japan on the Korean peninsula. Formal statements of apology to Korea for Japan's colonial rule were issued, visits were made by the leaders of Japan and South Korea to each other's countries, and bilateral trade agreements were negotiated.

Conclusion

Japan is one of the most developed countries that, despite all difficulties, continues to improve all sides of the economy. And now it is one of the most successful examples in the international arena.

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THE ENERGY BALANCE OF CORN ETHANOL ЕНЕРГЕТИЧНИЙ БАЛАНС КУКУРУДЗЯНОГО ЕТАНОЛУ

Новіков Е.В – здобувач вищої освіти ММ 1/2

Науковий керівник - Марковська А. В., кандидат філологічних наук, доцент МНАУ

Ця стаття визначає фактори широкого спектра оцінок, які спричиняють ці суттєві зміни, та розробляє більш послідовну оцінку. Ми прийшли до висновку, що NEV кукурудзяного етанолу з часом зростає завдяки технологічним досягненням у перетворенні етанолу та підвищенню ефективності сільськогосподарського виробництва. Це показує, що етанол кукурудзи є енергоефективним, про що свідчить джерело енергії: коефіцієнт введення 1,34.

Ключові слова: етанол, баланс чистої енергії, виробництво кукурудзи, енергія.

This article identifies the factors in a wide range of assessments that cause these significant changes and develops a more consistent assessment. We conclude that the NEV of corn ethanol has grown over time due to technological advances in ethanol conversion and increased efficiency in

agricultural production. This shows that corn ethanol is energy efficient, as evidenced by the energy source: an input factor of 1.34.

Keywords: *ethanol, net energy balance, corn production, energy.*

Ethanol production rose from a few million gallons in the mid-1970s to more than 1.7 billion gallons in 2001. National energy security concerns, new federal gasoline standards, and government incentives have been major drivers of this growth. In addition, public and private research funding has led to new technologies that have reduced the cost of producing ethanol made from corn. Oil prices have risen sharply, raising major concerns about the security of national energy sources. It became a fuel with ethanol, attractive as a gasoline expander, and was considered an increase in gasoline supplies. The Environmental Protection Agency has tried to replace lead additives with gasoline used to increase octane levels. Due to its high octane content, ethanol soon played an important role as an octane enhancer. An increase in ethanol production leads to an increase in demand for corn and an increase in average prices for corn. This could lead to higher corn prices and lower payments for farming programs.

That is, according to critics, the renewable energy needed to grow and convert corn to ethanol is a greater energy value present in ethanol fuel. Thus, they argue that corn ethanol does not replace fossil energy, and increased production hardly displaces oil imports and energy security.

Others argue that while the energy balance is certain, concerns are not paramount in addressing energy security issues. The production of imported ethanol allows to achieve a net increase in the more desirable energy level. In other words, abundant domestic raw materials such as coal and natural gas are effectively used to convert corn into a high-quality liquid fuel that replaces imported oil. This approach reduces the energy balance to fair value in terms of the energy value of the liquid fossil fuel used to produce corn ethanol. In our analysis, we use both approaches. The issue of energy balance first appeared in the mid-1970s, when ethanol began to attract attention as a gasoline expander. Studies at the time of analyzing the energy benefits of replacing ethanol with gasoline generally concluded that the net energy value (NEV, defined as the energy content of ethanol minus the energy of fossils used to produce ethanol) of corn ethanol was slightly negative. Although these studies focused on the evaluation of ethanol-related greenhouse gases compared to gasoline, some of these studies also reported NEV ethanol. This broad variation applies to various assumptions about farming and ethanol transformation. In addition, different researchers used data from different time periods. Research on energy consumption since ethanol and agricultural production technologies are becoming more energy efficient. It is often difficult to aggravate the situation to determine why the results differ from study to study as reports often lack specific details of settlement procedures. The aim of this article is to identify methodological differences that create inconsistencies in research results and provide a more consistent assessment of NEV in corn

ethanol. We conclude that corn ethanol NEV is positive when fertilizers are produced using modern plant treatment, corn is converted into modern ethanol plants, and farmers achieve average yield of corn. Corn ethanol is energy efficient, as indicated by an energy factor of 1.34; that is, for each Btu devoted to ethanol production, there is a 34 percent increase in energy. In addition, the production of ethanol from its own corn reserves achieves a net increase in the more desirable form of energy, which helps reduce its dependence on imported oil. For the production of ethanol, a large amount of domestic energy raw materials, such as coal and natural gas, is used to process corn into high-grade liquid fuel. Only about 17 percent of the energy used to produce ethanol is liquid fuels, such as gasoline and diesel. For every 1 Btu of liquid fuel used to produce ethanol, there is 6.3 Increase in Btu. Looking at past NEV research, it turns out that the energy needs for ethanol halon production are declining over time. One of the main factors in this increase in energy efficiency is the increase in corn yield.

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WAYS OF MODIFICATION OF ANTIBIOTICS TO OVERCOME RESISTANCE (ШЛЯХИ МОДИФІКАЦІЇ АНТИБІОТИКІВ ДЛЯ ПОДОЛАННЯ РЕЗИСТЕНТНОСТІ)

Орищенко А. О. – здобувач вищої освіти групи БТ 4/1

Науковий керівник - Саламатіна О. О., кандидат філологічних наук, доцент кафедри іноземних мов МНАУ

В статті наведені основні механізми розвитку та розповсюдження антибіотикорезистентності мікроорганізмів до часто використовуваних