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Newer Challenges in Food Science & Technology: Industrial Perspective

POSTER PRESENTATION CERTIFICATE

This is to Certify that the paper entitled **Deep-frying performance of canola oil blended with palm olein oil (FO 14)** authored by Farhoosh R, Esmaeilzadeh-Kenari R, Poorazrang H is presented in the Poster Sessions held at IFCON-2008, CFTRI Campus, Mysore during 15-19 December 2008.

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FO 11

Oxidative stability and radical scavenging effect of some coconut oil blends

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FO 12

Storage stability of packed coconut oil blends with other vegetable oils

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FO 13

Natural antioxidants from chilli and pepper for improving thermal stability of vegetable oils

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FO 14

Deep-frying performance of canola oil blended with palm olein oil

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FO 15

Effect of mango peel extracts on oxidative stability of sunflower oils

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FO 16 (Registration fee not received till date)

Studying physical and chemical changes in liquid frying margarine after consecutive times of heating

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FO 17 (Registration fee not received till date)

Formulation of liquid frying margarine and studying its chemical and physical properties

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FO 18 (Registration fee not received till date)

Effect of storage temperature on shelf life of liquid frying margarine

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FO 19

Effect of different treatments on coconut milk emulsion to obtain coconut oil

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FO 20

Influence of rice variety on lipid lowering metabolites of *Monascus purpureus* MTCC 410

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FO 21

Relative effects of blended and interesterified vegetable oils containing omega-3 fatty acids on serum and tissue lipids in rats

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Deep-Frying Performance of Canola Oil Blended with Palm Olein Oil

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Abstract

The fatty acid composition, peroxide value (PV), acid value (AV), iodine value (IV), total tocopherols (TT) content, and total phenolics (TP) content of canola (CAO) and palm olein (POO) oils were determined. Their blend was prepared in the volume ratio of 75:25. The CAO and its blend with POO were used to fry potato pieces (7.0cm×0.5cm×0.3 cm) at 180 ºC. During the frying process, total polar compounds (TPC) content and oil/oxidative stability index (OSI) of the CAO/blend were measured. In general, frying stability of the CAO was significantly ($P < 0.05$) improved by the blending.

Keywords: Blending, Canola oil, Frying, Palm olein oil, Stability

Introduction

Canola is one of the most important oilseed crops in the world. Research indicates that the fatty acid composition of canola oil (CAO) is especially favourable in terms of health benefits when used as part of a nutritionally balanced diet. CAO, because of its high content of PUFA, is considered superior to many vegetable oils, but it is inferior in thermal stability at high temperatures. Flavor deterioration has been attributed mainly to secondary oxidation products of PUFA [1]. Blending the polyunsaturated oils with more saturated or monounsaturated oils is a

potential solution to improve oil stability [2]. Palm olein oil (POO), a fraction obtained from palm oil during the production of stearin, is less saturated than palm oil. POO is used increasingly in frying operations, and because of inherent excellent frying properties, improves the frying quality of other vegetable oils when it is blended with them [3]. The objective of this study was to determine the frying stability of CAO and its blend with POO during deep-frying.

Materials and methods

Refined, bleached, and deodorized CAO and POO with no added antioxidants were supplied by Ghoncheh (in Sari) factory, and were stored at -18 ºC until analysis. Their blend was prepared in the volume ratio of 75:25.

Analytical measures were: fatty acid composition, peroxide value (PV), acid value (AV), total tocopherols (TT) content, total phenolics (TP) content, total polar compounds (TPC) content, and oil/oxidative stability index (OSI).

All experiments and measurements were carried out in triplicate, and data were subjected to analysis of variance (ANOVA).

Results and discussion

Due to the high level of C16:0, the POO showed a higher significant percentage of SFA ($P < 0.05$). The %MUFA of the CAO was significantly higher than that of the POO (Table 1). The %PUFA of the CAO was more than 4 times that of the POO. Therefore, the PUFA/SFA ratio was the greater for the CAO than for POO. The PUFA/SFA ratio is usually taken as a measure of the extent of polyunsaturation of an oil and, obviously, of its tendency to undergo

autoxidation [6]. As can be seen in Table 1, the blending of the CAO with the POO led to an increase in its %SFA. Consequently, the blend prepared had a better PUFA/SFA ratio.

The PV and AV of the vegetable oils and their blends were all less than 0.5 meq kg^{-1} and 0.3 mg g^{-1}, respectively, indicating that they were unoxidized and of high initial quality (Table 1). The IV, which is considered as a measure of the oil unsaturation, for the oils and their blends was in very good accordance with their polyene index. The TT content of the CAO (750.4 ppm) was significantly higher than that of the POO (332.3 ppm). A higher significant TP content was found in the CAO (53.8 vs. 40.3 ppm). It was interesting to find that the CAO/POO blend had the TT and TP contents of near to the CAO.

There was no statistically significant difference between the initial TPC content of the CAO and its blend. The TPC contents linearly increased with the high determination coefficients. It has been recommended that frying oils containing more than 24–27% of the TPC content should be discarded [7]. Assuming that the limit of acceptance for the TPC content is 24%, the time required to reach this limit was considered as a measure of frying stability. As shown in Fig. 1, the CAO showed a frying stability significantly lower (7.3 h) than that of its blend (15.9 h).

The fresh CAO and its blend with the POO had OSIs (6.3 and 6.5 h, respectively) (Fig. 2). During the frying process, the OSIs decreased with different rates. While the CAO showed a decrease of 79% of the initial OSI, for the CAO blended with POO decrease of 64% was found after 16 h of frying. This indicates that the POO positively changed the OSI.

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Table 1 The fatty acid composition (%) and chemical characteristics of the CAO and its blend with POO

Parameter	CAO	POO	CAO/POO
SFA	7.6	48.8	17.9
MUFA	65.5	44.9	60.4
PUFA	26.8	6.0	21.6
PUFA/SFA	3.5	0.1	2.7
PV	0.2	0.3	0.2
AV	0.3	0.2	0.3
IV	109.0	49.6	94.1
TT content	750.4	332.3	645.9
TP content	53.8	40.3	50.4

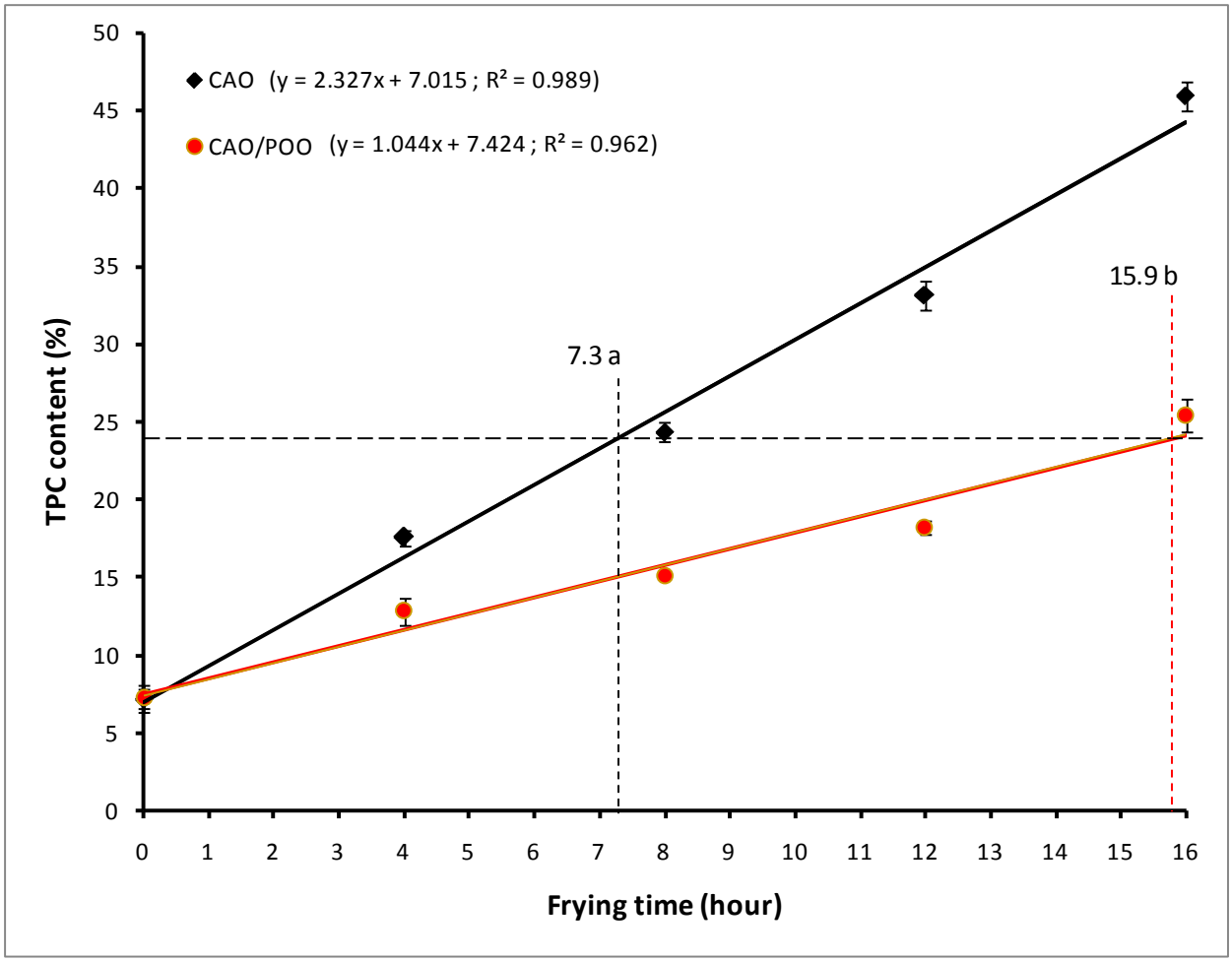

Fig. 1 The TPC content of the CAO and its blend with POO during the frying process at 180 ºC. The quantities with the same lowercase letters are not significantly different at $P < 0.05$

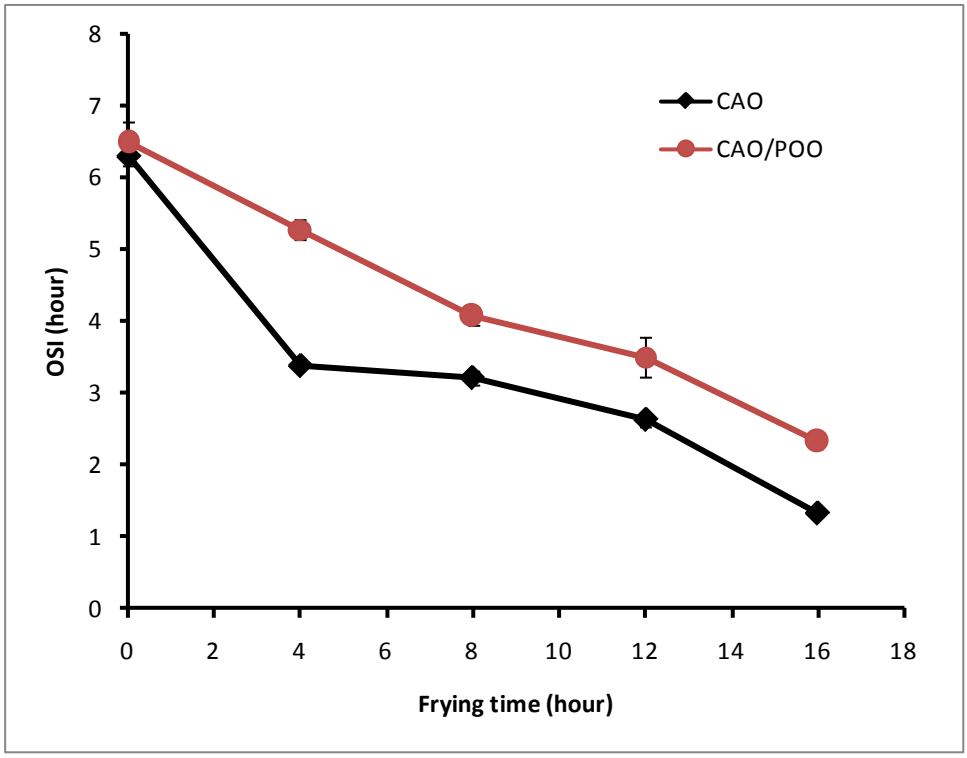

Fig. 2 The OSI of the CAO and its blend with POO during the frying process at 180 ºC.