

ANTIOXIDATIVE EFFECT OF SOYA BUD IN MODEL SYSTEMS

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Background

The food products with high fat contents, are very susceptible to lipid oxidation results in the development of warmed-over-flavour, rendering the products unacceptable for human consumption.

Moreover, there is some evidence that eat lipid oxidated food should be potential contributing to heart disease, cancer and stroke (Pearson, et al, 1983).

To preserve a retarding deterioration, rancidity, or discoloration due to oxidation, antioxidants substances are used. They are generally classified in two categories: Primary antioxidants that react directly with lipid radicals, thus inhibiting propagation; and Secondary antioxidants that inhibit initiation and branching reactions (Erickson, 1998).

Synthetic antioxidants such as BHA and BHT traditionally have been added to foods, although there has been a growing interest in replacing them with natural ingredients, because they are believed to possess carcinogenic activity (Namiki, M, 1990).

Many natural substances have been shown to impart an antioxidative effect in food. Superoxide dismutase enzyme for example, which has dimutase activity in soya bean and first soya buds, specifically. SOD is considered to be the first line of defense against oxygen toxicity. This enzyme from soya is unusually stable to heat and could be incorporated into food materials that need to be cooked (Clarkson and Large, 1989).

Objective.

Our objective was to evaluate the influence of the antioxidative activity of soya buds in lard by using accelerated model systems.

Materials and Methods

Samples (30 g) of fused lard under Nitrogen atmosphere were used like lipidic substrate (Chavez et al., 1998). Soya buds were obtained from previously selected soya beans, which were soaking in water during one hour and then germinated in darkness at room temperature. Once buds had 1cm of long, they were separated of beans and dehydrated at (30 °C) for 24 hours in a drying chamber.

Concentraciones of 0 ; 0.03 and 0.06 from the of triturated dry buds were emulsified in model systems. Control was BHA 0.01 %. Induction period final was considered when Peroxide value reached to 20, according to Bailey (1961).

The lipid oxidation was carried out at 80 °C, in dark and static conditions, in open recipients during 48 hours.

Peroxide values, expressed in terms of milliequivalents of peroxide per kilogramme of sample, were measured by the AOCS official method (AOCS Cd 8-53, 1993). Conjugated dienes concentration, expressed in milliliters per milligrams of sample, were measured by AOAC official method (AOAC 957.13.1990).

Data were analyzed using Response surface methodology in Statgraphics Plus for Windows 4.0 software package. Experimental design adopted was multilevel factorial 3^2 , with 3 center points, in which the two factors or independent selected variables were: Antioxidant Concentration and Time, while the variable response were: Peroxide value (PV) and Conjugated dienes (CD) formation.

Results and Discussion

Lipid oxidation measured as peroxide value was affected by soya buds concentration, reducing peroxide value of lard without additives by 27 and 30 % of the control value, at 48 h of incubation for 0.03 and 0.06 %, respectively.

Butylated hydroxyanisole (BHA), used as control showed antioxidant activity of 81 %, based on the peroxide value of the pure fat, at 48 h. The analysis of Variance (ANOVA) of Peroxide values, used for comparison among treatments, showed that concentration of soya buds, time of incubation, and the lineal interaction and quadratic time exerted significative effect on itself. The regression equation and response surface (Fig 1) were (in decoded variables) :

$$\text{Peroxide value} = 2.4725 + 52.25 * C + 0.10041 * T - 9.892361 * C * T + 0.0348 * T * T$$

The changes of CD in lard with different Soya buds concentration and time, indicated that both parameters and its linear interaction had significative effect ($p < 0,05$), during the first 24 hours. The ANOVA of Conjugated dienes . The regression equation and response surface (Fig 2) were (in decoded variables) :

$$\text{Conjugated dienes} = 0.461424 - 1.755 * C + 0.0537 * t - 0.324444 * C * t$$

Conclusion

The result of this paper show that soya buds has antioxidant activity on lard model system, and it seems to be somewhat related SOD enzyme present in them.

Pertinent Literature

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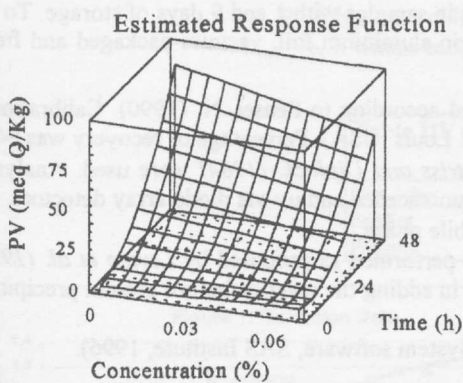


Fig.1 - Effects of concentration and time on Peroxide Value from fused lard.

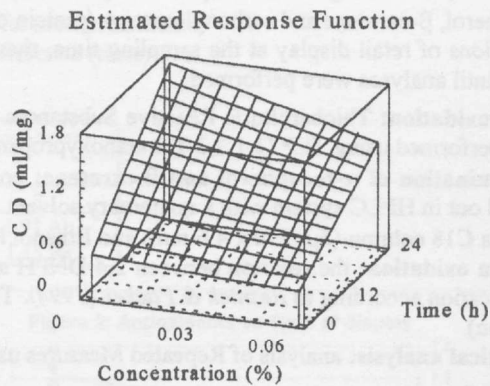


Fig.2 - Effects of concentration and time on Conjugated Dienes (CD) from fused lard