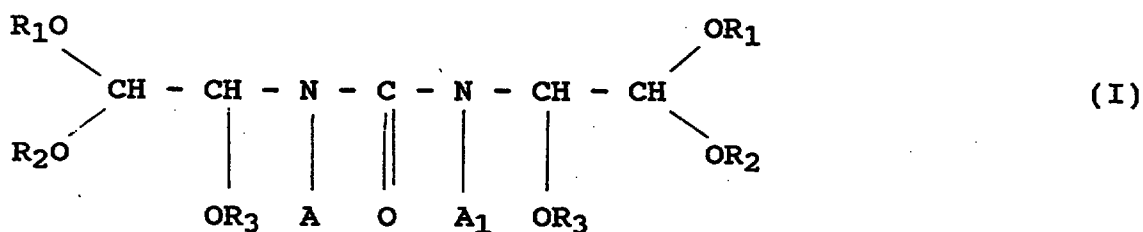


The invention relates to substituted ureas and their process of preparation and their application, more particularly in the improvement of cellulose fibres.

Cyclic ureas of imidazolidinic structure, more particularly 1,3-dimethyl-4,5-dihydroxy-2-imidazolidinone and 4,5-dihydroxy-1,3-dimethyl-2-imidazolidinone are raw materials at present used for the preparation of textile finishings for the improvement of cellulose fibres. According to French Patent No. 1 558 244, 1,3-dihydroxymethyl-4,5-dihydroxy-2-imidazolidinone is obtained by reacting at a pH higher than 7 one mole of urea with at least 0.8 mole of glyoxal and at least 1.6 mole of formaldehyde. 1,3-dimethyl-4,5-dihydroxy-2-imidazolidinone can be obtained according to European Patent No. 0141755 by reacting glyoxal with a surplus or not of 1,3-dimethyl urea, at a pH of between 4 and 7 in the presence of orthophosphoric acid.

The invention relates to substituted ureas of formula I in their racemic forms or their stereoisomeric mixtures



wherein either R_1 and R_2 are identical and denote a $-\text{CH}_2\text{R}$ group where R denotes a hydrogen atom or a C_1 to C_4 alkyl radical, or R_1 and R_2 together form a $-\text{CH}_2-(\text{CR}_4\text{R}_4)_n-\text{CH}_2-$ group where n denotes 0 or 1 and R_4 denotes a hydrogen atom or a methyl group, R_3 denotes a hydrogen atom or a CH_2R_5 radical where R_5 denotes a hydrogen atom or a C_1 to C_4 alkyl group and either A and A_1 are

identical and denote a hydrogen atom, or A and A₁ together form an ethylene, trimethylene or -CH(OCH₂R₆)-CH(OCH₂R₆)- radical where R₆ denotes a hydrogen atom or a C₁ to C₄ alkyl group or, where R₃ denotes a hydrogen atom, a 1,2-dihydroxyethylene group.

The expression "C₁-C₄ alkyl" can denote, for example, a methyl, ethyl, propyl, butyl, isopropyl or isobutyl radical.

The expression "in their racemic forms or their stereoisomeric mixtures" means that the asymmetrical carbon atoms of the products of formula I can be in their R and S configuration.

The invention relates more particularly to the products as defined hereinbefore, characterized in that in formula I R₁ and R₂ are identical and denote a methyl or butyl group, R₃ denotes a hydrogen atom, a methyl or butyl group, and either A and A₁ are identical and denote a hydrogen atom, or A and A₁ together form an ethylene group, a 1,2-dimethoxyethylene group, a 1,2-dibutoxyethylene or, where R₃ denotes a hydrogen atom, a 1,2-dihydroxyethylene.

Amongst these products, the following may be mentioned more particularly:

- bis-1,3-(2,2-dimethoxy-1-hydroxyethyl) urea;
- bis-1,3-(1,2,2-trimethoxyethyl) urea;
- bis-1,3-(2,2-dibutoxy hydroxyethyl) urea;
- bis-1,3-(1,2,2-tributoxyethyl) urea;
- bis-1,3-(2,2-dimethoxy-1-hydroxyethyl)-2-imidazolidinone;
- bis-1,3-(1,2,2-trimethoxyethyl)-2-imidazolidinone;
- bis-1,3-(2,2-dibutoxy-1-hydroxyethyl)-2-imidazolidinone;
- bis-1,3-(1,2,2-tributoxyethyl)-2-imidazolidinone;
- bis-1,3-(2,2-diethoxy-1-hydroxyethyl)-2-imidazolidinone;

1 -1,3-(2,2-dimethoxy-1-hydroxyethyl)-4,5-dihydroxy-2-imidazolidinone;

bis-1,3-(1,2,2-trimethoxyethyl)-4,5-dimethoxy-2-imidazolidinone;

bis-1,3-(2,2-dibutoxy-1-hydroxyethyl)-4,5-dihydroxy-2-imidazolidinone;

bis-1,3-(1,2,2-tributoxyethyl)-4,5-dibutoxy-2-imidazolidinone;

bis-1,3-(2,2-dimethoxy-1-hydroxyethyl)-1H tetrahydro-2-pyrimidinone;

bis-1,3-(1,2,2-trimethoxyethyl)-1H-tetrahydro-2-pyrimidinone.

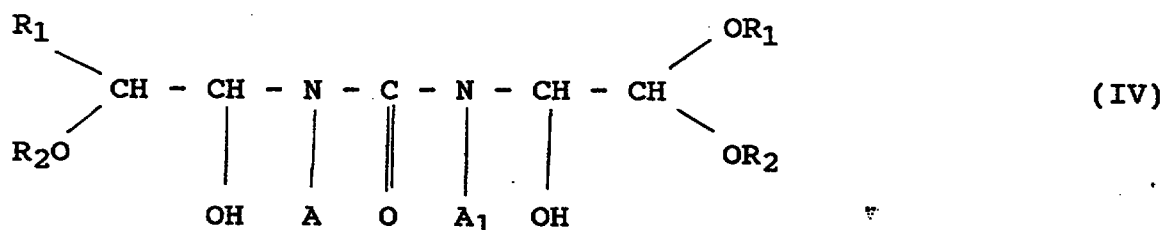
According to the invention, the above products of formula I can be prepared by a process characterized in that a disubstituted ethanal of formula II:



where R_1 and R_2 have the meaning stated hereinbefore is reacted with a urea of formula III:



where A and A_1 have the meaning stated hereinbefore, to obtain a product of formula IV:



(where R_1 , R_2 , A and A_1 retain the meaning stated hereinbefore) which, if required, is etherified by the usual methods with an alcoholate of formula V:



where R_5 has the meaning stated hereinbefore.

The ureas of formula III are either commercial products or are described in the Literature.

The substituted ethanal of formula II can be obtained by the process disclosed in French Patent Application No. 86 07957, published under No. 2 599 362.

In preferential conditions for the performance of the process according to the invention, the condensation of the product of formula II with the urea of formula III is performed:

at an alkaline pH, advantageously between 7 and 9, in the presence of a compatible alkaline catalyst, such as sodium hydroxide or potassium hydroxide;

at a temperature of between 30 and 80°C.

The condensation can also be performed in water or in a compatible organic solvent, such as a lower alkanol, or in a water/lower alkanol medium. The alkanol used will be selected so as to avoid parasitic transesterification reactions.

a rule the process according to the invention is performed with stoichiometric quantities of reagents.

On completion of the condensation reaction, the substituted urea of formula IV formed is either isolated by known methods, such as crystallization or elution chromatography (cf. W.C. Still et al., J. Org. Chem., 1978, 43, 2923), or used as it is, after the neutralization, if necessary, of the catalyst used and the elimination, if necessary, of the or each reaction solvent by evaporation at reduced pressure. In the crude state the substituted urea of formula IV has an adequate purity to be used in the application disclosed hereinafter.

The possible etherification of the hydroxyls present in the product of formula IV is performed by the usual methods of etherification of the N-hydroxymethyl carbomoyl groups by the action of an alkanol of formula V in an acid medium, advantageously at a pH of between 2 and 6.5 and at a temperature of between 20 and 80°C (cf. H. Petersen - Chemical Aftertreatment of Textiles, Chapter V, pages 135-265, H. Mark-Wiley Interscience, 1971).

The products of formula I in their racemic forms or their stereoisomeric mixtures have advantageous properties for cross-linking cellulose and can more particularly be used to confer on cellulose fibres properties of resistance to creasing and shrinkage. For these applications they can be used in quantities and operational conditions similar to those currently applied by an engineer in the art making use of the conventional textile resins on the base of, for example, bis-1,3-(hydroxymethyl-4,5-dihydroxy)-2-imidazolidinone (cf. H. Petersen, loc. cit.).

However, in applications for the improvement of cellulose

films, the products of formula I have the advantage of conferring on the cellulose fibres outstanding properties of use without having too unfavourable an effect on the mechanical properties of the fibres, and more particularly without using formaldehyde or compounds which might release the same. Moreover, the effects obtained have satisfactory permanence.

The following Examples illustrate the invention without limitation.

The physical analyses by nuclear magnetic resonance spectroscopy (NMR) of either proton, H^1 , or of carbon thirteen, C^{13} , were performed with a Bruker AC 200 apparatus, at 200 MHz for the proton and 50 MHz for the C^{13} . Chemical displacements were expressed in ppm in relation to tetramethyl silane (TMS).

Certain stereoisomers have only slight differences in chemical displacements: in that case the chemical displacements were confirmed by the physical recording of the spectrum of the mixture of purified stereoisomers.

The high pressure liquid preparative chromatograph (HPLC) were produced using a Waters 600 pump and a Waters 401 differential refractometer with a column of 25 cm and 2.54 mm in diameter, charged with either Lichrosorb Si60 (Merck) or Polygosil C18 (Mascherey-Nagel).

EXAMPLES

Example 1 - Bis-1,3-(2,2-dimethoxy-1-hydroxyethyl) urea.

24 g (0.4 mole) of urea were dissolved with agitation in 96 g of a methanolic solution of dimethoxy ethanal (87% by weight) - i.e., 0.8 mole. The solution obtained was then taken to pH = 8 by the addition of a few drops of 2N soda, whereafter it was heated with agitation for two hours at 50°C. Then the methanol

was . . .ven off and the oily residue was taken up in an acetone/diethyl oxide mixture. The required product crystallized and was centrifuged and dried in vacuo to constant weight at 50°C.

The result was bis-1,3-(2,2-dimethoxy-1-hydroxyethyl) urea in the form of colourless prisms which melted at 90 - 110°C.

Microanalysis

		C%	H%	N%	O%
C ₉ H ₂₀ N ₂ O ₇	calculated	40.29	7.51	10.44	41.75
M.W. = 268.27	found	40.8	7.8	10.6	

Physical analyses

When subjected to preparative chromatography (HPLC) on a Polygosil C18 column with 96.5/3.5 water/methanol elution, this product led to the two expected diastereoisomers: the first isomer had a retention time of 244 seconds, the second one having a retention time of 635 seconds (flow rate 1 cm³ per minute).

The two diastereoisomers thus isolated had the following NMR H¹ spectra in deuterated dimethyl sulphoxide (DMSO d₆):

	<u>1st isomer</u>	<u>2nd isomer</u>
NH (d, 2H, J = 9,4 Hz)	6.6 ppm	6.6 ppm
OH (d, 2H, J = 5.6 Hz)	5.53 ppm	5.52 ppm
N-CH-O (m, 2H)	5.02 ppm	5.02 ppm
CH (OMe) ₂ (d, 2H, J = 3.9 Hz)	4.13 ppm	4.14 ppm
OMe (s, 3H)	3.34 ppm	3.34 ppm
OMe (s, 3H)	3.31 ppm	3.31 ppm

As far as the Applicants are aware, these products are not described in the Literature.

Example 2 - Bis-1,3-(2,2-dibutoxy-1-hydroxyethyl)-2-imidazolidinone

860 mg (10 mmoles) of ethylene (2-imidazolidinone) urea and 3.76 g (20 mmoles) of dibutoxy ethanal were dissolved with agitation at 40°C in 4 g of acetone. The solution obtained was then brought to a slightly alkaline pH by the addition of a few drops of 2N soda, whereafter it was heated with agitation for 30 minutes at 30°C and finally concentrated in vacuo. The residual oil was then purified by chromatography on silica gel with elution by ethyl acetate. In this way two fractions were isolated: the first contained a product having an Rf of 0.6 and the second a product having an Rf of 0.45.

After the elimination of the elution solvent, two products were isolated in the form of oil which corresponded to the expected two diastereoisomers of bis-1,3 (2,2-dibutoxy-1-hydroxyethyl)-2-imidazolidinone.

Physical analyses

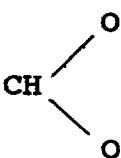
NMR H¹ 200 MHz (DMSO d₆)

	<u>1st isomer</u>	<u>2nd isomer</u>
OH (d, 2H, J = 6HZ)	5.82 ppm	5.79 ppm
N-CH-O (t, 2H, J = 6HZ)	5.06 ppm	5.06 ppm
CH(OBu) ₂ (d, 2H, J = 6HZ)	4.40 ppm	4.36 ppm
OCH ₂ and NCH ₂ (m, 12H)	3.6-3.23 ppm	3.6-3.23 ppm
CH ₂ (m, 16H)	1.57-1.25 ppm	1.53-1.24 ppm
CH ₃ (m, 12H)	0.92-0.83 ppm	0.92-0.82 ppm

1 : C^{13} , 200 MHz, (DMSO d_6)

1st isomer

159.4 ppm >C=O

101.6 ppm CH 

75.0 ppm NHCHOH

66.3 ppm $\text{O}-\text{CH}_2-$

65.5 ppm $\text{O}-\text{CH}_2-$

37.2 ppm $\text{N}-\text{CH}_2-$

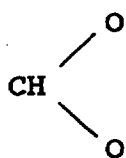
31.5 ppm $-\text{CH}_2-$

18.8 ppm $-\text{CH}_2-$

13.7 ppm $-\text{CH}_3-$

2nd isomer

158.7 ppm >C=O

101.5 ppm CH 

74.9 ppm N-CHOH

66.3 ppm $\text{O}-\text{CH}_2-$

65.1 ppm $\text{O}-\text{CH}_2-$

37.2 ppm $\text{N}-\text{CH}_2-$

31.5 ppm $-\text{CH}_2-$

18.8 ppm $-\text{CH}_2-$

13.7 ppm $-\text{CH}_3-$

The spectra agreed with the proposed structure. As far as the Applicants are aware, these products are not described in the Literature.

Example 3 - Bis-1,3-(1,2,2-tributoxyethyl)-2-imidazolidinone

860 mg (10 mmoles) of ethylene urea and 3.765 g (20 mmoles) of dibutoxyl ethanal were dissolved with agitation at 40°C in 4 g of acetone. The solution obtained was then brought to a slightly alkaline pH by the addition of a few drops of 2N soda, whereafter it was heated with agitation for 30 minutes at 30°C and finally concentrated in vacuo. The residual oil was dissolved in 16 g of n-butanol, whereafter the solution obtained was acidified with a few drops of 50% sulphuric acid in water and then left for 2 hours with agitation at ambient temperature before being poured into 100 g of water. Decantation was performed, whereafter the

aqueous phase was washed three times with 50 g of hexane. The combined organic phases were then washed with 1N soda and then with water until the washings were neutral, and then dried on anhydrous calcium chloride, filtered and concentrated until dry in vacuo. The crude residual oil was then purified by chromatography on silica gel with elution using ethyl acetate. The result was 3.43 g (6 mmoles) of bis-1,3-(1,2,2-tributoxyethyl)-2-imidazolidinone in the form of a colourless oil soluble in hexane and diisopropyl oxide.

This product was a mixture of the expected two diastereoisomers.

Physical analyses

1 - NMR H^1 , $CDCl_3$ (deuterated chloroform)

	<u>1st isomer</u>	<u>2nd isomer</u>
N-CH-O (d, 2H)	5.16 ppm (J=5.9 Hz)	5.15 ppm (J=5.6 Hz)
CH(OBu) ₂ (d, 2H)	4.52 ppm (J=5.9 Hz)	4.51 ppm (J=5.6 Hz)
OCH ₂ and NCH ₂ (m, 16H)	3.63 - 3.41 ppm	
CH ₂ (m, 24H)	1.61 - 1.29 ppm	
CH ₃ (m, 12H)	0.95 - 0.86 ppm	

2 - NMR C^{13} , $CDCl_3$

	<u>1st isomer</u>	<u>2nd isomer</u>
$>C=O$	160.42 ppm	160.35 ppm
-CH (OBu) ₂	100.8 ppm	100.9 ppm
N - CH - OBu	81.7 ppm	81.8 ppm
OCH ₂	68.1- 68.0- 67.1- 67.0 ppm	
	65.5 and 65.4 ppm	
N - CH ₂	37.7 ppm	37.9 ppm
CH ₂	31.9- 31.8- 31.5- 19.3 ppm	
CH ₃	13.8 ppm	

As far as the Applicants are aware these products are not described in the Literature.

Example 4 - Bis-1,3-(2,2-diethoxy-1-hydroxyethyl)-2-imidazolidinone

45 g (0.34 mole) of diethoxy ethanal and 14.6 g (0.17 mole) of ethylene urea were heated for 1 hour at $65 \pm 5^\circ\text{C}$ with agitation and at a slightly alkaline pH. Then, after cooling, the required product crystallized spontaneously. It was recrystallized in diisopropyl oxide, the result being 50.6 g (0.144 mole) of bis-1,3-(2,2-diethoxy-1-hydroxyethyl)-2-imidazolidinone in the form of colourless crystals having a melting point of 105°C - i.e., a yield of 85% of the theoretical value.

Microanalysis

		C%	H%	N%	O%
$\text{C}_{15}\text{H}_{30}\text{B}_2\text{O}_7$	calculated	51.41	8.63	8.0	31.96
M.W. = 350.4	found	51.3	8.7	8.0	

When analyzed by thin layer chromatography on silica gel with elution using a dichloromethane/methanol (95-5) mixture, this product showed the presence of two products respectively having an R_f of 0.16 and 0.21. After isolation by preparative HPLC, the two products had the following NMR spectra:

1 - NMR H^1 , DMSO d_6

	<u>1st isomer</u>	<u>2nd isomer</u>
OH (d, 2H, $J = 6.0$ Hz)	5.85 ppm	5.81 ppm
N-CH-O (t, 2H, $J = 6.0$ Hz)	5.04 ppm	5.04 ppm
CH (OEt) ₂ (d, 2H, $J = 6.0$ Hz)	4.41 ppm	4.41 ppm
-CH ₂ - (m, 12H)	3.69 - 3.25 ppm	
-CH ₃ - (m, 12H)	1.17 - 1.05 ppm	

4 - NMR C¹³, DMSO d₆

	<u>1st isomer</u>	<u>2nd isomer</u>
C = O	159.4 ppm	158.6 ppm
$\begin{array}{c} \text{O} \\ \diagup \\ \text{CH} \\ \diagdown \\ \text{O} \end{array}$	101.4 ppm	101.2 ppm
N-CH-O	75.1 ppm	74.9 ppm
OCH ₂	62.2 ppm	62.2 ppm
OCH ₂	61.4 ppm	61.0 ppm
N-CH ₂	37.1 ppm	37.1 ppm
CH ₃	15.3 ppm	15.3 ppm

As far as the Applicants are aware, this product is not described in the Literature.

Example 5 - Bis-1,3-(2,2-dimethoxy-1-hydroxyethyl)-2-imidazolidinone

A solution formed by:

292.5 g (2 moles) of dimethoxy ethanal in 53% solution by weight in water;

86 g (1 mole) of ethylene urea;

an adequate quantity of 2N soda to obtain a pH of 8 were heated with agitation for 1 hour at 50°C and the solution obtained was concentrated in vacuo. The required product crystallized spontaneously. After being taken up in diethyloxide and dried in vacuo to constant weight at 40°C, 262 g (0.89 mole) of crystallized bis-1,3-(2,2-dimethoxy-1-hydroxyethyl)-2-imidazolidinone were obtained having a melting point of 127 ± 3°C.

Microanalysis

		C%	H%	N%	O%
$C_{11}H_{22}N_2O_7$	calculated	44.89	7.54	9.52	38.05
M.W. = 294.31	found	44.8	7.7	9.6	

NMR C^{13} , DMSO d_6

C = O 159.2 ppm

-CH(OMe) $_2$ 103.1 ppm

N-CH-O 74.5 ppm

O-CH $_3$ 54.2 ppm

O-CH $_3$ 53.6 ppm

N-CH $_2$ 36.7 ppm

As far as the Applicants are aware, this product is not described in the Literature

Example 6 - Bis-1,3-(1,2,2-trimethoxyethyl)-2-imidazolidinone

A solution of 40.8 g (0.125 mole) of bis-1,3-(2,2-dimethoxy-1-hydroxyethyl)-2-imidazolidinone was heated in 85 g of methanol and an adequate quantity of sulphuric acid (25% by weight) in water for 90 minutes at 50°C to obtain a pH of 4.

The solution obtained was then cooled to ambient temperature, neutralized to pH = 7 with sodium bicarbonate and concentrated to dry in vacuo. The crystallized product obtained was recrystallized hot and cold in dipropyl oxide.

The result was 36.3 g (0.1125 mole) of crystallized bis-1,3-(1,2,2-trimethoxyethyl)-2-imidazolidinone having a melting point of $66 \pm 3^\circ C$.

Microanalysis

		C%	H%	N%	O%
$C_{13}H_{26}N_2O_7$	calculated	48.4	8.13	8.69	34.74
M.W. = 322.4	found	48.3	8.2	8.7	

As far as the Applicants are aware this product is not described in the Literature.

Example 7 - Bis-1,3-(2,2-dimethoxy-1-hydroxyethyl)-4,5-dihydroxy-2-imidazolidinone

29.5 g (0.25 mole) of transisomer 4,5-dihydroxy-2-imidazolidinone was dissolved with agitation at 50°C in 104 g of dimethoxy ethanol in aqueous solution (50% by weight - i.e., 0.5 mole), whereafter the solution obtained was brought to pH = 8-9 by the addition of a few drops of 2N soda. The solution was then heated for one hour at 40°C with agitation and then concentrated in vacuo.

The residual oil obtained was then purified by chromatography on silica gel with elution using a dichloromethane/methanol mixture. The result was 40.7 g (0.125 mole) of bis-1,3-(2,2-dimethoxy-1-hydroxyethyl)-4,5-dihydroxy-2-imidazolidinone in the form of a colourless oil whose NMR H^1 and C^{13} spectra were in agreement with the proposed structure.

Microanalysis

		C%	H%	N%	O%
$C_{11}H_{22}N_2O_9$	calculated	40.49	6.79	8.59	44.13
M.W. = 326.3	found	39.8	6.9	8.4	

As far as the Applicants are aware this product is not described in the Literature.

Sample 8

Using a padding mangle, a scalded and bleached 100% cotton poplin fabric weighing about 130 g per m² with a squeezing rate of 75% was impregnated in an aqueous bath containing in solution:

0.4354 mole per litre of a substituted urea according to the invention;

12 g per litre of hexahydrated magnesium chloride;

2.1 g per litre of acetic acid;

2 g per litre of ethoxylated nonyphenol with 10 moles of ethylene oxide.

The fabric was then dried at 120°C, whereafter it was subjected to a thermal treatment at 180°C for 35 seconds on a laboratory tenter.

The following determinations were then carried out on samples of the fabric treated:

crease recovery by the AATCC No. 66-1978 method on samples as such and on samples subjected to three domestic washings at 60°C; crease recovery was expressed by the sum of the angles of crease recovery obtained in the warp and weft directions;

tensile strength, stressed in daN, in the warp direction plus the weft direction, to French Standard G07 001;

the rates of residual formaldehyde from the fabric by the AATCC 112-1982 method and by the method described in Japanese Law 112-1973.

The results obtained are given in Table 1.

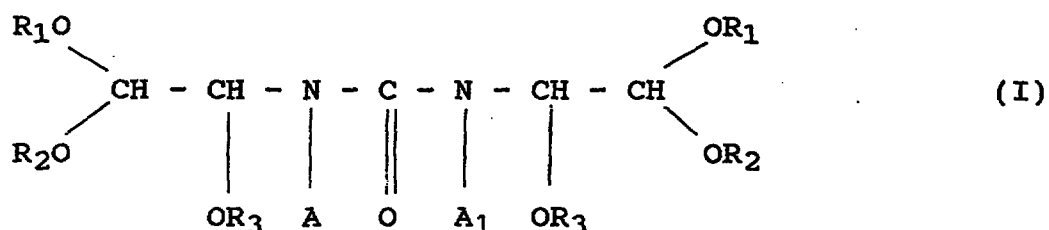
Table 1

	Angles of crease recovery on fabric		Tensile strength	Residual formaldehyde rates
	as such	after 3 washings		
on untreated fabric	174	174	98.4	Undetectable
on fabric treated with the product of Example 5	273	248.5	63.1	Undetectable
on fabric treated with the product of Example 6	271	248	50.5	Undetectable

It will be noted that the products according to the invention considerably improve the resistance to creasing properties of the fabrics treated.

CLAIMS

1. Substituted ureas of formula I in their racemic forms or their stereoisomeric mixtures



wherein either R_1 and R_2 are identical and denote a $-CH_2R$ group where R denotes a hydrogen atom or a C_1 to C_4 alkyl radical, or R_1 and R_2 together form a $-CH_2-(CR_4R_4)_n-CH_2$ group where n denotes 0 or 1 and R_4 denotes a hydrogen atom or a methyl group, R_3 denotes a hydrogen atom or a $-CH_2R_5$ radical where R_5 denotes a hydrogen atom or a C_1 to C_4 alkyl group and either A and A_1 are identical and denote a hydrogen atom, or A and A_1 together form an ethylene, trimethylene or $-CH(OCH_2R_6)-CH(OCH_2R_6)$ radical where R_6 denotes a hydrogen atom or a C_1 to C_4 alkyl group or, where R_3 denotes a hydrogen atom, a 1,2-dihydroxyethylene group.

2. Ureas as defined in claim 1, characterized in that in formula I R_1 and R_2 are identical and denote a methyl or butyl group, R_3 denotes a hydrogen atom, a methyl or butyl group, and either A and A_1 are identical and denote a hydrogen atom, or A and A_1 together form an ethylene group, a 1,2-dimethoxyethylene



group, a 1,2-dibutoxyethylene group or, where R_3 denotes a hydrogen atom, a 1,2-dihydroxyethylene group.

3. A urea corresponding to formula I of claim 1, characterized in that it is bis-1,3-(2,2-dimethoxy-1-hydroxyethyl) urea.
4. A urea corresponding to formula I of claim 1, characterized in that it is bis-1,3-(1,2,2-trimethoxyethyl) urea.
5. A urea corresponding to formula I of claim 1, characterized in that it is bis-1,3-(2,2-dimethoxy-1-hydroxyethyl)-2-imidazolidinone.
6. A urea corresponding to formula I of claim 1, characterized in that it is bis-1,3-(1,2,2-trimethoxyethyl)-2-imidazolidinone.
7. A urea corresponding to formula I of claim 1, characterized in that it is bis-1,3-(2,2-dibutoxy-1-hydroxyethyl)-2-imidazolidinone.
8. A urea corresponding to formula I of claim 1, characterized in that it is bis-1,3-(1,2,2-tributoxyethyl)-2-imidazolidinone.
9. A urea corresponding to formula I of claim 1, characterized in that it is bis-1,3-(2,2-diethoxy-1-hydroxyethyl)-2-imidazolidinone.
10. A urea corresponding to formula I of claim 1, characterized in that it is bis-1,3-(2,2-dimethoxy-1-hydroxyethyl)-4,5-dihydroxy-2-imidazolidinone.



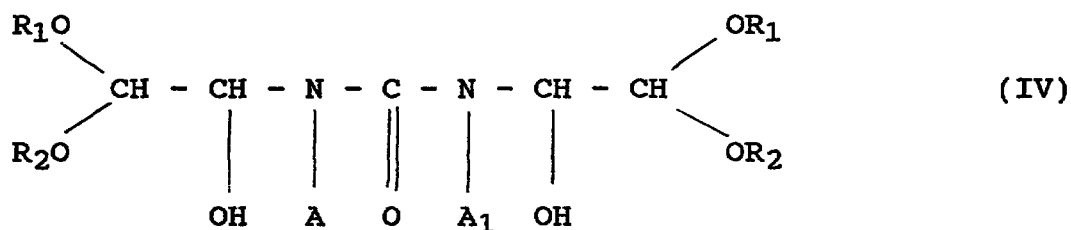
11. process for the preparation of ureas as defined by formula I in claim 1 in their racemic forms or their stereoisomeric mixtures, characterized in that a disubstituted ethanal of formula II:



where R_1 and R_2 have the meaning stated in claim 1 is reacted with a urea of formula III:



where A and A_1 have the meaning stated in claim 1, to obtain a product of formula IV:



where R_1 , R_2 , A and A_1 retain the meaning stated hereinbefore which, if required, is etherified by the usual methods with an alcohol of formula V:



where R_5 has the meaning stated in claim 1.



12. Application by way of products for improving cellulose fibres of the ureas as defined by formula I of claim 1, in their racemic forms and their stereoisomeric mixtures.

13. Application by way of products for improving cellulose fibres of the ureas as defined in claim 2, in their racemic forms and their stereoisomeric mixtures.

14. Application by way of products for improving cellulose fibres of the ureas as defined in any of claims 3 to 10.

