

# MICROENCAPSULATED PALM OIL BASED PRODUCTS

by: NOOR LIDA HABI MAT DIAN

MAY 1995

# 41

DI TERIMA  
- 1 JUN 1995

PUSAT MAKLUMAT SAINS  
PORIM

PORIM TT NO. 27

PORIM INFORMATION SERIES

ISSN 0128-5726

## INTRODUCTION

**M**icroencapsulation is one of the techniques used for downstream processing of palm oil and processed palm oil products. It is a technique by which droplets of liquid oil or solid fat particles of palm oil based products (core material) are coated with a thin film of coating/encapsulating agent (*i.e.* a polymer). The structure formed by the coating agent around the core material protects the core against deterioration and releases it under desired conditions.



*Microencapsulated palm oil based products.*

There are numerous techniques of producing microcapsules. The choice, to a great extent, depends on the core material to be treated. The most common technique for oils and fats is spray drying which produces fine oils or fats powders. The spray drying process is economical and flexible, requires equipment that is readily available, and produces products of good quality.

Coating materials for microencapsulation by spray drying technique should have bland flavour, high solubility and possess the necessary emulsification properties, film-forming and good drying characteristics. In addition, its concentrated solution should have low viscosity. The variety of coating materials commonly used included natural gums, carbohydrates and proteins.

Palm oil based products have widely been used in various food and non-food applications. Their applications especially in food product formulation can be further extended by using the



microencapsulation technique. In our recent work, this process, under carefully selected conditions, has proven to be successful in producing powdered oil containing up to 70% palm oil/red palm oil and even greater when the higher melting fraction of palm oil (*i.e.*, palm stearin) was used. The microencapsulated oils have good free flowing properties and are mechanically stable.

### PRODUCTION OF MICROENCAPSULATED PALM OIL BASED PRODUCTS

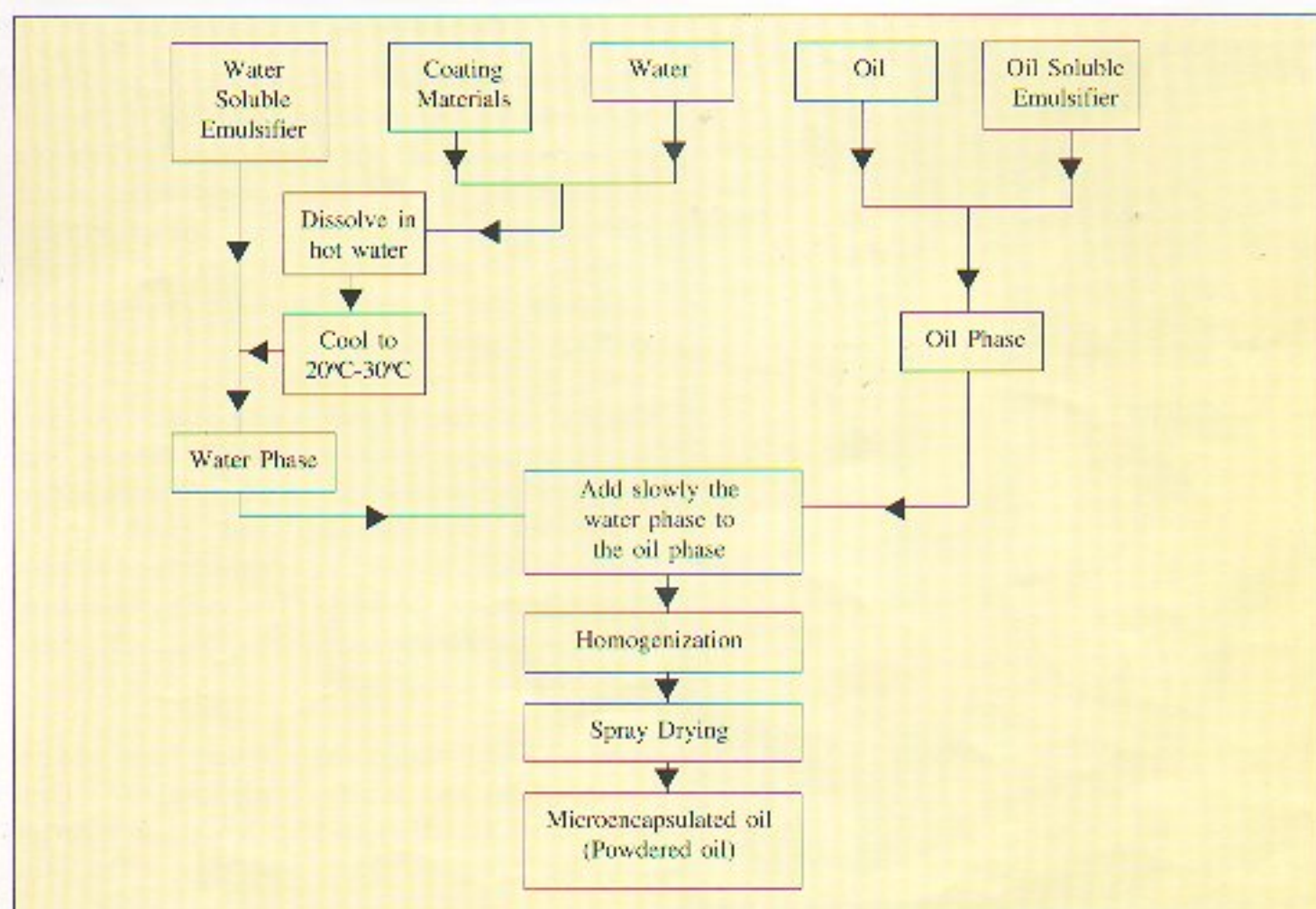
The essential steps for the production of microencapsulated palm oil based products by spray drying technique are shown in *Figure 1*. *Figure 2* shows the schematic diagram of microencapsulation process.

### ADVANTAGES OF MICROENCAPSULATED PALM OIL BASED PRODUCTS

Microencapsulated palm oil based products with functional encapsulants such as carbohydrates, gums

and proteins have numerous advantages over the unmicroencapsulated oils. Some of the advantages are:

- The microencapsulated oils are protected against deterioration, such as by light, oxygen and moisture. Hence the stability of the microencapsulated product could be enhanced.
- Original nutritive value of the microencapsulated oils is not lost on extended storage under normal storage condition.
- The microencapsulated oils have been transformed from liquid oils into easily handled free-flowing and ready for packing solid oils. This will provide convenient-to-use ingredients and can also reduce transportation costs.
- The microencapsulated oils may easily be recombined or incorporated as ingredients into many food systems. This will allow food processors greater flexibility and control in



*Figure 1. Flow diagram of microencapsulated oil preparation by spray drying technique.*

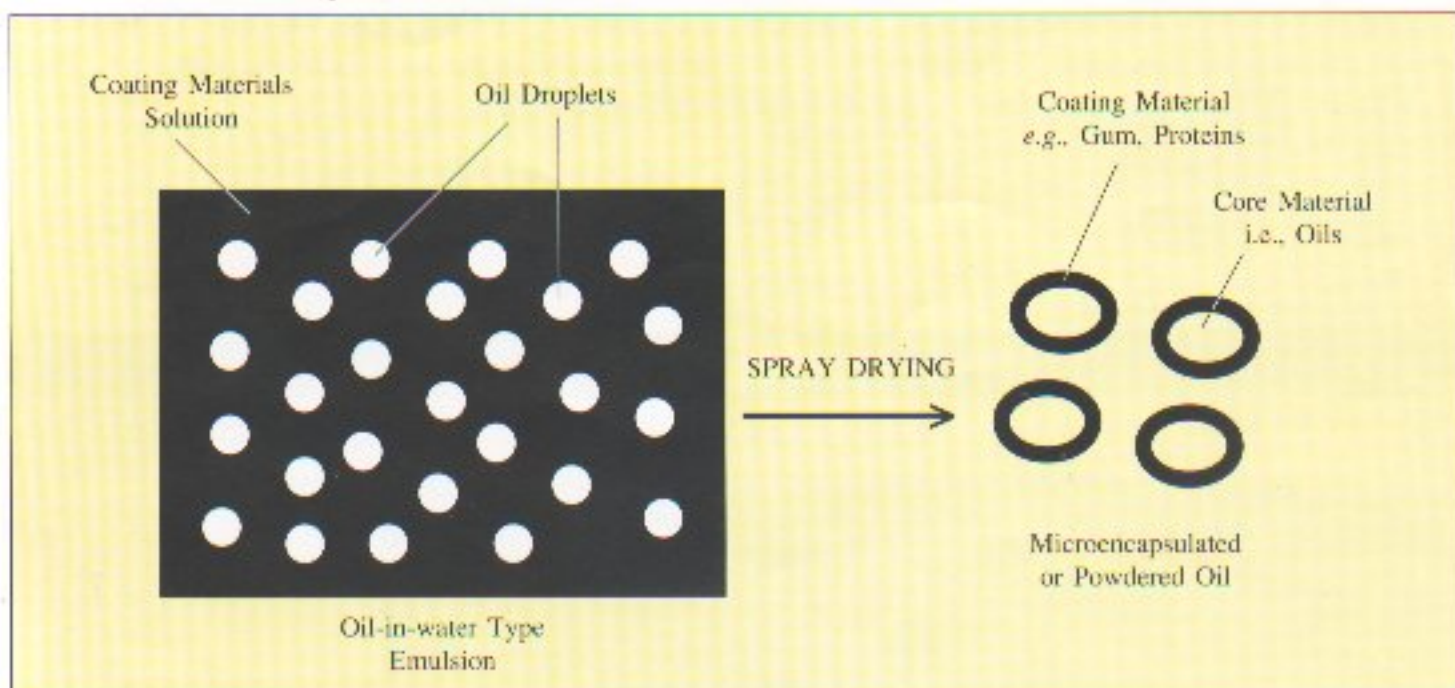


Figure 2. Schematic diagram of microencapsulation by spray drying technique.

developing food with higher nutritional value.

- The microencapsulated oils are protected from undesirable interaction with other ingredients.

#### APPLICATIONS OF MICROENCAPSULATED PALM OIL BASED PRODUCTS

The potential applications of microencapsulated palm oil based products are rather wide and diverse. Generally, the products will be powdered type convenience foods. They can also be used in products in which contamination with oil would be harmful to the end products. Example of typical food products where microencapsulated oil can be used are as listed below:

- Instant soup mixes
- Cakes mixes
- Dessert mixes
- Coffee creamer/whitener
- Sauce creamer
- Convenience ice cream

#### CONCLUSION

Microencapsulation increases the stability of palm oil based products and protects it against deterioration

during prolonged storage. It may also improve the flavour, nutritive value, functional properties and appearance of the oils. Such products can be readily used both as intermediates in food processing plants and as consumer products.

#### REFERENCES

- Young, S L; Sarda, X and Rosenberg, M** (1993). Microencapsulating properties of whey proteins. I. Microencapsulation of anhydrous milk fat. *J. Dairy Sci.*, 76(10) : 2868.
- Dziezak, J D** (1988). Microencapsulation and encapsulated ingredients. *Food Technology*, 42(4) : 136.
- Reineccius, G A** (1988). Spray drying in food flavors. Page 45 in *Flavor Encapsulation*. G.A. Reineccius and S.J. Risch, ed. *Am. Chem. Soc. Symp. No. 370*. Am. Chem. Soc., Washington, DC.
- Heath, H B and Reineccius, G** (1986). Flavor production. Ch. II. In "Flavor Chemistry and Technology". AVI Pub. Co., Inc., Westport, Conn.
- Balassa, L L and Fanger, G O** (1971). Microencapsulation in the food industry. *CRC Review in Food Technology*, 2: 245.

**Herbig, J A** (1970). Microencapsulation. Page 436 in *Encyclopedia of Chemical Technology*. Vol. 13. E. Kirk and D.E. Othmer, ed. John Wiley & Sons, New Yorks, NY.

**Jackson, L S and Lee, K** (1991). Microencapsulation in the food industry. *Labensm. Wiss. Technol.* 24: 289.



For more information kindly contact:

Director-General  
PORIM  
P. O. Box 10620  
50720 Kuala Lumpur  
Malaysia

4917  
Pusat Maklumat  
Sawit



I

12141 / 1