EFFECT OF FRACTIONATION TEMPERATURES ON THE PHYSICOCHEMICAL PROPERTIES OF PALM STEARIN AND PALM KERNEL OIL BLEND

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ABSTRACT

EFFECT OF FRACTIONATION TEMPERATURES ON THE PHYSICOCHEMICAL PROPERTIES OF PALM STEARIN AND PALM KERNEL OIL BLEND

The physicochemical properties of palm stearin (PS), palm kernel oil (PKO), 1:1 palm stearin palm kernel oil (PSPKO) blend and their fractions were evaluated in terms of their physical and chemical properties. The 1:1 PSPKO blend was subjected to dry fractionation at three different temperatures and the effect of these temperatures on the physical and chemical properties of olein and stearin fraction were investigated. Result indicated that blending and fractionation had modified the characteristic of palm stearin and palm kernel oil. The fractionation temperature also affected the physical and chemical properties of olein and stearin fractioned obtained. Increasing the fractionation temperature resulted in the decreased of % yields of stearin but increased in the amount of olein fraction. The slip melting point (SMP) of stearin increased as the fractionation temperature increased while in olein the SMP it were decreased as the fractionation temperature increased. The olein and stearin fractions had low cloud point when the fractionation temperatures decreased. At 27°C, olein fraction had the lowest cloud point. Iodine value of stearin and olein fraction decreased with increased in fractionation temperatures. The solid fat content (SFC) of stearin fractions were completely melted at 60°C while olein fractions obtained completely melted below 40°C which is below body temperature. These olein fractions might be suitable for margarine and confectionary fats. Fractionation had resulted in stearin fractions with higher palmitic acid (C16:0) and lower lauric (C12:0) and oleic acids (C18:1) than the original blend but did not affect the fatty acid content of olein fractions.

CHAPTER 1

INTRODUCTION

1.1 Background

The oil palm produces two types of oil namely crude palm oil (CPO) that originates from the fibrous mesocarp and crude palm kernel oil (CPKO) from the kernels. Eventhough both oils are from the same fruit, the chemical and nutritional content of palm oil is different from palm kernel oil. To diversify the usage of palm oil, the refined product is required to undergo fractionation to separate oil into two fractions called olein (liquid fraction) and stearin (solid fraction). Fractionation is based on the difference in the melting points of triacylgycerol. There are three types of fractionation process which are dry, solvent and detergent fractionation. The dry fractionation is the simplest and the most economical separation technique. In this method, the oil is partially crystallised from melt at desired temperature and the liquid fraction will be separated from the solid fraction using the vacuum filter (Gibon, 2002).

Palm stearin is the solid fraction obtained from fractionation of refined, bleached and deodourised (RBD) palm oil at controlled temperature. Palm stearin present in wide range of melting point and iodine value depending on the fractionation condition used. It is a source of natural hard fat component for product such as shortening, margarine and vanaspati (Hasmadi *et* al., 2004).