NEW METHOD OF EVALUATING PERFUMERY RAW MATERIALS: PART II IN COSMETIC PRODUCTS

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ABSTRACT

The new alignment chart method has been used in the evaluation of the fragrances of the essential oils from ***C. citratus*** *(Dc) stapf,* ***E. uniflora*** *linn,* ***L. adoensis*** *Hochst,* ***V. agnus-castus*** *Linn and* ***Z. rigidifolium*** *waterman in cosmetic products. The method incorporates the retentivity index, R_F, acceptability index, R_A and the final performance, F_P.*

The consistency of the cosmetic products seem to have some effects on the R_f values but very little or no effects on the R_A values.

INTRODUCTION

Fragrance is a quality of cosmetic products and it plays a significant role in determining the choice of these products (Sagarin 1957). Fragrance has also been shown to be of great importance in the sales appeal of cosmetic products (Wilkinson and Moore 1982).

In a previous study (Igwilo et al 1987), an alignment charge was developed which was used to evaluate perfumery raw materials. The aim of the present work is to investigate the use of the alignment chart in evaluating perfumery raw materials in cosmetic products. The essential oils extracted from the leaves of *Cymbopogon citratus* (DC) *Stapf, Eugenia uniflora Linn, Lippia adoensis* Hochst, *Vitex agnus-castus Linn,* and *Zanthoxylum rigidifolium* Waterman were incorporated into some cosmetic products and these products were evaluated for their fragrances using the alignment chart method.

The cosmetic products chosen represent solid/semi-solid to liquid types and these are cleaning cream, shaving cream, liquid shampoo and after-shave lotion.

*CORRESPONDENCE

MATERIALS AND METHODS

Source and extraction process have been reported earlier (Igwilo, et al 1987). The analysis of the essential oils from *Z. rigidifolium* Waterman and *C. citratus* (DC) Stapf has been reported (Onawunmi et al 1984, Ekundayo, 1985, Oguntimein et al 1985).

Product Formulation and Evaluation

10g of each of the following cosmetic products was prepared using each of the essential oils and essence of rose as perfume.

1. Cleansing Creams		2. Shaving Cream	
Beeswax	8.0	Methyl cellulose (2% Solution)	73.7
Mineral oil	49.0	Sodium lauryl sulphate	1.0
Paraffin wax	7.0	Glycerol	5.0
Cetyl alcohol	1.0	Mineral oil	15.0
Borax	0.4	Menthol	0.3
Water	34.6	Water	5.0

In the preparation of the cleansing and shaving creams, the oil soluble components were heated together to about 70°C and the water soluble components heated together to the same temperature. The latter was added to the former with constant stirring. 0.05ml of either the essential oil or the essence of rose, obtained from a standard dropper, was added at about 50°C and stirring continued. The creams were filled into jars at about 42°C.

3. Liquid Shampoo:	
Coconut oil	18.0
Castor oil	4.2
Potassium hydroxide (85%)	5.3
Glycerol	4.0
Borax	0.5
Water	68.0

The oil soluble components were added together into a coloured fluted bottle and a drop of the essential oil or essence of rose was added. The water soluble components were mixed together in a small beaker and gradually added to the oil soluble components in the bottle with vigorous shaking after each addition.

4. After-shave Lotion	
Ethyl alcohol, special denatured	50.0
Sorbitol	3.0
Menthol	0.1
Boric acid	2.0
Water	44.9

The ingredients were dissolved in alcohol inside a coloured fluted bottle and a drop of the essential oil or essence of rose was added. Water was gradually added with constant shaking.

Measurement of odour, using the perfume slip method and acceptability testing were carried out as previously described (Igwilo et al 1987). In the perfume slip method, about 0.05g of the product was carefully spread on the slips and the number of hours required for the odour to disappear was noted. This was carried out three times and the average number of hours recorded. The retentivity index (R_F), acceptability index (R_A) and the final performance (F_P) were determined as reported earlier (Igwilo et al 1987). The modified conditions and the corresponding boundaries used in the determination of the final performance of the essential oils in the cosmetic products are shown in Table 1.

RESULTS AND DISCUSSION

The values of R_F, R_A and F_P are given in Tables 2, 3, and 4 respectively. Fig. 1 (a, b) shows the representative histograms of the final performance (F_P) of the essential oils in cleansing cream and after-shave lotion.

It is seen in Table 2 that the essential oils in general had comparatively higher R_F values in the semi-solid compared with the liquid preparations studied. This finding relates to the more viscous nature of the semi-solids compared with the liquid preparations. On the other hand, the acceptability indices (Table 3) were independent of the semi-solid or liquid consistency of the preparation; each oil had similar acceptability indices in the four cosmetic products investigated. This presumably shows that an odour whose acceptability rating is positive may maintain the same rating in a range of cosmetic products.

TABLE 1: MODIFIED CONDITIONS AND CORRESPONDING BOUNDARIES

CONDITIONS	BOUNDARY
1. $R_F \leq 0.5, R_A \leq 0.5$ A_R = + (or) −	K (or) Q
2. $R_F \geq 0.5, R_A \geq 0.5$ A_R = +	M
3. $0.25 \leq R_F \leq 0.5, R_A \geq 0.5$ A_R = +	M
4. $R_F \geq 0.5, 0.25 \leq R_A \leq 0.5$ A_R = + (or) −	K (or) Q
5. $R_F \leq 0.25, R_A \leq 0.25$ A_R = −	Q

KEY: R_F = Retentivity Index
R_A = Acceptability Index
A_R = Acceptability Rating

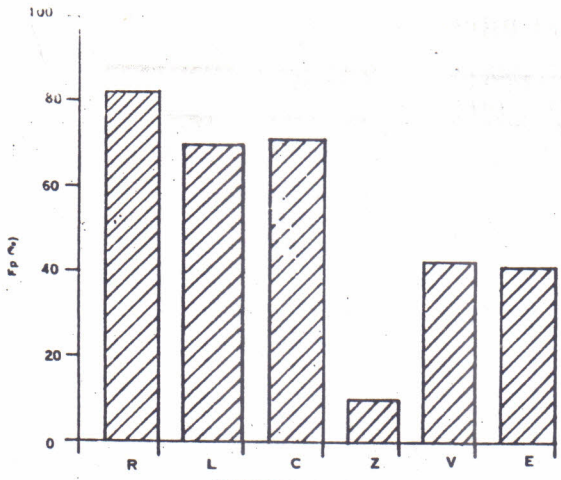

FIG 1a: THE FINAL PERFORMANCE (Fp) OF THE ESSENTIAL OIL IN CLEANSING CREAM

KEY:— R = Essence of Rose, L = L. adoensis, C = C. citratus, Z = Z. rigidifolium, V. = V. agnus-castus and E = E. uniflora.

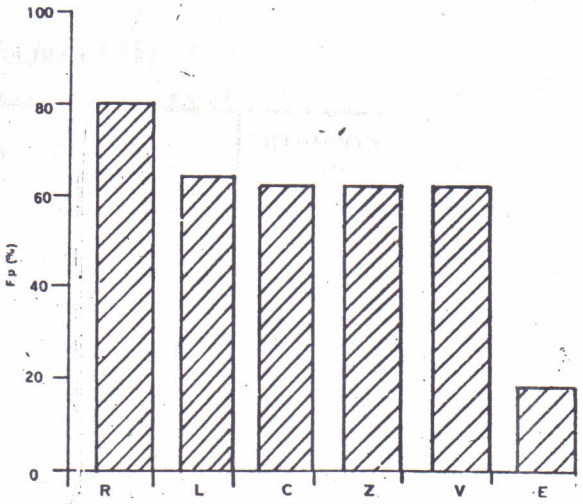

FIG. 1b: THE FINAL PERFORMANCE (F_P) OF THE ESSENTIAL OIL IN AFTER-SHAVE LOTION

(Key as in Fig. 1a.)

TABLE 2: VALUES OF R_F

COSMETIC PRODUCTS	ESSENTIAL OILS					
	C. citratus	*L. adoensis*	*E. uniflora*	*V. agnus-castus*	*Z. rigidifolium*	Essence of Rose
After-shave lotion	0.35	0.35	0.26	0.25	0.40	0.48
Cleansing Cream	0.36	0.35	0.39	0.46	0.40	0.56
Liquid Shampoo	0.50	0.52	0.32	0.30	0.40	0.50
Shaving Cream	0.24	0.56	0.50	0.56	0.28	0.90

TABLE 3: VALUES OF R_A

COSMETIC PRODUCTS	ESSENTIAL OILS					
	C. citratus	*L. adoensis*	*E. uniflora*	*V. agnus-castus*	*Z. rigidifolium*	Essence of Rose
After-shave lotion	0.56	0.56	0.38	0.68	0.52	0.92
Cleansing Cream	0.74	0.59	0.50	0.49	0.17	0.92
Liquid Shampoo	0.80	0.64	0.30	0.50	0.50	0.75
Shaving Cream	0.80	0.68	0.41	0.40	0.29	0.86

TABLE 4: VALUES OF RF (%)

COSMETIC PRODUCTS	ESSENTIAL OILS					
	C. citratus	*L. adoensis*	*E. uniflora*	*V. agnus-castus*	*Z. nigidifolium*	Essence of Rose
After-shave lotion	65	68	18	65	65	80
Cleansing Cream	71	70	43	44	10	85
Liquid Shampoo	77	72	15	42	45	75
Shaving Cream	72	74	25	25	15	93

The final performance, *FP* of the essential oils in the cleaning cream and liquid shampoo were in the order *C. citratus* > *L. adoensis* > *V. agnus-castus* > *E. uniflora Z. rigidifolium* and *C. Citratus* > *L. adoensis* > *V. agnus-castus* > *rigidifolium* > *E. uniflora* respectively.

The F_p values for *Z. rigidifolium* and *V. agnus-castus* were generally below 50% in the cosmetic products except in the after shave lotion where the value was 65%. This may be due to the fact that after-shave lotion has a methol flavour in the formula which increased the F_p values of the two fragrances.

The essential oil from *C. citratus* was the most acceptable in the cleansing cream while the oil from the *Z. rigidifolium* was the least acceptable (Fig. 1a). In the after-shave lotion, the oils from *L. adoensis, C. citratus, Z. rigidifolium* and *V. agnus-castus* had equal acceptability (Fig. 1b); oil of *E. uniflora* had poor acceptability in this preparation.

The new alignment chart method has been extended to the evaluation of perfumery raw materials in cosmetic products. The study has shown that the retentivity of each of the fragrances investigated in the preparations depends on a large extent on the viscous nature of the product. The oils of *C. citratus, L. adoensis, V. agnus-castus* were generally accepted as fragrances in the cosmetic preparations studied.

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