

Preparation of Some Nutritionally Superior Quality Mayonnaise Products

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Abstract

Some new kinds of mayonnaise have been formulated with a view to provide certain nutritional benefits and functional advantages over the conventional types of mayonnaise. Cholesterol free egg protein and milk protein casein which is a phosphoprotein have been incorporated in it. The fat phase has been chosen to improve nutritional quality, texture and taste. Physical characteristics of mayonnaise prepared from blend of Rice Bran Oil and Palm stearin, Rice Bran Oil and Vanaspati and blend of Rice Bran Oil and casein powder in varying ratio have been also investigated. The study reveals that blends of Rice Bran Oil and Palm stearin in the proportion of 7:3 and 6.5:3.5 gives soft appearance, creamy appearance including the softness and perfect appearance respectively. The product developed from Rice Bran Oil are expected to contain antioxidants like oryzanol, squalene, tocopherols, tocotrienols and polyunsaturated fatty acid like linoleic. The mayonnaise prepared from Casein and Rice Bran Oil (7:3 w/w) also gives an acceptable mayonnaise with soft appearance and sweet acceptable taste.

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Introduction

Mayonnaise is defined by the FDA as the emulsified semisolid food prepared from vegetable oil, acidifying ingredients, egg yolk and spices. Traditional mayonnaise contains at least 65% fat. Mayonnaise is often used as base for cream-type salad dressing or sauces, as a binder for cold salad such as chicken, tuna or seafood salads.

Much interest has been generated in recent decades to produce mayonnaise products that can be consumed to assure nutrition and good health by guarding against cholesterol and atherosclerotic lesions. The route for making antiatherogenic products involves the use of cholesterol free egg yolk in place of the normal egg yolks that has invariably significant cholesterol content. Also, it is now a days conceived to use an oil that

is enriched in antioxidants and has a balanced saturated, MUFA and PUFA composition. In case of mayonnaise products of relatively hard consistency, it is important that the fat phase is zero or very low in trans fatty acid content for health purpose and protection against CVD. There is use of high melting fat fraction such as Palm stearin in mayonnaise product formation with zero trans appears to be also feasible. Mayonnaise contains in certain proportion a protein material principally egg protein and milk protein (casein) is also an important protein that can be utilized in mayonnaise to provide nutrition when given in the form of food products.

Use of Lactose free casein powder will give a chance to serve this mayonnaise to the lactose intolerant children. The use of oil in this mayonnaise preparation such as Rice bran Oil (RBO) will add nutritionally beneficial compounds such as oryzanol and the unsaponifiable components such as sterol, tocopherols and squalene.

One of the most well known health beneficial effect of RBO is its antihypercholesterolemic property. It decreases LDL cholesterol level without affecting HDL cholesterol level. Other beneficial effects include inhibition of gastric acid secretion, antioxidant action and inhibition of platelet aggregation.

Egg yolks, a major source of vitamins and minerals contain all of the essential fatty acids, cholesterol and a good source of choline, which is an important nutrient that helps to regulate the brain, nervous system and cardiovascular system. Egg yolk contains lecithin, which is used as a food additive, natural emulsifier or lubricant. The main components of egg-yolk lecithin are phosphatidylcholine and phosphatidylethanolamine. Egg yolk lecithin contains lysophosphatidylcholine (LPC), sphingomyelin (SM) and neutral lipids in minor quantities. Egg yolk lecithin shows its stabilizing property due to its saturated fatty acid content. However, egg lecithin needs to be free from cholesterol for nutritional health benefits for the consumers with atherosclerotic problems. .

Acetic acid is used under the food additive code E20 as an acidity regulator and as a condiment. Traditional mayonnaise is manufactured with soybean oil (SBO) and egg yolk containing ingredients. Rice Bran oil (RBO), a healthy lipid source, has cholesterol lowering effect and could be used to replace SBO in mayonnaise preparation. To take the advantage of health benefits associated with RBO, food products containing RBO need to be developed.

Mayonnaise containing Vitamin E reportedly acts as a part of healthy diet for heart , infact a significant reduction in risk of heart disease among women who ate Vitamin E-rich mayonnaise is also reported. Mayonnaise made with omega-3 fatty acids, have been shown to reduce sudden death from heart attacks and have also been linked to the positive treatment of depression, arthritis and colon inflammation.

The aim of the present paper is to formulate mayonnaise products which will attribute better nutrition properties due to proper selection of fat phase to provide desired fatty acids and essential micronutrients and zero cholesterol content and protein phase with more Arginine content and less Lysine besides providing the other essential amino acids.

Material and Methods

Materials

Refined Rice Bran Oil provided by M/S Sethia Oil mill ,West Bengal .

Palm oil and Vanaspati from local industry, Vinegar (4.5% acetic acid), Egg yolk, Sugar, Salt, Mustard, White pepper were purchased from local market. Eggs were purchased for preparing cholesterol free lecithin and protein phase.

Acetic acid, Acetone and other chemicals used were purchased from Merck India Pvt.Ltd..

Methods

Preparation of cholesterol free lecithin & protein phase

Egg yolk contains cholesterol, lecithin and protein principally. Cholesterol-free lecithin and protein together from egg yolk was prepared as follows: Yolks were washed with acetone several times to remove pigments and cholesterol and the precipitated or insoluble lecithin and other phospholipids and also protein were removed by centrifugation. The total acetone insoluble material was desolventized to remove the remaining acetone under vacuum. The dried acetone insoluble material in the mixture obtained were egg protein and egg-phospholipids.

Preparation of Palm stearin

Palm oil and acetone were mixed in a ratio of 1:6. Then the mixture was taken in a normal room temperature in a pot of cold water (20°C) so as to allow the Solid fraction to settle down which is Palm stearin. Then the Palm stearin was filtered and collected.

Preparation of Mayonnaise Products

A. Mayonnaise containing Rice Bran Oil and cholesterol free egg yolk powder and other ingredients:

After preparing cholesterol free egg yolk powder and lecithin a sample of mayonnaise was prepared with total Rice Bran Oil, i.e. this sample contains only Rice Bran Oil as its fat phase.

B. Product from Rice Bran Oil and Palm Stearin

After preparing Palm stearin various samples of mayonnaise were prepared according to the following ratio of Rice Bran Oil and Palm stearin as 8:2 (RBO: palm stearin), 7:3 (do), 6.5:3.5 (do) and 7.5:2.5 (do).

C. Product from Rice Bran Oil and Vanaspati

A sample of mayonnaise was also prepared with RBO and Vanaspati in the ratio of 8:2 respectively.

D. Product from Rice Bran Oil and Casein

Mayonnaise was prepared comprising 70 parts of RBO and 30 parts of casein powder in the ratio of 7:3.

E. Composition of Ingredients of Mayonnaise Products as formulated in the present study(%w/w):

Mayonnaise Products	Fat Phase(%)	Vinegar (%)	Egg Yolk Powder cholesterol free (%)	Sugar (%)	Salt (%)	Mustard (%)	White Pepper (%)
Product -1	RBO80.0	9.4	7.0	1.5	1.5	0.5	0.1
Product -2	RBO:PS64:16	9.4	7.0	1.5	1.5	0.5	0.1
Product -3	RBO:PS56:24	9.4	7.0	1.5	1.5	0.5	0.1
Product -4	RBO:PS52:28	9.4	7.0	1.5	1.5	0.5	0.1
Product -5	RBO:PS60:20	9.4	7.0	1.5	1.5	0.5	0.1
Product -6	RBO:Vanaspati64:16	9.4	7.0	1.5	1.5	0.5	0.1
Product -7	RBO:Casein56:24	9.4	7.0	1.5	1.5	0.5	0.1

Oryzanol estimation: Gamma oryzanol content (%) in oils extracted from Mayonnaise were determined from spectrophotometer absorption measurements at the wavelength of maximum absorption near 315nm. Approximately 0.02g of the sample was weighed accurately into a 25mL volumetric flask, it was then made up to the mark with n-hexane. Cuvette was filled with the solution obtained and measured the extinction at the wavelength of maximum absorption near 315nm, using the same solvent as a reference. Oryzanol percentage was calculated according to the formula.

$$\text{Gamma oryzanol content, \%} = 25 \times (1 / W) \times A \times (1 / E)$$

Where W = mass of sample (g)

A = extinction (absorbance) of the solution

E = specific extinction E1% 1cm = 359

Result and Discussion

Various samples of mayonnaise have been developed using RBO, Palm stearin and Vanaspati as fat phase in appropriate proportions along with casein powder and egg yolk .

Table 1: Characteristics of the product made from only RBO (Product -1) as fat phase :

Colour	Texture	Flavour	Consistency	Taste	Oryzanol %(w/w)
Pale yellow	Oily and grainy	Acidic	Liquid	Slight sour	0.64

Table 2: Composition and Characteristics of the Products Made from RBO and Palm Stearin Blends as fat phase :

Mayonnaise Product	Colour	Texture	Flavour	Consistency	Taste	Oryzanol % (w/w)
Product-2RBO:PS64:16	Pale yellow	Oily and grainy	Acidic	Liquid	Slight sour	0.512
Product-3RBO:PS56:24	Pale yellow	Plain	Acidic	Solid	Slight sour	0.448
Product-4RBO:PS52:28	Pale yellow	Creamy	Acidic	Solid	Slight sour	0.416
Product-5RBO:PS60:20	Pale yellow	Plain	Acidic	Semi-solid	Slight sour	0.48

Table 3: Composition and Characteristics of the Products Made from RBO and Vanaspati

Mayonnaise Product	Colour	Texture	Flavour	Consistency	Taste	Oryzanol %(w/w)
Product -6	Pale yellow	Plain	Acidic	Hard	Sour-sweet	0.512

Table 4: Composition and Characteristics of the Products Made from RBO Casein powder

Mayonnaise Product	Colour	Texture	Flavour	Consistency	Taste	Oryzanol %(w/w)
Product -7	Pale yellow	Plain	Acidic	Soft	Sweet-sour	0.448

From the various formulated mayonnaise products certain aspects can be discussed and highlighted. The mayonnaise products give an acidic flavor, generally taste sour, some time slight sweet in taste and the

colour obtained is pale yellow. Plain blended oil phase gives a liquid consistency, which is not attractive in appearance. But the mixture of cheap fat phase i.e. Palm stearin gives the product soft and creamy like appearance, which is attractive in appearance. The fat phase of RBO and palm stearin in 7:3 ratio imparts to the product a soft appearance which is acceptable to the consumer. But the fat phase of RBO and palm stearin in 6.5:3.5 ratio yields a product with a creamy appearance and softness. This fat phase gives the product perfect appearance.

A fat phase consisting of the mixture of RBO and Vanaspati when used makes the product very hard. This kind of mayonnaise product is not acceptable, and the hydrogenated fat phase does not appear to be appropriate for making mayonnaise with satisfying properties.

The use of RBO and casein powder in 7:3 ratio enables to make a mayonnaise product with soft appearance, acidic flavour and slight sweet taste.

Conclusion

The study leads to the conclusion that certain mayonnaise products with desirable characteristics such as quality, appearance, texture and taste can be made by proper selection of the fat phase and protein phase. Incorporation of Rice bran oil provides Oryzanol (0.8g/100g oil), Tocopherol, Tocotrienol, Squalene which enhances the stability along with providing balanced Fatty acid composition to the mayonnaise. The use of palm stearin along with RBO can serve a cost effective fat phase and also can provide better texture, spreading and antioxidant content. RBO containing mayonnaise products can be regarded as nutritionally superior to the mayonnaise commonly produced. The product made from cholesterol free egg yolk powder and RBO is nutritionally improved. Milk Protein casein can also replace egg protein in making mayonnaise.

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