„SUGAR PLASTIC“ COULD REDUCE RELIANCE ON PETROLEUM

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A new way to make plastics out of sugar could help reduce the world´s reliance on petroleum. The technique could ultimately allow industry to make plastics from high-fructose corn syrups or other plant materials.

a) [Companies] and research organisations around the world [are experimenting with plant-based plastics] in a bid to lower carbon dioxide emissions and reduce the use of petroleum as oil stocks decline.

Now b) [researchers] led by chemical engineer James Dumesic at the University of Wisconsin, Madison, [have developed an efficient way to convert fructose into a polymer precursor.]

c) [The researchers were interested in a chemical called 5-hydroxymethylfurfural (HMF),] which can easily be converted into furandicarboxylic acid (FDCA). This is similar in structure to a petroleum-based precursor for the type of plastic commonly used in plastic bottles.

But HMF has previously been difficult and expensive to make in quantity. This is because as HMF is produced, it reacts with any fructose remaining in the solution to produce an unusable waste material.

To change fructose to HMF, d) [the researchers „dehydrated“ it by adding an acid to strip off water molecules]. Then, e) [to prevent the newly formed HMF from reacting with the remaining fructose, they added a solvent.] This bound to the HMF and floated above the water, preventing further contact with any remaining fructose. Further chemicals were added to prevent side reactions.

The result was a reaction that converted 90% of the fructose in a solution to HMF. Once the reaction was complete, the solvent was boiled away, leaving the HMF to be turned into plastic.

1) Read the rest of the text. Use the word given in capitals to form a word that fits in the space. There is an example in 0.

Bio-based polymers are not new. One of the (**0**) **oldest** plastics	OLD
is celluloid, made out of the (**1**) ..... occurring polymer	NATURAL
cellulose. More (**2**)..... , bacteria have been used to	RECENT
convert sugar into PHA, a bio- (**3**)..... plastic.	DEGRADE
But the (**4**).....hope that because of its different	RESEARCH
chemical structure, HMF will allow **(5)**..... to design	ENGINE
plastics with a range of (**6).**.....properties. There are	DIFFER
many types of petroleum-based polymers. with (**7**).....	INTEREST
properties so it will be necessary to **(8)**..... many	DEVELOPMENT
types of bio-based polymers as **(9)**..... But industry	ALTERNATE
has little incentive to do so while petrochemicals remain (**10**).....	RELATIVE
cheap.	**10b**

2) Read the text and decide whether the sentences are true or false. If they are false, say what is true

a) „Sugar“ plastics can lower our dependence on petroleum. T/F

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b) Oil reserves are stable. T/F

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c) Researchers can now change fructose into plastic bottles T/F

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d) To convert fructose to HMF, water molecules should be removed. T/F

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e) Celluloid is one of the oldest petroleum-based plastics. T/F

.....

10 b

3) Ask about the underlined expressions

a) .....

b) ......

c) .....

d) .....

e) .....

10 b

4) Answer the questions in your own words

a) Why are experiments with plant-based plastics done ?

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b) Why were researchers interested in HMF ?

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c) How did researchers solve the problem of HMF reacting with the remaining fructose ?

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d) How is PHA produced ?

.....

e) What is celluloid ?

.....

10 b

5) Write a summary of the whole text in Czech/Slovak in about 80 words. 10 b