Studies in the Evaluation of Unconventional Oils from Burkina Faso - Part One: Rich in Oleic acid (C18:1 n-9)

Prof. Vijai K.S. Shukla, Søren Nielsen, International Cosmetic Science Centre ApS, Lystrup, Denmark.

Introduction

Fats and oils are used throughout the world for both food applications and industrial uses. They are consumed in products such as margarines, butter, salad and cooking oils as well as in animal feeds, fatty acids, soaps, personal care, biodiesel, paints, lubricants and greases. Global production[1] has been expanding rapidly in recent years driven by demand from the food sector and also increasingly by fuel and non-food applications such as oleochemicals. This consumption is driven by gross domestic product (GDP) improvement globally.

Food is the most basic prerequisite of living organisms. It contributes towards building the body, providing energy for living and working and regulating mechanisms essential for health and survival for life. Food thus constitutes the foundation for the health of both humans and animals.

Lipids play a vital role in the formulation and performance of many new cosmetic products. They act as binders, lubricants, solubilisers, carriers, viscosity modifiers, spreading agents, emollients and emulsifiers in a varity of applications such as lipsticks, creams, lotions, makeup bases, moisturisers, bath oils, pressed powders, fragrances and a varity of cleansers for hair face and body. In all these applications people are looking for natural new ideas from exotic countries.

Several earlier studies have reported fatty acid composition of newer seed oils[2-4]. These studies were undertaken to explore fully the possibilities of several underexploited or unexploited tree crops of West Africa for industrial applications. The present paper deals with seven different naturally occurring seed oils from Burkina Faso. We have systematically studied the oil content, fatty acid profile and oxidative stability of these oils.

Materials and Methods

Materials

The ripe fruits and seeds were collected in different locations in Burkina Faso. Some of the samples were extracted in Burkina Faso and transported to our Danish premises as oil samples. Others were transported as seed samples.

Methods

Oil Content

The oils were extracted using a Soxhlet apparatus. 10 to 30 g of the samples were extracted with boiling hexane p.a. overnight. The hexane was evaporated and residues were dried in a vacuum oven to constant weight.

Fatty Acid Methyl Esters

The oils were transesterified with Methanol/Boron triflouride and the methylesters were extracted with Hexane (IUPAC 2.301 and 2.302). Gas Liquid Chromatography (GLC) was performed using an Autosystem XL equipped with a programmable temperature injector (PTV) and a flame ionization detector (FID). The column was a capillary CP Sil 88, 50.0 m x 0.25 mm with a film thickness at 0.2 µ. Helium was used as carrier gas. The PTV injector was maintained at 50°C and after injection raised to 270°C. The column temperature was initially 100°C for 2 min, then raised with 5°C/min to 225°C where it was kept for the rest of the run.

HPSEC

HPSEC was performed as reported in a previous paper[5]. The oils were taken up into tetrahydrofuran (THF) to make a 20% solution. This solution was injected directly into the columns, which were three connected polystyrene-divinyl benzene polymer packed columns, in order 500 Å, 100 Å and 100 Å. Each column was 300 mm x 7.5 mm stainless steel and the packing was 5 µ in diameter. The detector used was a Model 410 differential refractometer. Tetrahydrofuran was used as a mobile phase.

Tocopherols[6]

A Series 200 fluorescence detector and a Rheodyne 7125 injector equipped with a 20 µL loop were used. The excitation wavelength was 290 nm and the emission wavelength