PAPER COATING WITH PALM-BASED MATERIALS FOR FOOD WRAPPERS

by: ABDUL RASHID, S; OOI, T L and SALMIAH, A

MAY 1996

56

PORIM TT NO. 38

PORIM INFORMATION SERIES ISSN 0128-5726

INTRODUCTION

Most of the coating and plastic materials used in the food packaging industry are derived from petroleum and natural gas derivatives such as paraffin wax, microcrystalline wax, polypropylene *etc*. These materials are non-renewable resources and with the rapid increase in the price of petroleum and natural gas, it may be necessary to take a new look at the renewable resources of vegetable oils and their derivatives as starting or supplementary materials for plastics or coating in food packaging industries.

Paraffin wax coated paper for wrapping foods is one of the oldest hot melt coating processes. Then, microcrystalline waxes were introduced to supplement paraffin wax for many uses such as to improve the film or coating on the paper. The film or coating properties were further improved by blending the wax with resins and synthetic or natural polymers such as ethyl cellulose, polyethylene, and co-polymer such as poly (ethylene vinyl acrylate). For example, ethyl cellulose is the first polymer to be used successfully in hot melt coatings formulation, in combination with paraffin wax and hydrogenated castor oil.

Figure 1. Paper coated with palm based materials (from pre-commercial trial).

Machine-finished papers, supercalendered papers, pigment (titanium dioxide) coated papers, glassine and grease-proof are some of the grades using for waxing. The waxed products are used for bread wrappers, drinking cups, frozen food cartons, bottle-cap stock and paper milk cartons.

Paper coated with palm-based materials has been studied. Results obtained show that the characteristics of the coated surface of some palm-based coating materials are quite similar to that of paraffin wax coated paper. There may be possibilities to use palm-based materials for paper coating. Palm-based materials offer several major advantages since it is edible, biodegradable and comes from a renewable resource.

The characteristics and properties of lipid films can be enhanced with hot melt formulation or by improving the operational functions of the coating machine including its coating conditions. Pre-commercial trials in a local factory using simple grave roller coater has been successfully conducted. Palm-based materials can be coated on the paper by melting the materials at 65°C – 70°C and running the machine at a high speed (100 – 200 m/min).

ISSN 0128-5726

9 770128 572000

Palm Oil Research Institute of Malaysia, Ministry of Primary Industries, Malaysia
P. O. Box 10620, 50720 Kuala Lumpur, Malaysia. Tel: 03-8259155, 8259775, Telex: MA31609, Telefax: 03-8259446

Figure 1 shows a sample of paper coated with palm-based materials from a pre-commercial trial.

Palm-based materials/wax coated paper was found to have better water resistance. However, palm-based materials/wax coated paper have poor oil resistance. This problem has been tackled by adding some food grade additives. By adding 1% of such additives, first appearance of oil penetration occurred only after 12 - 13 hours.

Surface parameters of coated paper such as rubproofness resistance, abrasion resistance, folding endurance, heat seal properties, *etc*. have to be improved to vary or widen the usage of the coated paper in the food packaging industry. Since most of the palm-based coating materials have low melting point (<70°C), food wrappers produced are not suitable for wrapping higher temperature materials or hot food. For the time being, palm-based coated paper can be used as bread wrappers, as fish, meat or vegetable wrappers, drinking cups, frozen food cartons and paper milk cartons.

CONCLUSION

- Some of palm-based materials have the potential to replace paraffin wax for food wrappers.
- Palm-based materials offer several advantages compared to paraffin wax or polyethylene coated/ laminated paper, since it is an edible, renewable resource and biodegradable.
- Palm-based coating paper can be used as in bread wrappers, as fish, meat and vegetable wrappers, drinking cups, frozen food cartons and paper mil

For more information kindly contact:

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