Perfume Material In Palm Based White Soap

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The basic chemical component of soap is a blend of sodium salts of $C_{16 - 18}$ and $C_{12 - 14}$ fatty acids. Traditionally $C_{16 - 18}$ fatty acids have been derived from tallow, but palm oil is now slowly gaining popularity as a partial or total replacement for tallow. Coconut oil is the traditional source of $C_{12 - 14}$ fatty acids but palm kernel oil has been found to be a suitable substitute. Palm oil and palm kernel oil have characteristic odours which are not acceptable in soap, but these can be suppressed by incorporating perfume. Perfuming of soap is not a simple process: it involves the blending of various fragrances, aromatic compounds and essential oils which will finally give the desired pleasant smell. The fragrant materials are usually volatile organic compounds from the families of ketones, aldehydes, alcohols, ester and lactones. Mixed in the correct ratio these organic compounds will give harmonius blends in various style.

The chemical complexity of perfumes means that diverse functional groups are present, and raises the possibility of undesirable effects on the soap after incorporation. Soap is slightly alkaline in nature and some of the organic compounds in perfumes can undergo chemical reactions under alkaline conditions, which may discolour white soap or suppress the pleasant smell of the perfume. Thus perfume for use in soap should have good retention in soap and several complementary properties such as odour compatibility, dermatological tolerance and substantivity on the skin (Grosso, 1973).

In addition to enhancing the pleasant smell to toilet soap, the fragrance also serves to perfume the skin of the user and the bathroom. At present, soaps containing natural herbal fragrances are becoming more popular due to changes in the consumers' preferences.

Basically there are two processes in soap making, direct saponification of oil, and neutralization of fatty acids: the latter is being used increasingly by soap manufacturers. Additives such as chelating agents, anti-oxidants, foaming agents, colouring and perfume are normally incorporated into the neat soap before it goes through the milling process. Therefore colour changes, if any, will take place during or after milling and in storage.

Literature survey showed that most soap perfumery studies have been conducted using tallow-based soaps. The present preliminary study was done with palm-based soaps containing 75% palm oil and 25% coconut oil and tallow-based soaps with 70% tallow and 30% coconut oil.

The first part of the study concerned only palm-based soap into which were incorporated three types of perfume that is Sunrise, Farbianca and Biexia. The dosage applied was 1.5 percent. Visually, the sequence of increasing degree of discolouration in the three white soap samples was Biexia, Farbianca, and Sunrise. This was confirmed by determining the degree of whiteness using the Colour and Colour Difference Meter. The principle of this measurement is a calculation using the Hunter Whiteness equation (Salmiah *et al.*, 1986).

$$W = 100 - [(100 - L)^2 + (a^2 + b^2)]^{1/2}$$

In this equation the reflection coefficient of a perfect white solid at 457 mμ is taken as

100 percent. For sample, deviation from the 100% reflection coefficient can be due to a difference in lightness (L) or colour hue (a and b), or both. These differences can be measured using the Colour and Colour Difference Meter (Model ND–100/DP from Nippon Denshoku Kogya Co. Ltd.). *Table 1* shows the results obtained in the present study. Biexia had the highest value of 85, followed by Farbianca with 84 and Sunrise with 80. *Figure 1* shows the soaps containing the perfumes.

In the second part of this study, a similar but larger experiment was carried out: ten different perfume materials were incorporated into palm-based and tallow-based soaps at 1.2% concentration. A few of the perfume materials discoloured the soaps, as can be seen from the Hunter Whiteness values listed in *Table 2*. The incorporation of Eugenol caused a high degree of discolouration in both palm-based and tallow-based soaps. The value for palm-based soap blank was 88 and for that containing Eugenol was 79. Similar results were obtained for the tallow-based soap, the value for the blank being 85 while the one with Eugenol showed 76. This colour difference can also be seen in *Figures 2* and *3*.

Table 2 shows that palm-based white soap containing Undecylic Aldehyde in 50% DPG (dipropyleneglycol), Galaxolide, Koavone, Lyral or Styrallyl Acetate has a Hunter Whiteness of 88, which is the same as that of the blank. This means that these perfumes do not affect the whiteness of the soap. Geraniol and Hexyl

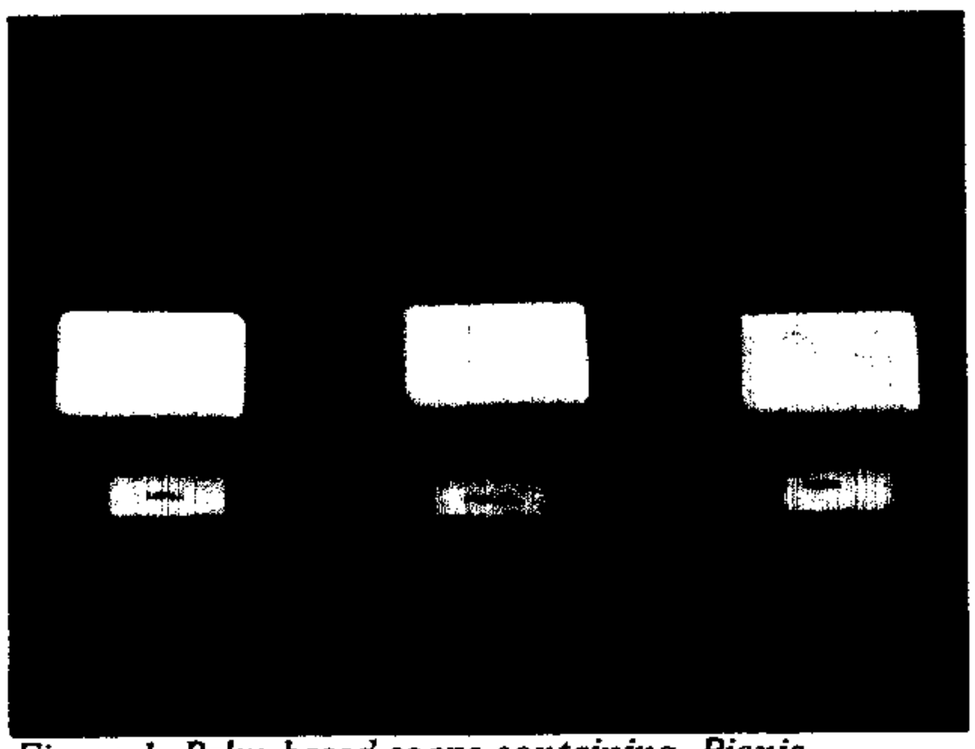

Figure 1. Palm-based soaps containing Biexia. Farbianca and Sunrise.

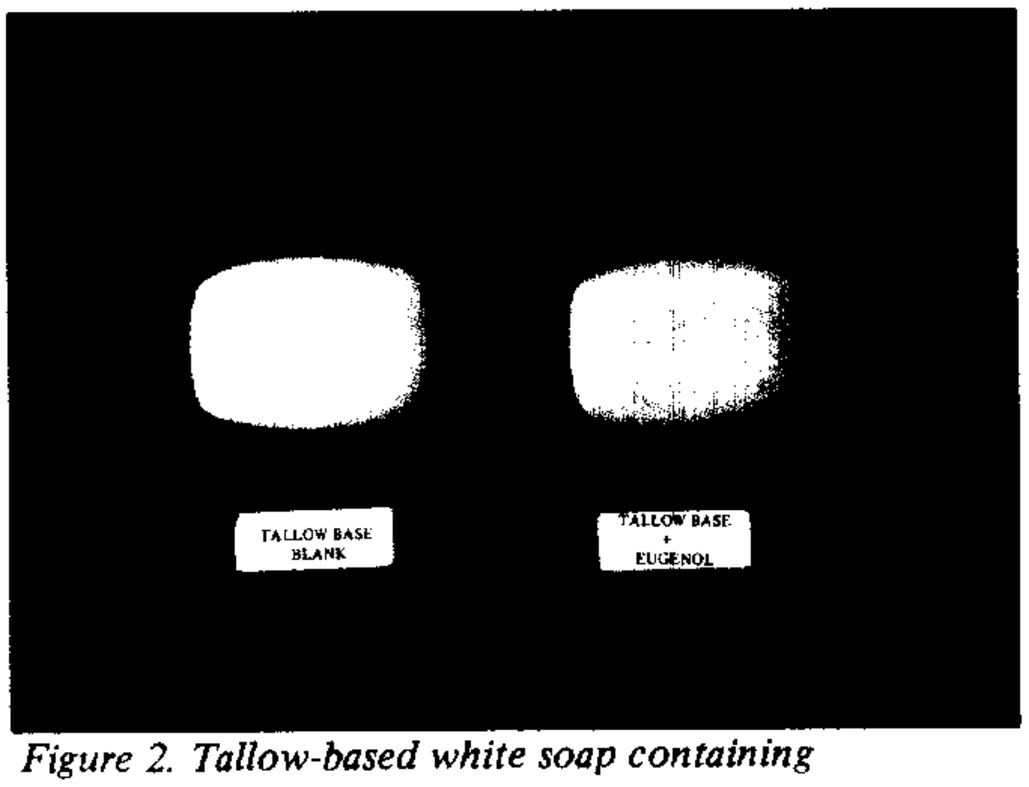

Figure 2. Tallow-based white soap containing Eugenol.

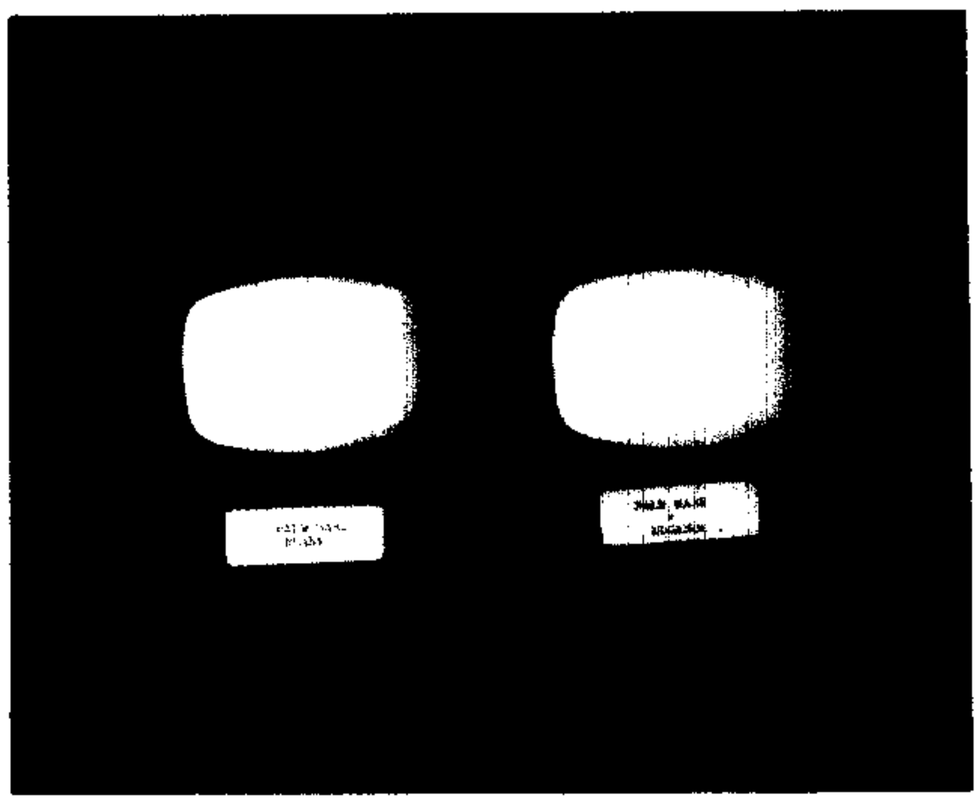

Figure 3. Palm based white soap containing Eugenol.

TABLE 1. DEGREE OF WHITENESS OF PALM-BASED SOAPS CONTAINING BIEXIA, FARBIANCA AND SUNRISE

Samples	Hunter Whiteness
Biexia	85
Farbianca	84
Sunrise	80

TABLE 2. DEGREE OF WHITENESS OF SOAPS CONTAINING PERFUME MATERIALS

	Hunter Whiteness	
Soap + Perfume Samples	**Palm-based**	**Tallow-based**
1. Blank	88	85
2. L' Air du Temps	84	81
3. Undecylic Aldehyde in 50% DPG	88	83
4. Eugenol	79	76
5. Galaxolide	88	85
6. Geraniol	87	85
7. Hexyl Cinnamic Aldehyde	87	85
8. Koavone	88	85
9. Lyral	88	81
10. Styrallyl Acetate	88	85
11. Ylang Ylang	83	81

Cinnamic Aldehyde discoloured the palm-based white soap slightly, while L'Air du Temps and Ylang Ylang caused more discolouration. The perfumes that did not affect tallow-based white soaps were Galaxolide, Geraniol, Hexyl Cinnamic Aldehyde, Koavone and Styrallyl Acetate. Undecylic Aldehyde discoloured the tallow-based white soap slightly, while L' Air du Temps, Lyral and Ylang-Ylang had a more deleterious effect on whiteness.

These results indicate that the performance of some perfumes such as Galaxolide, Koavone and Styrallyl Acetate is the same in palm-based soap, as in tallow-based soap; in other cases, such as Undecylic Aldehyde in 50% DPG and Lyral, performance is better in palm-based soap. These observations also show that perfume compounding for white soap needs careful consideration as certain materials cause changes in white soap. Further studies of the effect of perfume raw materials on palm-based soap and comparisons with tallow-based soaps will be carried out.

REFERENCE

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