

SANITARY TOWEL

The present invention relates to a sanitary towel having a deodorizing capacity.

Various sanitary towels are now marketed. These take various forms and their function is that of absorbing and retaining menstrual fluid.

Recently, a highly-absorbent polymer capable of absorbing physiological saline solution in an amount 30 times the weight of the polymer per se has been developed and the performance of this is regarded as adequate.

Investigations are now being made as to how rapidly menstrual fluid can be absorbed, and the primary function of absorbing menstrual fluid is adequately performed by presently available sanitary towels.

In order that sanitary towels should be comfortable to wear, they should be compact and they should also have a deodorizing effect. However, a sanitary towel which is satisfactory in these other functions has not yet been developed.

It is therefore a primary object of the present invention to provide a sanitary towel that is not only sufficiently absorbent but also a satisfactory deodorizing capacity.

As means for controlling menstrual odours, there have been proposed a physical adsorption method utilizing various adsorbents represented by active carbon and a method using a fungicide such as benzalkonium chloride or chlorophyllin. However, the deodorizing effect of an adsorbent such as

5 is effective to some extent for prevention of putrefaction but attainment of a deodorizing effect cannot be expected within an ordinary sanitary towel-wear period of 2 to 3 hours.

We have performed research with a view to
10 eliminating these defects involved in the conventional
techniques and we have found that the amine-based odours
can be removed with high efficiency by sodium ions
and an unreacted water-insoluble crosslinking-type
polyacrylic acid.

15 Thus in accordance with the present invention,
there is provided a sanitary towel which comprises
an envelope and an absorbent material comprising a water-
insoluble sodium salt of polyacrylic acid, which is poly-
acrylamide/sodium polyacrylate, starch-sodium polyacrylate
20 or sodium polyacrylate of the self-crosslinking type,
said polyacrylic acid being partially neutralized with a
neutralization degree of from 10 to 70 mol %.

The polyacrylamide/sodium polyacrylate may be as disclosed in Japanese Patent Publication No.43395/75 by Grain Processing Co. Ltd., the starch-sodium polyacrylate may be as disclosed in Japanese Patent Application Laid-Open Specification No. 47937/76 by Dow Chemical CoLtd., or in Japanese Patents Application Laid-Open Specification No.125468/76 by Sankyo Kasei Kabushiki Kaisha, and the sodium polyacrylate of the self-crosslinking type may be as disclosed

in Japanese Patent Application Laid-Open Specification No. 46389/78 by the applicant of the present invention. Such polymer completely neutralized by sodium is sodium polyacrylate and such polymer not neutralized by sodium at all is known as a carboxyvinyl polymer. In the present invention, by using water-insoluble crosslinking type sodium polyacrylate having a neutralization degree of 10 to 70 mol %, a sanitary towel having good deodorizing effect and water-absorbing property can be obtained. In the case where the neutralization degree is lower than 10 mol %, the deodorizing effect is satisfactory but the water-absorbing property is poor, and if the neutralization degree exceeds 70 mol %, the water-absorbing property is good but the deodorizing effect is reduced.

Brief description of the drawings:

Figure 1 is a sectional view illustrating one embodiment of a sanitary towel according to the present invention.

Figure 2 is a sectional view illustrating a comparative sanitary towel composed mainly of pulp.

Figure 3 is a sectional view illustrating a comparative sanitary towel composed mainly of crepe paper.

A partially neutralized polyacrylic acid which is water-insoluble and is of the cross-linking type is used as an absorbent, being enveloped in a sanitary towel of conventional structure. One practical embodiment of the towel according to the invention is shown in Figure 1 and comprises a layer of rayon staple cotton 2, a layer of pulp 3, sheets of active carbon paper 4, two sheets of absorbent paper 5 and the absorbent consisting of the



partially neutralized polyacrylic acid which is inserted between said sheets 5, all the above layers being enveloped with a leakage-preventing sheet 6 having an opening at a portion to contact with said layer of rayon staple cotton 2, further being enveloped with a non-woven fabric. In the invention, various sanitary towels having structures different from the above stated embodiment may be used.

The present invention will now be described in detail with reference to the following Examples.

Example 1

0.1 g of a partial neutralization product of polyacrylic acid was uniformly scattered on an absorbent paper and the adsorbent paper was wrapped with a dry type non-woven fabric to form a tea-bag-like structure. This was packed together with a source of amine smell into a test bottle equipped with an inner plug. The intensity of the smell in the bottle was measured just after introduction of the smell source and at intervals of 10 times by gas chromatography to determine the smell removal ratio. The absorption quantity was determined by dispersing 1 g of the polymer in physiological saline solution, filtering the dispersion and measuring the weight increase in the polymer. The obtained results are shown in Table 1.



Table 1

Polymer Neutralization Degree (mol. %)	Amine Smell Removal Ratio (%)				Absorption Quantity (g/g)
	0 minute	10 minutes	20 minutes	30 minutes	
0	0	96	99	100	8
10	0	91	95	100	25
30	0	85	98	100	49
50	0	90	99	100	56
70	0	91	95	100	53
78	0	43	48	50	60

From the results shown in Table 1, it will readily be understood that in the products having a neutralization degree of 0 to 70 mol %, the deodorizing effect is higher than in the product having a neutralization degree 15 of 78 mol % (comparative product). However, it will also be understood that in the product having a neutralization degree of 0 mol %, the absorbing property is reduced. Thus, it will be understood that the degree of neutralization should lie in the range of from 10 to 70 mol %.

Example 2

The deodorizing effect of a sanitary towel comprising a partially 20 neutralization product of water-insoluble polyacrylic acid combined with active carbon paper was compared with a towel composed mainly of pulp

and a towel composed mainly of crepe paper. The deodorizing towel comprised, as shown in Figure 1, a non-woven fabric 1, a rayon staple cotton 2, a pulp 3 (2.2 g), an active carbon paper 4 (containing 0.1 g of active carbon), a polymer sheet 5 comprising 0.3 g of a 40 mol % neutralization product of polyacrylic acid inserted between absorbent papers and a leakage-preventing sheet 6. In this napkin, the active carbon paper 4 was prepared by forming a mixture of fibrous or powdery active carbon with pulp or rayon into a paper. The comparative towel composed mainly of pulp comprised, as shown in Figure 2, a non-woven fabric 1, a pulp 3 (2.2 g) and a leakage-preventing sheet 6. The comparative napkin composed mainly of crepe paper comprised, as shown in Figure 3, a non-woven fabric 1, a crepe paper 7 (2.2 g) and a leakage-preventing sheet 6.

The sample towel was packed together with a source of amine smell into a test bottle having a capacity of about 1 liter and equipped with an inner plug, and after passage of the predetermined time, the intensity of the smell in the bottle was measured and the deodorizing ratio was determined.

The results obtained are shown in Table 2.

Table 2

<u>Kind of Sanitary Towel</u>	<u>Ratio (%) of Removal of Amine Smell</u>				
	0 minute	10 minutes	20 minutes	30 minutes	60 minutes
product of present invention	0	72	100	100	100
product composed mainly of pulp	0	0	10	21	29
product composed mainly of crepe paper	0	0	13	27	30

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In case of the product of the present invention, 30 minutes after introduction of the smell source, the amine smell removal ratio was as high as 100 %.

From the results shown in Table 2, it will readily be understood that by combining active carbon with the sanitary towel of the present invention, the deodorizing effect can further be improved.

Example 3

The deodorizing effects of the same towel of the present invention and the same comparative towels composed mainly of pulp and of crepe paper as used in Example 2 were measured by using a mercaptan smell source in the same manner as described in Example 2. The obtained results are shown in Table 3.

Table 3

Kind of Sanitary Towel	Ratio (%) of Removal of Mercaptan Smell				
	0 minute	10 minutes	20 minutes	30 minutes	60 minutes
product of present invention	0	86	95	100	100
product composed mainly of pulp	0	0	0	0	0
product composed mainly of crepe paper	0	0	0	0	0

From the results shown in Table 3, it will readily be understood that the sanitary towel of the present invention has a good deodorizing effect towards the mercaptan smell.



CLAIMS:

1. A sanitary towel which comprises an envelope and an absorbent material comprising a water-insoluble sodium salt of polyacrylic acid, which is polyacrylamide/ sodium polyacrylate, starch-sodium polyacrylate or sodium polyacrylate of the self-crosslinking type, said polyacrylic acid being partially neutralized with a neutralization degree of from 10 to 70 mol %.
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