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**DUSTING POWDER COMPOSITION CONTAINING
SALTS OF POLY BASIC PHOSPHORIC ACIDS**Stephen Penn Richardson, Hayling Island, Hants, Eng-
land, assignor to Johnson & Johnson, a corporation of
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This invention relates to dusting powders, that is, powders which are suitable for application to the human or animal skin.

Dusting powders are used for purely cosmetic purposes to improve facial appearance; and for other purposes such as to absorb perspiration, for instance, inside rubber gloves; or as a soothing and lubricating agent for the sensitive skin of a baby, particularly for those areas normally covered by, or in contact with, a napkin.

When formulating dusting powders care must be taken to ensure that the powder, after it has been in contact with the skin for some time, develops a pH which approximates as closely as possible to that of the skin, which is normally in the region of 6.0. If alkaline powders, for example, talc, remain in contact with the skin for a prolonged period of time, the effect might well be irritation, a mild rash, or even dermatitis.

In order to minimise the possibility of these dangers, it has been known to incorporate with the talc various agents to counteract the alkalinity of the talc, so that the acidity level of the powder after it has been in contact with the skin for some time is similar to that of the skin.

While the agents hitherto employed have generally been quite satisfactory, their use has presented certain practical problems; for instance, costs have been high, availability has not always been assured, and toxicity has been a factor which had to be carefully guarded against. Also, the flow characteristics of powders containing these agents were sometimes adversely influenced. It is, of course, easily appreciated that dusting powders should flow freely and easily out of their containers, and that they should not cake inside, or stick to the sides of, the containers.

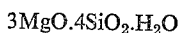
It is one of the objects of the invention to provide a free-flowing dusting powder which is non-irritant and in which the disadvantages associated with known neutral or acidic powders are obviated.

According to the present invention, a free-flowing dusting powder suitable for application to the human or animal skin comprises a major amount of a non-toxic inorganic powder in intimate admixture with a minor amount of an acid salt of an alkali metal or alkaline earth metal and a polybasic phosphoric acid.

Salts of polybasic phosphoric acids suitable for the purposes of the invention include those of orthophosphoric acid (H_3PO_4), pyrophosphoric acid ($H_4P_2O_7$) and hypophosphoric acid ($H_4P_2O_6$), and among particularly suitable salts are sodium dihydrogen orthophosphate, potassium dihydrogen orthophosphate, disodium dihydrogen pyrophosphate, dicalcium orthophosphate, monocalcium orthophosphate and calcium superphosphate, the last of which being one of the preferred.

The term "calcium superphosphate" should be understood to refer to the material which is obtained by the reaction between an acid calcium phosphate and sulphuric acid. The formula usually assigned to this product is $Ca(H_2PO_4)_2 \cdot H_2O + 2(CaSO_4 \cdot 2H_2O)$ (see, for instance, *Chemie Lexikon*, Roempp, 4th edition, 1958, page 643).

The preferred inorganic powder is talc which is a mineral substance whose molecular formula is



When moistened, talc exhibits markedly alkaline prop-

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erties. The pH of talc was measured according to the following test procedure:

Equal weights of talc and distilled water at 16.6° C. are stirred together until a homogenous slurry is obtained. The initial hydrogen ion concentration (pH) of the slurry is then determined by means of a pH meter. Before subsequent determinations of the same mixture are carried out, it must again be stirred until homogeneity is obtained.

Table I represents the results of one particular series of pH determinations of talc carried out according to the above test procedure.

TABLE I

Period:	pH
After 2 minutes	8.28
After 2 hours	8.38
After 4 hours	8.44

Although the inorganic powder is preferably based on talc, the invention can also be used successfully with other inorganic dusting powders, for instance kieselguhr or zinc oxide, which, although not necessarily exerting an alkaline reaction to moist skin, nevertheless do not have sufficient acidity to make them fully compatible with the skin.

The effect of the phosphate is to adjust the pH of the dusting powder, when it is in contact with the skin, so as to avoid irritation to the skin. The most suitable amount of phosphate to be added to the inorganic powder, in order to obtain the said effect, will naturally depend upon the acidity of the particular phosphate and of the particular inorganic powder used. The amount of phosphate added will generally be in the range of 0.1% to 5.0% based on the combined weight of inorganic powder plus phosphate. The range of 0.4% to 0.6% is often preferred, especially when using talc as the inorganic powder and calcium superphosphate as the phosphate.

Dusting powders made according to the invention may be sterilised successfully if required. They may also contain antiseptics, perfumes, and other suitable additives for dusting powder.

Example 1

A dusting powder containing 0.5% by weight (calculated on the weight of talc) of calcium superphosphate was prepared by grinding 10 lbs. of calcium superphosphate with 30 lbs. of talc in a mill to a particle size of less than 200 mesh, and subsequently blending this mixture with 1960 lbs. of talc.

The resulting mixture was found to be very free-flowing and showed no signs of caking after prolonged storage.

When the pH of an aqueous slurry of this powder was determined, according to the method described in the foregoing test procedure, it was found that the freshly prepared dispersion had a pH of 5.73; that after two hours the pH was 5.89; after four hours the pH was 5.89; and after 24 hours the pH was 6.02.

These values were within the pH range approximating to that of the skin. No adverse effects were observed when the powder was applied regularly to the human skin.

Example 2

A further eight batches of dusting powders consisting of mixtures of talc and superphosphates in varying proportions were prepared and the pH measured according to the method described in the foregoing test procedure. It will be seen from Table II, which summarises the composition of these mixtures and the pH determinations carried out on them that amounts as low as 0.4% (Example 7) of calcium superphosphate were sufficient to produce pH levels approximating those of the skin, and that these

levels were maintained within acceptable limits over extended periods.

TABLE II

Example Number	Talc (percent w./w.)	Super-phosphate (percent w./w.)	pH			
			Initial	After 2 hours	After 4 hours	After 24 hours
1	99.90	0.10	7.28	7.65	7.74	7.92
2	99.85	0.15	7.00	7.44	7.60	7.67
3	99.80	0.20	6.78	7.18	7.20	7.56
4	99.75	0.25	6.51	6.89	7.05	7.42
5	99.70	0.30	6.40	6.71	6.83	7.15
6	99.65	0.35	6.25	6.52	6.59	7.09
7	99.60	0.40	6.18	6.37	6.42	6.88
8	99.55	0.45	6.04	6.21	6.26	6.70

Example 3

A dusting powder containing 0.25% by weight of monocalcium orthophosphate was prepared by grinding 25 grams of monocalcium orthophosphate with 250 grams of talc in a mill to a particle size of less than 200 mesh, and subsequently blending this mixture with 9,725 grams of talc.

The resulting mixture was free-flowing and did not cake after prolonged storage.

pH tests of an aqueous slurry of the powder carried out in accordance with the foregoing test procedure gave the following results.

Period:	pH
Initial	5.95
After 2 hours	6.25
After 24 hours	6.60

These values were within the pH range approximating to that of the skin.

The powder was suitable as a general dusting powder for babies.

Example 4

A dusting powder containing 0.5% by weight of acid phosphate was prepared by grinding 50 grams of sodium dihydrogen orthophosphate with 225 grams of talc in a mill to a particle size of less than 200 mesh and subsequently blending this mixture with 9,725 grams of talc. The resulting mixture was free-flowing and did not cake during prolonged storage.

pH tests of an aqueous slurry of the powder carried out in accordance with the foregoing test procedure gave the following results.

Period:	pH
Initial	6.14
After 2 hours	6.16
After 24 hours	6.70

These values were within the pH range approximating to that of the skin.

The powder was suitable as a general dusting powder for babies.

Example 5

A dusting powder containing 0.5% by weight of an acid phosphate was prepared by grinding 50 grams of potassium dihydrogen orthophosphate with 225 grams of talc in a mill to a particle size of less than 200 mesh and subsequently blending this mixture with 9,725 grams of talc. The resulting mixture was free-flowing and did not cake during prolonged storage.

pH tests of an aqueous slurry of the powder carried

out in accordance with the foregoing test procedure gave the following results.

Period:	pH
Initial	6.17
After 2 hours	6.44
After 24 hours	6.52

These values were within the pH range approximating to that of the skin.

The powder was suitable as a general dusting powder for babies.

Example 6

A dusting powder containing 0.5% by weight of acid phosphate was prepared by grinding 50 grams of disodium dihydrogen pyrophosphate with 225 grams of talc in a mill to a particle size of less than 200 mesh and subsequently blending this mixture with 9,725 grams of talc. The resulting mixture was free-flowing and did not cake during storage tests.

pH tests of an aqueous slurry of the powder carried out in accordance with the foregoing test procedure gave the following results.

Period:	pH
Initial	5.76
After 2 hours	6.03
After 24 hours	6.56

These values were within the pH range approximating to that of the skin.

The powder was suitable as a general dusting powder for babies.

What we claim is:

1. A dusting powder composition suitable for application to the human and animal skin comprising a major amount of a non-toxic inorganic powder selected from the group consisting of talc, zinc oxide, kieselguhr, and mixtures of these substances, in intimate admixture with a minor amount of an acid salt of a polybasic phosphoric acid and a metal selected from the group consisting of the alkali and alkaline earth metals.
2. A dusting powder composition of claim 1 wherein the acid salt is calcium superphosphate.
3. A dusting powder composition of claim 1 wherein the acid salt is monocalcium orthophosphate.
4. A dusting powder composition of claim 1 wherein the acid salt is sodium dihydrogen orthophosphate.
5. A dusting powder composition of claim 1 wherein the acid salt is potassium dihydrogen orthophosphate.
6. A dusting powder composition of claim 1 wherein the acid salt is disodium dihydrogen pyrophosphate.
7. A dusting powder composition of claim 1 wherein the phosphate forms 0.1% to 5% of the combined weight of the inorganic powder plus phosphate.
8. A dusting powder composition of claim 1 wherein the phosphate forms 0.4% to 0.6% of the combined weight of the inorganic powder plus phosphate.

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