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ANALYSIS OF PRODUCTS OBTAINED BY FERMENTATIVE HYDROLYSIS FROM RICE STEM

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Abstract: A technology for extracting valuable monosaccharides from industrially unimportant rice stalks in the medium of dimethylsulfoxide, an ionic liquid, is presented. The products obtained from the breakdown of rice stalks were separated from the ionic liquid by enzymatic hydrolysis.

Key words: *Trifluoroacetic acid, solution, hydrolysis, arabinose, xylose, glucose, mannose, galactose, natural polymer, rice stalk, dimethylsulfoxide.*

Introduction. The use of ultrasound in combination with dimethylsulfoxide made it possible to increase the reactivity of isolated polysaccharide fractions under enzymatic hydrolysis conditions, not to reduce the duration and temperature of heat treatment of rice stalks. The polysaccharide fractions are more efficiently hydrolyzed by enzymes than the original rice stalk and polysaccharide fractions isolated after heat treatment.

Experiment and analysis part: Regardless of processing conditions, GS fractions have high reactivity under enzymatic conditions. Due to the use of ultrasound, the percentage of polysaccharides that can be hydrolyzed by enzymes in the fraction is greater after heat treatment and reaches 83-90% (sqm. 16-23 %) organize did.

Experimental in the circumstances isolated TS fractions fermentative hydrolysis conditions of low reactivity with is described of monosaccharides product each one in the fraction from 56 to 64 % or aqm. up to 27-40% changed stands With that together, high productivity has which is a TS fraction to GS fraction than original rice stem point of view in terms of carbohydrates high productivity provides.

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Heat at 100 °C (15 minutes). With processing to give during ultrasound power from 10 to 50 W up to increase with, polysaccharide from fractions of monosaccharides output increases. Again work temperature increase with monosaccharides of separation increase only the GS fraction for observed. 50 W and of temperature increase together effect from the TS fraction monosaccharide of separation to decrease take will come. It is from 120 °C high at temperatures more it is felt. As a result, polysaccharide fractions of monosaccharides common separation decreases. Ultrasonic at 120 °C (30 W). Processing to give the term change polysaccharide of fractions fermentative hydrolysis efficiency effect does not minutes at 100 °C 50 W during power Rice stem polysaccharides point of view in terms of carbohydrates productivity theoretical in terms of possible 80% of which organize did In IS conditions without ultrasound rice stem heat with processing to give 2 hours in the process of carbohydrates at 140 °C during break up percentage up it has been So and rice stem under dimethylsulfoxide urea conditions ultrasound with work from polysaccharide fermentative of monosaccharides break up 5 times the product increase provides. From the GS faction carbohydrates output maximum yield was obtained at 140 °C (50 W, 15 min) and from TS fraction at 100 °C (50 W, 15 min). Starting 1-butyl-3-methylimidazolium chloride is a colorless liquid. After use, it has an amber color, which darkens with increasing temperature and time of use. The color change, dimethylsulfoxide urea] is due to the presence of fractionation products of rice stem biomass and their thermal transformation reaction products., in addition to liquid extraction with organic solvents (benzene, dioxane, TGF) and supercritical CO_2 extraction method, activated carbon adsorption method was used to recover dimethylsulfoxide urea. Without, low molecular weight in weight products adsorbed and activated carbon layer the rest Rice stem heat with processing 2 hours at 140°C during for IS used adsorption done increased.

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Activated to carbon adsorption from being done then cleaned of dimethylsulfoxide urea ^{13} C YMR in the spectrum addition signals no, it is molecular in weight products from IS complete take thrown shows.

Table 1

Activated in carbon from adsorption after hydrogen of atoms relative composition dimethylsulfoxide

Chemical shift , ppm	Structural group	Ionic liquid	
		initial	cleaned
0.87(3)	-CH $_2$ -CH $_2$ -CH $_2$ -C **H** $_3$	0.201	0.200
1.31(6)	-CH $_2$ -CH $_2$ -C **H** $_2$ -CH $_3$	0.134	0.133
1.84(5)	-CH $_2$ -C **H** $_2$ -CH $_2$ -CH $_3$	0.133	0.133
3.87(1)	-N $_3$ -C **H** $_3$	0.201	0.200
4.19(3)	-N $_1$ -C **H** $_2$ -	0.134	0.136
7.42(2)	**H** (4, 5)- C=	0.132	0.133
8.71(1)	**H** (2)- C=	0.065	0.066

Adsorption of the method advantages dimethylsulfoxide ni of mixtures cleaning relatively high efficiency, disadvantages of dimethylsulfoxide duration and significant losses own into takes.

Table 2

Fractions output

	Output , % aqm .		
IS sample	Technician celluloses	hemicelluloses	lignin
Primary	62.25	1 8,13	5.91
Cleared :			
Extraction of TGF	63.53	17.86	5.23
activated coal	62,63	18.53	5.62

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supercritical CO2	63.05	17.93	5.44

Methods with cleaned of dimethylsulfoxide urea efficiency evaluation for rice to the stem heat with processing give 1 hour at 100 °C during, then fractionation through done increased. Experience for purified IS three examples used (Table 2).

Received to information according to, cleared dimethylsulfoxide urea rice stem biomass fractionation efficiency according to from the beginning almost difference does not Clean up using dimethylsulfoxide urea rice stem fractionation the way with received polysaccharide factions fermentative from hydrolysis next carbohydrate the product is also original from dimethylsulfoxide urea when used to productivity near will be (Table 3).

Table 3

Fermentative from hydrolysis after of carbohydrate output

(48 hours during)

IS sample	TS share, %		Share of GS, %		General yield, % aqm
	fraction per head	aqm from	fraction per head	aqm from	
Primary	52,59	32.74	70.35	12.75	45,49
Extraction of TGF	51.23	32.55	68.56	12.24	44.79
activated coal	52.01	32.57	69.51	12.88	45.45
supercritical CO2	51.63	32.55	69.06	12.38	44.93

Summary: So making the liquid extraction to do critical CO_2 extraction and activated in carbon adsorption methods dimethylsulfoxide urea regeneration for different different efficiency with use can

Tetrahydrofuran, extreme critical carbonate anhydride or activated to carbon adsorption with liquid extraction with cleaned samples of dimethylsulfoxide urea rice stem biomass in the faction efficiency without losing use possible was shown .

Disruption of intermolecular bonds and separation of submolecular substances was achieved by exposure to ionic liquid at an average temperature of 120 ^{o}C on rice stalks.

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