

Palm Oil – The Healthier Choice for Fast Food Industries

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INTRODUCTION

The concept of fast food restaurants (FFRs) is not new as the culture of eating so-called fast foods has long existed in many cultures of the world. Satay (Malaysia and Indonesia), kebab and falafel (Arab countries) are some of the examples of fast foods. The first modern concept of FFRs was introduced in the 1950s by the American fast food chains through the franchise system. In the concept, a FFR is a restaurant which serves popular foods, like French fries, fried chicken, nuggets, fillets and onion rings, quickly after ordering (within 5 – 7 min) and with minimal service. Most FFRs are part of popular restaurant chains or franchise operations in which the foods are prepared in a standard manner for consistent quality. The restaurant is clean, attractive and convenient, and sometimes a child play section and drive-through facilities are also provided. The prices are very affordable to cater for the consumers.

FFRs are part of the larger sector of the food industry known as the quick service industry (QSI), which includes even simpler fast food outlets, such as food stalls. The FFRs have now spread across the world employing millions of people and become a billion dollar business (*Table 1*) with about half of them operating in the USA (Razali *et al.*, 2005). For example, in 2004, McDonalds alone had more than 30 000 restaurants, close to half of which were in the USA with the rest in 119 other countries with a total revenue of RM 14.82 billion (McDonald Annual Report, 2004). The success and phenomenal growth of the US franchise system was later followed by

restaurant chains from other countries, such as Jollibee of the Philippines, Spur and Nando's of South Africa and Marrybrown of Malaysia. In the Philippines, Jollibee has become so popular, overtaking the US fast food restaurants and controlling over 60% of the local fast foods business (www.jollibee.com, 2004).

THE FFRs DILEMMA

The annual consumption of frying oils and fats in the US fast food segment was estimated to be several million tonnes (Shao and Melton, 2001), making the FFRs one of the major users of oils and fats. In FFRs, oils and fats are mainly used for frying. Frying media with high stability against oxidation at high temperature are required. Palm oil and its fractions and hydrogenated oils are among the popular frying media used by

FFRs and other frying establishments. Hydrogenated soyabean oil has been the popular frying medium amongst the FFRs in the USA. As the FFR sectors in Japan, South Korea, Taiwan and the Gulf Cooperation Council (GCC) countries are dominated by American fast food chains such as McDonalds, KFC, A&W, Burger King and the like, they have also been using hydrogenated oils. A study in 1998/1999 showed that the fluid and solid shortenings made from partially hydrogenated soyabean or canola oils were supplied directly from the US under franchise agreements to countries such as the Gulf States. A similar finding in the GCC countries was reported by Akbar (2001). The typical composition of a fluid shortening made from partially hydrogenated canola oil and imported by the GCC countries is shown in *Table 2* (Razali *et al.*, 1999). The shortening contained about 22% *trans* fatty acids while a similar product made from palm olein had no *trans* fatty acids.

As more and more evidence shows the negative nutritional effects of consuming *trans* fatty acids, several countries have recently tried to reduce their consumption. In the European Union (EU), Denmark was the first country to limit *trans* fatty acid in oils/fats to a maximum of 2% for processing of foods since 1 December 2003. Other EU countries are considering the

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TABLE 1. FAST FOOD RESTAURANTS – WORLDWIDE OUTLETS (2004)

Restaurants	USA	EU	China	India	GCC	Malaysia	Others	Worldwide
^a McDonald's	13 673	5 747	639	67	176	164	11 095	31 561
^b KFC	5 489	729	1 300	-	51	367	5 177	12 882
A&W	513	-	-	-	9	27	151	700
Burger King	7 956	1 634	1	-	113	22	1 475	11 201
^c Jollibee (Philippines) (nationwide: 988)	9	-	1	-	7	-	7	1 012
Spur (South Africa) (nationwide: 203)	-	3	-	-	-	-	20	226
Marrybrown (Malaysia) (nationwide: 25)	-	-	20	18	7	25	30	100

Notes: ^a Sales in 2004: RM 14.82 billion; ^b sales in 2004: RM 37 billion; ^c sales in 2004: RM1.9 billion.
Source: Internet.

TABLE 2. FATTY ACID COMPOSITIONS OF FLUID SHORTENING AND PALM OLEIN-BASED FLUID SHORTENING

Fatty acid	Fluid shortening* (% fatty acid)	Palm olein-based fluid shortening (% fatty acid)
C12:0	0.1	0.3
C14:0	0.1	1.1
C16:0	6.6	34.2
C16:1	0.2	0.2
C18:0	6.4	3.5
C18:1 (<i>trans</i>)	16.4	-
C18:1 (<i>cis</i>)	50.4	45.6
C18:2 (<i>trans</i>)	5.6	-
C18:2 (<i>cis</i>)	9.0	13.3
C18:3	1.9	0.4
C20:0	0.8	0.3
C20:1	1.4	0.3
C22:0	0.4	-
Others	0.8	0.7
Saturated	14.2	39.4
Monounsaturated	51.2	46.0
Polyunsaturated	10.9	13.7
Total <i>trans</i>	22.0	-
OSI (110°C, hr)	16	18.0

Note: *Partially hydrogenated canola oil.
Source: Razali *et al.* (1999).

Danish rationale. In May 2003, the White House requested the FDA to issue stronger warnings on the dangers of consuming *trans* fat to *save lives*. Starting 1 January 2006, the FDA will require mandatory labelling of the *trans* fatty acid content in processed foods to provide better

information to consumers. In 2004, Canada announced the establishment of a task force to make recommendations for both an appropriate regulatory framework and the introduction and widespread use of healthy alternatives to limit *trans* fats content to the lowest levels

possible in foods sold in Canada (BanTransFats.com, 2005). With the above regulations on *trans* fatty acids coming into force, the FFRs using hydrogenated fats will have to shift to healthier fats or oils with as good a stability as that of hydrogenated oils. There are two ways of eliminating *trans*

fatty acids, *i.e.*, by fully hydrogenating the oil and then interesterifying it with its liquid fraction or to use a natural oil or fat, as stable as hydrogenated oils. The former alternative is rather expensive due to the additional cost of processing. Palm oil and its fractions are the natural oils and fats that are as stable as hydrogenated oils. They are scientifically proven to be wholesome and can be the healthier alternative for FFRs.

Table 2 shows that palm olein-based fluid shortening has a higher oxidative stability index (OSI) of 18 hr compared to 16 hr for hydrogenated fluid shortening.

MALAYSIAN EXPERIENCES

In the almost 15 years since the entry of FFRs into Malaysia and Singapore in the early 1960s, imported hydrogenated shortenings of melting point around 40°C, free fatty acid contents of less than 0.05% and *trans* fatty contents of 36%-40% (Table 3a) have been mainly used for their frying. Following the successful Malaysian Government policy of encouraging downstream processing of palm oil in the 1970s and close collaboration

between the palm oil refiners and Malaysian FFRs franchisees in the early 1980s, palm oil products such as palm olein, fluid palm shortening, scoopable palm shortening and solid palm shortening (Table 3b) were accepted as equivalent/better frying media for popular items like French fries, fried chicken, nuggets, onion rings and the like, totally replacing the hydrogenated shortenings (Razali and Johari, 2003).

A&W in Malaysia was the first to use palm olein back in 1977/1978. In 1982, McDonald's began using palm shortening as their frying oil and this was followed by KFC which use palm oil-based fluid shortening (Razali, 2005). Over the last 25 years, the consumption and acceptance of the palm oil products as frying media have steadily increased and spread in tandem with the mushrooming of the FFRs. The main frying media used by some FFRs in Malaysia are tabulated in Table 4.

Over the years, MPOB export data have revealed that a substantial volume of the palm oil-based frying oils has also been exported to several countries for their FFRs. Table 5 shows the

consumption of Malaysian palm oil by segment. Consumption of frying oil by FFRs is lumped together under the sale of cooking/frying oil. There are currently about 1000 FFRs in Malaysia, Singapore and Brunei consuming some 40 000 t of palm oil-based frying oils annually. Substantial amounts of palm-based frying oils have been exported for FFRs in several countries.

CONCLUSION

Palm oil and its fractions offer a cheaper and yet healthier choice for FFRs. There is a huge potential for palm oil and its fractions in FFRs in the US and other countries as palm-based oils/fats are still not widely used there. There are also huge untapped markets in this segment in the emerging economies like China and India. With recent market and economic liberalization, changes in lifestyle, higher incomes and the aggressive expansion of the US-based FFRs in China and India coupled with the *trans* fatty acid issue, all the opportunities are there for palm oil and its products in the FFRs frying sector.

TABLE 3a. TYPICAL COMPOSITIONS OF HYDROGENATED FRYING MEDIA USED BY FAST FOOD RESTAURANTS IN MALAYSIA

	Shortening A (HSBO)	Shortening B (HCNO)
FAC (%)		
C12:0	-	-
C14:0	0.3	0.2
C16:0	10.8	13.6
C16:1	0.4	0.2
C18:0	14.6	10.0
C18:1 <i>trans</i>	40.6	36.7
C18:1 <i>cis</i>	30.3	31.5
C18:2	2.2	7.6
C18:3	0.8	0.3
FFA (%)	0.047	0.042
Melting point (°C)	42.7	40.9
Appearance	solid	solid
Smell	bland	bland
Colour	white	white

Notes: HSBO = hydrogenated soyabean oil; NCNO = hydrogenated corn oil.
Source: Razali *et al.* (1999).

TABLE 3b. TYPICAL COMPOSITIONS OF PALM-BASED FRYING MEDIA USED BY FAST FOOD RESTAURANTS IN MALAYSIA

Fatty acid	Palm olein	Palm shortening X	Palm shortening Y	Palm shortening Z
FAC (%)				
C12:0	0.2	0.3	0.2	0.3
C14:0	1.0	1.1	1.0	1.3
C16:0	40.2	43.3	44.7	45.5
C16:1	0.2	0.3	0.2	0.2
C18:0	4.1	4.2	4.4	5.4
C18:1	42.4	39.8	38.7	37.3
C18:2	11.4	10.3	10.2	9.5
C18:3	0.3	0.2	0.2	0.2
C20:0	0.2	0.5	0.4	0.3
<i>trans</i>	-	-	-	-
FFA (%)	0.03	0.045	0.06	0.04
Melting pt. (°C)	20.6	36.2	37.0	42.1
Smell	bland	bland	bland	bland
Colour	light yellow	creamy white	white	white
Appearance	liquid	fluid	solid, scoopable	solid

Source: Razali *et al.* (1999).

TABLE 4. MAIN FRYING MEDIA USED IN FAST FOOD RESTAURANT IN MALAYSIA

FFR chain	Frying medium
McDonald's	Solid palm shortening and palm olein
KFC	Fluid palm shortening
A&W	Palm olein
MarryBrown	Solid palm shortening and palm olein
Burger King	Palm olein
Jollibee	Palm olein

Source: Razali *et al.* (1999).

TABLE 5. MALAYSIAN PALM OIL CONSUMPTION – BY SEGMENT (t)

	2000	2001	2002	2003	2004
Sale of cooking/frying oils (including fast food)	482 507	496 691	507 318	525 059	577 584
Refineries local sale finished products (margarines & shortenings)	75 141	86 297	75 141	81 590	77 404
Industrial food processing	70 290	80 795	79 892	91 007	112 703
Animal feed processing	5 139	5 871	5 091	91 998	96 187
Non-food industries	1 887	2 920	3 033	3 175	2 411
Oleo-plants (input)	549 003	515 594	549 003	616 638	658 622

Source: MPOB (2005).