PALM PRODUCTS IN COFFEE WHITENERS*

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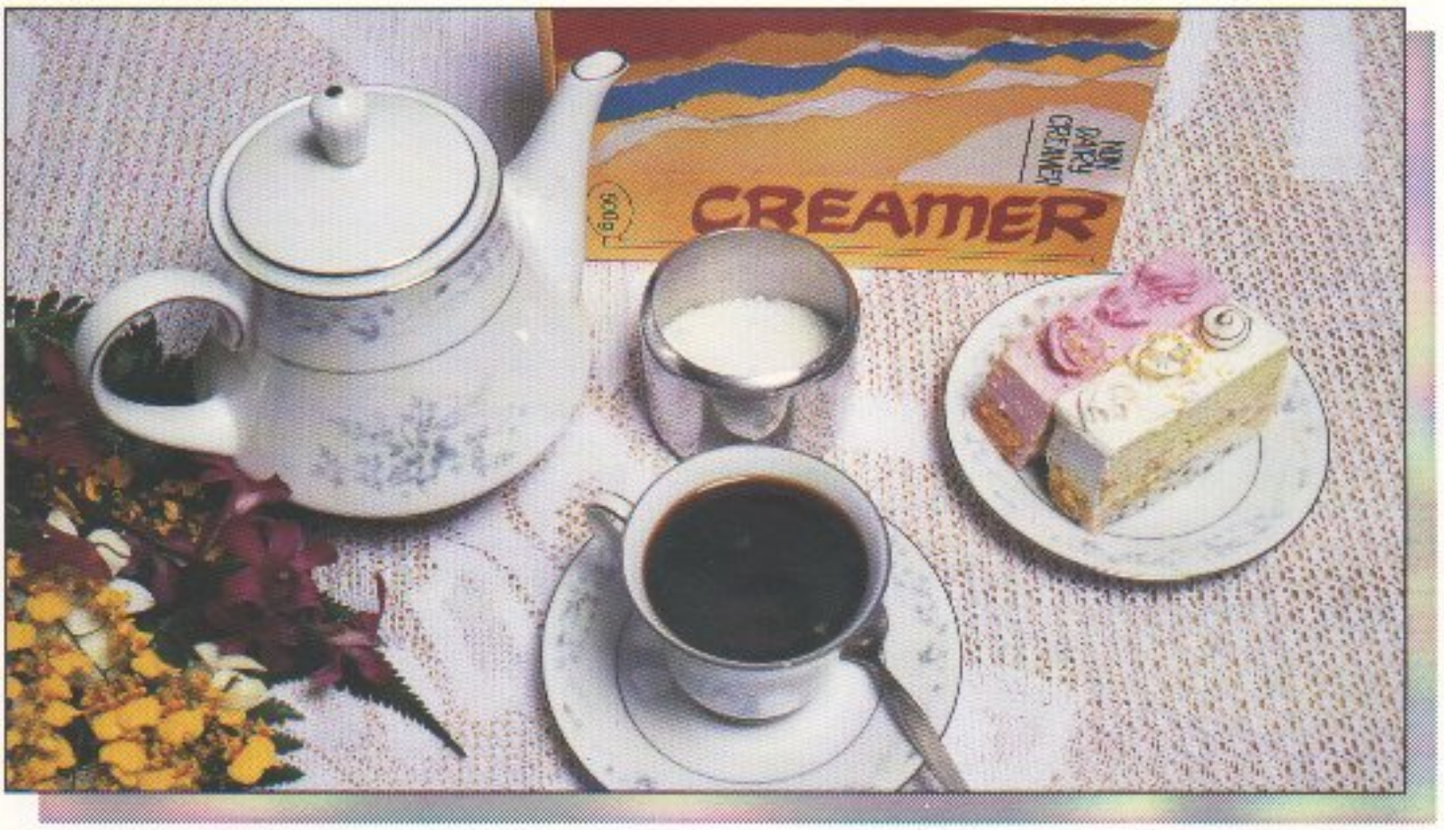

INTRODUCTION

Coffee whiteners are preparation used as substitutes for cream, evaporated milk or fresh milk in coffee, tea, and cocoa or drinking chocolate.

In recent years, coffee whiteners have become of increasing importance to the food industry from a marketing standpoint. They are formulated as intended replacements for their natural counterparts on the basis of their longer shelf life and easier storage, and production economics which often lead to lower retail prices. In markets where religious or health restrictions are important, coffee whiteners may also meet consumer demand and need. Accordingly, coffee whiteners have been well accepted by household consumers and by restaurants and institutional users.

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FUNCTION OF COFFEE WHITENERS

One purpose of the coffee whitener is the development of a desirable colour change, but it also imparts body to the food to which it is added. In this respect, a properly formulated product will impart a desirable cream-like flavour to a food or beverage.

AVAILABILITY

Coffee whiteners are currently available in three forms, namely powdered, liquid and frozen. All the emulsion systems and the powdered form, after careful preparation as an emulsion concentrate, forms an emulsion again on addition to aqueous media.

FORMULATION

The basic formulations for liquid and powdered coffee whiteners are as follows:

	Liquid Whitener (%)
Water	45-65
Vegetable fat	25-35
Protein	1.0-1.6
Carbohydrates	8.0-17.0
Emulsifiers	0.4-1.0
Stabilizers	0.1-0.8
Buffer salt	0.02-0.15

Source : Tony Van Eijk, 1986.

	Powdered Whitener (%)
Vegetable fat	25-40
Protein	0.0-9.0
Mono and di-saccharides	6.0-9.0
Maltodextrin	40-60
Emulsifiers	1.0-4.0
Stabilizers	0.4-0.6
Buffer salts	0.4-2.0

Source : Tony Van Eijk, 1986.

TYPES OF FAT USED IN WHITENERS

Powdered coffee whiteners are the kind of greater commercial interest because of their ease of handling, transportation and storage. However, in all types of coffee whitener, the basic function of the fat added is the same, *i.e.* to provide whitening powder, body and viscosity. The fat is present in an emulsified form with a particle size of 0.7 - 1.0 and the smaller the particle size, the greater is the whitening effect.

Several types of fats are used in coffee whiteners, but the main criteria for selecting a fat are good palatability and a high degree of resistance to oxidation. If a high proportion of the fat remains solid at body temperature, the product will have a greasy and waxy after taste. Thus a fat with a melting point of 35°C - 37°C and a high solid fat content at the storage temperature of the emulsion is most satisfactory for a liquid coffee whitener: hydrogenated palm kernel oil is such a fat. A typical formulation for a liquid whitener could be as follows:

	(%)
Hydrogenated palm kernel oil or palm kernel olein (35° C)	10
Protein (caseinate)	0.80
Maltodextrin (28 DE)	10.0
K_2HPO_4 (Dipotassium phosphate)	0.20
Stabilizers (carrageenan)	0.05
Emulsifier mixtures	0.60
Water	up to 100

Source: Grinstead formulation.

In the case of powdered coffee whiteners, the choice of fat has to take into consideration the temperatures during transit and storage apart from the requirements already described above. In this instance, the fat should have a relatively high melting point as well as sufficient solid fat at the temperatures encountered in transit or storage. If the fat is allowed to melt during transportation, the emulsion system is disrupted causing agglomeration and hence poor dispersibility

and an 'oiling-off ' effect when the powder is added to aqueous media.

A fat with a melting point of 38°C-40°C and an iodine value of less than three meets the requirements: hydrogenated palm kernel oil with melting points of 38°C is suitable, especially in a tropical climate.

A general formulation for powdered coffee whiteners is as follows :-

	(%)
Hydrogenated palm kernel oil (38° C)	16
Sodium caseinate	6.0
Maltodextrin (28DE)	26.8
Emulsifier	0.5
Stabilizer (carrageenan)	0.03
K_2HPO_4	0.3
Water, colour and flavour up to	100

The emulsion mixture is homogenized and spray-dried in PORIM based on a laboratory spray-drier and was found to be satisfactory.

A survey made in PORIM of some of commercial powdered coffee whiteners has indicated that hydrogenated palm kernel oil or hydrogenated coconut oil were the main fats used. Data on the percentage and properties of the fat in nine such products are given in *Table 1*.

Some of the fats have fairly low slip melting point and they are mainly taken from countries of temperate climate. However, under tropical conditions, caking of the powder takes place especially under high tropical and humid conditions.

A generalized specification of powdered coffee creamer fat in terms of melting point and SFC is as follows:

Slip Melting Point: 30°C - 40° C SFC (%)	
20° C	50%
25° C	15%
30° C	7-10%
35° C	3-6%
40° C	< 2%

TABLE 1

Code	1	2	3	4	5	6	7	8	9
Percentage of fat	32	33.3	33	32.4	28.7	30.1	28.6	32.9	30.6
Slip-Melting Point (° C)	33.5	39.0	25.0	38.0	30.8	34.0	32.5	36.0	35.5
SFC (%)									
5° C	90.0	-	86.3	92.4	90.7	90.2	87.9	91.3	90.4
10° C	89.3	91.4	77.4	90.3	85.8	86.3	86.4	87.9	87.8
15° C	78.0	85.0	63.8	81.0	72.9	75.4	72.1	77.2	75.5
20° C	56.8	73.2	41.1	59.1	52.3	54.0	49.6	54.9	51.0
25° C	22.7	58.9	6.4	23.7	17.0	21.8	20.5	22.3	22.9
30° C	6.9	39.0	0.2	8.1	3.8	5.3	7.0	10.0	10.8
35° C	5.3	17.8	-	6.8	2.4	3.4	3.5	6.5	5.4
40° C	0.9	2.7	-	2.7	-	0.2	2.1	3.6	3.1

(PORIM Survey 1987)

Hydrogenated palm kernel oil and hydrogenated palm kernel olein

CONCLUSION

In recent years, there has been a considerable growth in the importance of coffee whiteners as non-dairy substitutes for dairy products. A fat of vegetable origin with high oxidative stability is particularly suitable as the fat ingredient in a coffee whitener. Hydrogenated palm kernel oil and hydrogenated palm kernel olein are excellent raw materials for coffee whiteners owing to their good mouth feel and high oxidative stability.

REFERENCES

Atlas International Division. Simulated Dairy Products, 1972.

DUE JENSEN, I (1975). Some recent advances in agglomerating, instantizing and spray drying.

Grinstead formulation sheets.

KNIGHTLY, W H (1969). The role of ingredient in the formulation of coffee whitener.

TONY VAN EIJK (1986). Coffee whiteners - Their composition and manufacture.

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