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Determining Childhood Learning from Various Kind Formulas of Soft-Prepared Chalk

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Abstract

This research aimed to find out a baby powder formula made of soft-prepared chalk and to investigate satisfaction with the selected formula baby powder. The research sample was 300 people consisting of parents, students, and general people who were likely to use baby powder. Research instruments were a colorimeter, water activity meter, moisture analyzer, and a questionnaire on consumer satisfaction with six baby powder formulas. Descriptive statistics were mean, percentage, and standard deviation for data analysis. Findings showed that a formula made of 25% soft-prepared chalk mixed with 75% rice flour was the most suitable formula to make baby powder due to its good water absorbability and ease of application. The consumer's satisfaction with the selected baby powder formula was contact surface, color, ease of application, and overall preference.

Keywords: Baby powder, Rice flour, Satisfaction, Soft-prepared chalk

1. Introduction

Baby powder found in the market has been processed by dough called talcum. It is an inorganic and non-biodegradable substance. If inhaled for a long time, accumulation in the lungs is probably happened and causes respiratory problems. In addition, in the last decade,

Asbestos contamination has also been detected as a harmful substance to consumers. Many manufacturers have had multiple recalls (Bellinger, 2019; Sushmitha, 2019; Shahzad et al., 2022) but the use of body powder is one activity that most people still prefer to do. When applied, it feels slippery and comfortable as the dough absorbs moisture.

Even babies and children are often powdered before wearing diapers or wearing clothes. Parents or babysitters may sprinkle baby powder over the baby's body or apply a large amount of powder to the child. They think it helps keep the child dry for a long time, on the contrary, such activity could harm the children's health (Sarıkaya Karabudak et al., 2020). Khunhorn (2017) said that sprinkling talcum caused the powder floats in the air. The child has the opportunity to breathe the floating starch into the lungs and clump them into the lung wall cells. When accumulation occurs frequently, long-term intake causes respiratory diseases both in terms of contamination of compounds and side effects of inhalation of the dough dust while applying. When the child inhales it regularly, it causes respiratory harm and results in allergies. A tumor in the lung can occur and lead to the death of a child (Wyckiff, 2000; Goodman et al., 2020; Wentzensen & O'Brien, 2021, 2022).

Sickness and death may be caused by environmental insecurity when the children were at school. Until now, such problems continue to arise based on reports of pneumonia situations. When classified by age group, patients in the 0 to the 4-year-old group were found in the highest rate of sickness per hundred thousand people compared to patients with pneumonia in other age groups. There's a sickness rate of 226.5 per hundred thousand people in the last 4 years. This remained an age group with a higher morbidity rate than other age groups every year. Therefore a monitoring system should be launched to reduce violence and deaths. The preventive approach to health education measurement should be increased and focused heavily on surveillance (Siribunnam et al., 2014; Burns et al., 2019; Taher et al., 2019).

Considering the problem, it showed that the major problem was from talcum flour. Choosing the right type of dough to apply to the child is a significant way to reduce the problem. Soft-prepared chalk is one of the products which has been used to sprinkle over the body for a long time. It is from grinding marl soil, sifting, mixing water, filtering it thoroughly, and drying it until it is dry, then, bringing it to calcine by burning soft-prepared chalk to remove contaminated germs. This is because soft-prepared chalk is considered a type of herbs with a cold effect. It also cures rashes and treats eczema. In addition to soft-prepared chalk, body flour is produced from plants such as corn, and rice (Dao-Sukhothai, 2016) which 100% organic. Moreover, rice flour is a naturally biodegradable microorganism. Therefore, this neither causes any accumulation in the respiratory system nor irritation (Hypoallergenic). Moreover, it reduces the chance of developing allergies. This has been certified that it is safe for children (Pitisan, 2020). With the value and benefits of soft-prepared chalk that has long been in the Thai way of life and rice powder, such innovation is recognized nationally and internationally.

2. Method

2.1 Participants

The research participants were those who likely use baby powder in Thanyaburi district, Pathum Thani province, Thailand. The 300 participants were classified as follows:

- 100 participants were for the survey on consumer demand for baby powder.
- 100 participants were for consumer satisfaction with baby powder.
- 100 participants were for the consumer satisfaction test on the selected baby powder formula.

2.2 Research Instruments

Color meter, water activity meter, moisture analyzer, a questionnaire on the consumer satisfaction towards the 6 baby powder formulas, and a consumer satisfaction test for the selected flour formula.

2.3 Data Collection

A survey of consumer demand for baby powder was done by asking 100 people who were likely to use baby powder including parents. Most of the respondents were female, aged around 50 or even more, at an undergraduate educational level and most of them earned 10,000-20,000 baht per month. Most respondents used baby powder and spent 20-30 baht for a package of 100 grams. The white flour with mild fragrance was the most selected. Most respondents knew soft-prepared chalk and soft-prepared chalk baby powder was the preferable one. The 75 grams tester was the most selected for a trial.

The development of baby powder formulas was done by using soft-prepared chalk and rice flour as raw materials for the flour recipes development, as well as mixing soft-prepared chalk and rice flours in different ratios. Testing the physical properties of the six formulations of baby powder were done by testing the brightness value (L^*), the redness value (a^*), the yellowness value (b^*), the activity value of free water (aw), the amount of water in the starch (humidity), and the density.

Consumer satisfaction with the selected baby powder was done through the 100 people who were likely to use baby powder. It was found that the participants were satisfied with the skin contact test, smelling test, color, and ease of application.

2.4 Data Analysis

The variance of contact level preferences, smell, color, ease of application, and overall preference of rice flour mixed with soft-prepared chalk at various levels, consumer test preferences for rice flour mixed with soft-prepared chalk at the accepted level. Preference criteria were divided into 5 levels by mean of 4.50-5.00 was defined as the level of mostly like, 3.50-4.49 was defined as the like level, 2.50-3.49 was defined as a level of indifference, 1.50-2.49 was defined as dislike level, and 1.00-1.49 was defined as mostly dislike. Mean and standard deviation of the testers and consumer preference levels towards rice flour mixed

with soft-prepared chalk at various levels were used for data analysis.

3. Results and Discussion

3.1 Baby Powder Formulas from the Soft-Prepared Chalk

Development of baby powder formula after exploring consumer demand for baby powder, the tester's needs were developed by mixing soft-prepared chalk with rice flour in different ratios.

(1) 100% soft-prepared chalk

(2) Soft-prepared chalk 75% mixed with rice flour 25%

(3) Soft-prepared chalk 50% mixed with rice flour 50%

(4) Soft-prepared chalk 25% mixed with rice flour 75%

(5) Rice flour 100%

(6) Commercial rice flour

Then take all 6 formulas of flour to test its physical properties in the next step. Testing the physical properties of various baby powder formulations brightness (L^*), redness (a^*), yellowness (b^*), free water activity value (aw), and starch content (humidity) as shown in Table 1.

Table 1. Physical properties of various dough

Soft-prepared chalk: Rice flour	Brightness value (L^*)	Redness value (a^*)	Yellowness value (b^*)	Activity value of free water (aw)	The amount of water in the dough (Humidity)
100:0	$88.24^{e}\pm0.40$	$1.46^{a}\pm0.02$	$9.59^{a}\pm0.06$	$0.50^{b}\pm0.01$	$0.59^{e}\pm0$
75:25	$92.15^{d}\pm0.06$	$0.89^{b}\pm0.01$	$6.98^{b}\pm0.06$	$0.53^{a}\pm0.01$	$3.07^{d}\pm0.09$
50:50	$94.87^{c}\pm0.06$	$0.55^{c}\pm0$	$4.97^{c}\pm0.15$	$0.49^{b}\pm0.002$	$6.1^{c}\pm0.04$
25:75	$96.87^{b}\pm0.03$	$0.27^{d}\pm0.01$	$3.21^{d}\pm0.14$	$0.41^{c}\pm0.001$	$8.14^{b}\pm0.13$
0:100	$99.60^{a}\pm0.10$	$-0.04^{f}\pm0.01$	$1.61^{f}\pm0.04$	$0.48^{ab}\pm0.005$	$11.39^{a}\pm0.007$
0:Commercial rice flour	$99.43^{a}\pm0.11$	$0.03^{e}\pm0.01$	$1.77^{e}\pm0.09$	$0.51^{ab}\pm0.002$	$11.60^{a}\pm0.23$

The brightness value (L^*) indicated that the soft-prepared chalk had the least brightness value. When considering the brightness value of every experiment, it was found that by increasing the amount of soft-prepared chalk, the brightness value decreased. In terms of redness (a^*), all flours were found to be in the range of -0.04-1.46, which was the resulting color green (a^-).

The yellowish value (b^*) showed that all flours ranged from 1.61 to 9.59, which was influenced by soft-prepared chalk, resulting in a yellowish-green color.

The activity value of independent water and the amount of water in the starch (percent) showed that all formulations ranged from 0.41 to 0.53 and 0.59-11.60, which were unsuitable for microbial growth and chemical reactions, allowing soft-prepared chalk to be preserved for a long time. After that, the six dough formulas to test density worked as shown in Table 2.

Table 2. Various formulations of dough density tests

Formulas	Density (g per milliliter)
Formula 1: 100% soft-prepared chalk	0.896^{a}±0.02
Formula 2: Soft-prepared chalk 75%:Rice flour 25%	0.741^{b}±0.00
Formula 3: Soft-prepared chalk 50%:Rice flour 50%	0.660^{c}±0.01
Formula 4: Soft-prepared chalk 25%:Rice flour 75%	0.603^{d}±0.01
Formula 5: Rice flour 100%	0.451^{e}±0.01
Formula 6. Commercial rice flour	0.453^{e}±0.01

According to various formulations of flour density tests, 100% rice flour had a density of 0.451 grams per milliliter. This made good water absorption properties. Despite its high dispersion, when mixed with soft-prepared chalk, 100% with a density of 0.896 grams per milliliter reduced diffusion, while maintaining good water absorption properties.

The development of baby powder formula found that 25% of soft-prepared chalk dough recipes were mixed with rice flour, 75% of which were the dough formula that was mixed between soft-prepared chalk and rice flour that consumers most accepted. This was due to the development of the right dough formulation. Data from the consumer preferred baby powder survey was used to vary the levels of flour, soft-prepared chalk, and rice flour in different ratios. Examples of soft-prepared chalk flour and unmixed rice flour were comparative.

Tested the physical properties of baby powder in each formula, it was found that its color properties were not available. In brightness, it was found that when adding the amount of soft-prepared chalk dough, would result in a decrease in the brightness value of the mixed dough, this was due to the color of the soft-prepared chalk dough with a darker and more solid color. Red and yellow, it was found that the color of the mixed dough was yellowish-green because the redness value was relatively small and negative in some experimental things. This indicated that it was colored green. Moisture and free water content were low, indicating that the product could be preserved for a long time and could reduce microbial degradation. The safe free water content was below 0.6.

In terms of density, rice flour was found to be low density due to the large particles of

powder, so it was highly dispersed (Kwandee et al., 1998), soft-prepared chalk was highly dense due to the presence of small powder particles with low dispersion. When soft-prepared chalk was added to the rice flour, it reduced the diffusion of the pontoon while applying. It retained its water-absorbing properties, making it dry and easy to apply.

3.2 Satisfaction toward Soft-Prepared Chalk

Select the dough formula based on the satisfaction of those who experimented with baby powder products from various inflatable pencils by examining the satisfaction of the skin. The smell, color, ease of application, and overall preference of consumers experimenting with the product. 100 people appear as shown in Table 3.

Table 3. Consumer satisfaction toward baby powder

Soft-prepared chalk: Rice flour	Texture	Smell	Color	Ease of application	Overall preferences
100:0	2.92^{d}±1.15	2.58^{b}±0.94	2.44^{c}±1.12	2.72^{c}±1.21	2.70^{c}±1.01
75:25	3.48^{c}±1.21	2.46^{b}±1.01	3.00^{bc}±1.12	3.04^{ab}±1.24	3.08^{b}±0.98
50:50	3.56^{c}±1.10	2.66^{b}±0.91	3.20^{bc}±1.04	3.50^{b}±0.95	3.36^{b}±0.92
25:75	3.76^{c}±1.02	2.96^{b}±1.08	3.52^{b}±0.99	3.52^{ab}±0.99	3.44^{b}±0.88
0:100	4.04^{b} ±0.83	2.98^{b}±1.31	3.92^{b}±0.80	3.78^{b}±0.95	4.40^{a}±0.92
0:Commercial rice flour	4.34^{a}±0.96	4.22^{a}±0.95	4.18^{a}±0.96	4.18^{a}±1.06	4.38^{a}±0.92

According to sensory tests on soft-prepared chalk mixes at different levels, testers liked the texture of commercial rice flour the most, with a score of 4.34±0.96 (like level), followed by 100% of the rice flour recipes, 25% mixed rice flour, 75% soft-prepared chalk recipe 50% mixed rice flour, 50% soft-prepared chalk recipe, 75% mixed rice flour, 25% soft-prepared chalk recipe According to the results of the experiment, the amount of soft-prepared chalk affected the texture preferences of the dough. When increasing volume. The preference for the texture was reduced because the body of the soft-prepared chalk had a rather firmer texture than rice flour. When mixed into an increased amount, it resulted in a heavier and firmer appearance of the texture (Goldhaber, 1992; Vartuli & Rohs, 2008).

A test of the starchy senses mixed with soft-prepared chalk at various levels showed that the testers liked the smell of commercial rice flour the most, scoring 4.22±0.95 because the smell was added to the formula, while other formulas did not add smells, thus resulting in aroma preferences in other experiments. There was no statistically significant difference at .05 level.

A test of the senses of starch mixed with soft-prepared chalk at various levels showed that the testers preferred the color of commercial rice flour the most, scoring 4.18±0.96. This was because the color of the soft-prepared chalk was much darker than the rice flour, which

makes the resulting color more intense.

A test of the senses of starch mixing soft-prepared chalk at various levels showed that the testers preferred the ease of application of commercial rice flour the most, scoring 4.18±1.06, while flour with soft-prepared chalk fills showed that soft-prepared chalk had an effect on their preferences for ease of application. This was because soft-prepared chalk was soiled. This made the starch heavier than rice flour, which made it affected the customers' preferences.

According to the overall preference test, 100% of the commercial rice flour and rice flour recipes were the highest likes. There was no statistically significant difference. While 100 percent of the soft-prepared chalk dough formula was the least liked by the testers, it was concluded that the amount of soft-prepared chalk affected the overall preferences of the dough.

In this experiment, the researchers chose soft-prepared chalk with 25% mixed rice flour 75% because it had the most sensory acceptance values in the starch group with a combination of soft-prepared chalk with rice flour and took it to consumer testing in the next step. Once the right dough recipe has been selected, you can choose the right dough recipe. It was tested for satisfaction in the texture, color, ease of application, and overall preferences of 100 consumers.

Table 4. Consumer satisfaction

Characteristics	25% soft-prepared chalk flour with 75% rice flour
Texture	3.81±0.87
Color	3.83±0.78
Ease of application	3.91±0.81
Overall references	3.89±0.81

When bringing flour, the recipe is inflatable. 25% mixed rice flour, 75% tested on 100 consumers found a preference for texture. Consumers had a preference of 3.81±0.87 color preferences. Consumers had a preference of 3.83±0.78 preferences for ease of application. Consumers had 3.91 preferences±0.81, and overall preferences of 3.89±0.81, based on a score that indicated that the majority of consumers were in favor.

Testing consumer preferences in various areas found that consumers prefer rice flour over soft-prepared chalk. The greater the proportion of rice flour, the more accepted and the more accepted became. This was in line with the survey data that showed consumers prefer light flour. Therefore, the most recognized soft-prepared chalk dough recipe with rice flour, was, a 25% soft-prepared chalk dough recipe with 75% rice flour. When the dough was used, the formula was retested with consumer satisfaction. It was still accepted at the like level but had

a slightly higher score compared to testing in conjunction with other dough recipes.

This might be because there was no comparison with a formula with a larger rice flour ratio, and the tester was exposed to the texture characteristics. However, the chosen dough still produces more fuzz than formula flour with a soft-prepared chalk ratio greater than rice flour. The higher the soft-prepared chalk dough ratio and the lower the rice flour, the lower the dispersion. The research should be extended to find a balance between satisfaction and consumer safety and for a good choice in early childhood education (Prachagool & Nuangchalerm, 2012; Katz & Girolametto, 2013; Prachagool & Nuangchalerm, 2021).

4. Conclusion

The baby powder recipe made from the right soft-prepared chalk was 25% soft-prepared chalk flour mixed with rice flour, 75% was the most recognized by the testers. Satisfaction of those who experimented with baby powder products from soft-prepared chalk on the surface, color, ease of application, and overall preferences range from 3.81-3.91, which was at the like level. However, making baby powder from soft-prepared chalk is recognized by consumers to some extent, but it may lack some other characteristics, so it could be used for further research to find ways to develop the dough that is mixed with soft-prepared chalk to be recognized and used more widely.

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