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SUBSTITUTED UREAS

David J. Beaver, Richmond Heights, and Paul J. Stoffel, St. Louis, Mo., assignors to Monsanto Chemical Company, St. Louis, Mo., a corporation of Delaware

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This invention relates to new and useful substituted ureas and to processes for making same.

The substituted ureas of this invention may be represented by the structure

$$X_nC_6H_{5-n}—NH—\underset{\underset{O}{\|}}{C}—NH—CH_2CH_2CH_2—OH$$

where $X_nC_6H_{5-n}$ is a halogen substituted phenyl radical free of substituents ortho to the —NH— group, where X is a halogen atom, and where n is a whole number from 2 to 3. As illustrative of the substituted ureas of this invention is the following:

1-(3,4-dichlorophenyl) 3-(3-hydroxypropyl) urea
1-(3,4-dibromophenyl) 3-(3-hydroxypropyl) urea
1-(3,5-dichlorophenyl) 3-(3-hydroxypropyl) urea
1-(3,5-dibromophenyl) 3-(3-hydroxypropyl) urea
1-(3,4,5-trichlorophenyl) 3-(3-hydroxypropyl) urea
1-(3,4,5-tribromophenyl) 3-(3-hydroxypropyl) urea

As illustrative of the preparation of the compounds of this invention is the following:

Example I

To a suitable reaction vessel equipped with an agitator is added and mixed approximately 18.8 parts by weight of 3,4-dichlorophenylisocyanate, approximately 7.5 parts by weight of 3-amino-1-propanol and approximately 54 parts by weight of diethyl ether. The reaction is exothermic and upon its completion, as evidenced by a temperature drop, the mass is cooled and permitted to stand for one hour at room temperature. The mass is filtered and the filter cake is washed with two successive 18 parts by weight portions of diethyl ether. Upon air drying the filter cake, approximately 26 parts by weight of 1-(3,4-dichlorophenyl) 3-(3-hydroxypropyl) urea is obtained as white granules, M. P. 126.5–128° C.

Example II

Employing the procedure of Example I but replacing 3,4-dichlorophenylisocyanate with an equal weight of 3,5-dichlorophenylisocyanate, there is obtained 1-(3,5-dichlorophenyl) 3-(3-hydroxypropyl) urea.

Example III

Employing the procedure of Example I but replacing 3,4-dichlorophenylisocyanate with a chemically equivalent weight of 3,4,5-trichlorophenylisocyanate, there is obtained 1-(3,4,5-trichlorophenyl) 3-(3-hydroxypropyl) urea.

Example IV

Employing the procedure of Example I but replacing 3,4-dichlorophenylisocyanate with a chemically equivalent weight of 3,4-dibromophenylisocyanate, there is obtained 1-(3,4-dibromophenyl) 3-(3-hydroxypropyl) urea.

In the preparation of the new compounds of this invention other inert solvents than diethyl ether may be employed, e. g. di-isopropyl ether, methyl butyl ether, the liquid alkanes, and the like. The reaction temperature employed in making the new compounds may vary widely but in general will be between room temperature and the reflux temperature of the system.

The compounds of this invention are particularly useful in controlling bacterial growth, especially *Micrococcus pyogenes* var. *aureus*. In this regard the substituted ureas of this invention when compounded with a detergent soap (i. e. an alkali metal salt of a fatty acid of animal or vegetable origin such as stearic acid, lauric acid, palmitic acid, oleic cid, ricinoleic acid, myristic acid, and the like, or mixtures thereof obtained from tallow, lard, coconut oil, palm oil, castor oil, olive oil, cottonseed oil, and the like) provide highly useful antiseptic detergent soap compositions.

In order to illustrate the activity of the substituted ureas of this invention, 1-(3,4-dichlorophenyl) 3-(3-hydroxypropyl) urea was incorporated in an alkali metal fatty acid soap (a mixture of potassium and sodium salts of fatty acids whose fatty acid content analyzed

	Percent
Oleic and linoleic acid	About 46
Stearic	About 14
Palmitic acid	About 30
Lower fatty acids, e. g. myristic, lauric, etc.	About 10)

and compared to 1-(3,4-dichlorophenyl) 3-(2-hydroxypropyl) urea (a white solid melting at 152.0–152.8° C. prepared from 3,4-dichlorophenylisocyanate and 2-hydroxy-n-propylamine in accordance with the process of Example I). The respective compounds were incorporated in the said alkali metal fatty acid soap in a weight ratio of 1 part to 50 parts soap. Aliquots of each were added to a Sabourard's dextrose agar medium so as to give concentrations of 1, 10 and 100 parts per 100,000 of the respective urea derivatives in the agar. The agar in each case was then poured into a petri dish, allowed to harden, and then inoculated with a standard culture of *Micrococcus pyogenes* var. *aureus* of standard resistance. The incubation in each instance was made at 37° C. for 48 hours. The extent of growth is noted below:

Compound/Concentration in parts per 100,000		100	10	1
1-(3,4-dichlorophenyl) urea.	3-(2-hydroxypropyl)	none.	heavy.	heavy.
1-(3,4-dichlorophenyl) urea.	3-(3-hydroxypropyl)	none.	none.	none.

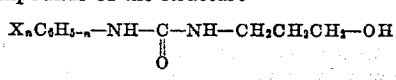
The same control of *Micrococcus pyogenes* var. *aureus* is obtained by replacing 1-(3,4-dichlorophenyl) 3-(3-hydroxypropyl) urea with an equal weight of 1-(3,5-dichlorophenyl) 3-(3-hydroxypropyl) urea or 1-(3,4,5-trichlorophenyl) 3-(3-hydroxypropyl) urea. Similar control is obtained employing the corresponding bromine substituted analogues thereof.

Relatively small amounts of these new substituted ureas in a detergent soap composition have been found to yield effective antiseptic detergent soap compositions. Amounts as low as 0.5% by weight based on the weight of the detergent soap have proved satisfactory. However, it is preferred to employ amounts in the order of 1 to 5% by weight. Larger amounts, e. g. up to 10% by weight, may be employed, however, such upper limit will be determined by practical considerations.

While this invention has been described with respect to certain embodiments, it is not so limited and it is to be understood that variations and modifications thereof which are obvious to those skilled in the art may be made without departing from the spirit or scope of this invention.

What is claimed is:

1. Compounds of the structure



where $X_nC_6H_{5-n}$ is a halogen substituted phenyl radical free of substituents ortho to the nitrogen atom, where X is a halogen atom and where n is a whole number from 2 to 3, inclusive.

2. Compounds of claim 1 where X is selected from the group consisting of bromine and chlorine.

3. Compounds of claim 1 wherein X is chlorine and wherein n is 2.

4. 1-(3,4-dichlorophenyl) 3-(3-hydroxypropyl) urea.

5. 1-(3,5-dichlorophenyl) 3-(3-hydroxypropyl) urea.

6. The process of making the compounds of claim 1, which comprises reacting in substantially equimolecular proportions 3-amino-1-propanol and an isocyanate of the formula $X_nC_6H_{5-n}NCO$, where $X_nC_6H_{5-n}$, X and n having the same significance as in claim 1, in the presence of an inert solvent at a temperature in the range of room temperature to the reflux temperature of the system.

References Cited in the file of this patent

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OTHER REFERENCES

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