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Effect of GMS and lecitiin on sensory parameters of soya spread and groundnut spread

Ivan Wilson and John David

Abstract
A study was conducted to develop and functional table spread with the incorporation of soya protein isolate, groundnut protein isolate, sunfiber and two different types of emulsifier (GMS and Lecithin). Sensory effect of these emulsifiers was evaluated on parameters of body and texture, flavor, colour and appearance, spreadability and overall acceptability. There were four treatments and each were replicated five times. Soya protein Isolate and groundnut protein isolate was incorporated at level (9%), sunfiber was incorporated in level (4%) two types of emulsifiers were used (GMS and Lecithin) at a level of 0.6%, T1 (9% soya protein isolate, 0.6 %glycerol monostearate and 4% sunfiber) was found to be best with average score of (8.24) for body and texture, (8.32) for flavor, (7.74) for colour and appearance, (8.72) for spreadability and (8.68) for overall accepatability.

Keywords: Soya protein isolate, groundnut protein isolate, lecithin, GMS, Sunfiber, Sensory attributes

Introduction
Today food industry is actively involved in new product development. This includes new formulations and imitation foods being designed to compete with or replace existing products based on their superiority in convenience, cost and quality. The apparent connection between diet and health has increased awareness for 'healthier' eating and the reduced-fat diet is therefore especially in vogue. This trend is reflected in the increased market for low fat products including low fat spread particularly in USA and Europe.
Soy protein isolates (ISP) have been known and produced for industrial purposes, mainly as adhesives for the paper coating industry, well before World War II. ISP's for food use, however, have been developed only in the early fifties.
The basic principles of ISP production are simple. Using defatted soy flour or flakes as the starting material, the protein is first solubilized in water. The solution is separated from the solid residue. Finally, the protein is precipitated from the solution, separated and dried. In the production of ISP for food use, in contrast to ISP for industrial use, care is taken to minimize chemical modification of the proteins during processing. Obviously, the sanitary requirements are also much more demanding.
Sunfiber is a galactomannan based soluble dietary fiber made from hydrolyzed guar gum. It is a versatile powder that can be easily added to a wide variety of foods, beverages and supplements. Sunfiber does not impact the flavor, color, texture, or aroma of the products to which it is added. It offers an easy way to increase fiber in the diet using consumers favorite foods and beverages.
Sunfiber is a truly regulating dietary fiber that helps to normalize the digestive system. It is clinically shown to be effective at regulating occasional diarrhea and occasional constipation. Sunfiber is an excellent prebiotic for maintaining digestive health and microflora balance. It is tasteless, colorless, odorless, gluten free, and 100% water-soluble.
Groundnut protein isolate is well recognised as a rich source of dietary protein. *Its* properties like taste, odour and colour have led to its widespread use. Groundnut protein isolate, the process for the production of which has been standardized, is also being used in fairly large quantities in the preparations of biscuits, toffees, other confectionery and beverages. One of the toxicants usually present in edible groundnut protein products is ailatoxin, produced by the fungus *Aspergillus jams*. It is now well established that aflatoxin is harmful to human beings when ingested even in minute'quantities. It therefore, becomes imperative that the edible flour is produced under strictly controlled hygienic conditions. Under optimum conditions of growth, harvesting and drying, the toxin content may be almost negligible. At the same time several methods have been developed for detoxification of the aflatoxin present in edible

groundnut flour by treatment with chemicals like ammonia, hydrogen peroxide and certain other oxidising agents. Simulataneously, these treatments tend to lower the nutritive value of the edible groundnut protein produ cts through destruction of the sulphur amino acids. Therefore, preferred methods of making edible groundnut protein products of good nutritive value and low aflatoxin content consist either in treating groundnut pods in the field to avoid fungal contamination, or in manually removing fungus-affected kernels before processing the remainder, or in using groundnut naturally resistant to fungus.

The majority of commercial lecithins are derived from soybean oil, typically containing between 0.5 and 3% phosphatides (Doig & Diks, 2003) [3]. On the other hand, the percentage of phospholipids in sunflower oil ranges from 0.02% to 1.5%, with an average of around 0.75%. Sunflower lecithin has a mild taste and similar emulsifying properties as soybean lecithin. The composition of the phospholipids is similar to soybean lecithin, with a tendency to higher PC and lower PE ratios, which might be caused by crop varieties and processing conditions (Szuhaj, 2005) [8]. In the food industry, lecithin represents a multifunctional additive in the manufacture of chocolate, bakery and instant products, margarines, and mayonnaise, due to the characteristics of its phospholipids (Cabezas *et al*., 2009) [1]. Lecithin helps to smooth the texture and serves as an emulsifying agent in margarine, chocolate, caramels, coatings (to control viscosity, crystallization, and sticking) Glycerol monostearate, commonly known as GMS, is an organic molecule used as an emulsifier. GMS is a white, odorless, and sweet-tasting flaky powder that is hygroscopic. It is a glycerol ester of stearic acid. It occurs naturally in the body as a product of the breakdown of fats by pancreatic lipase, and is also found in fatty foods.

GMS is a food additive used as a thickening, emulsifying, anti-caking, and preservative agent; an emulsifying agent for oils, waxes, and solvents; a protective coating for hygroscopic powders; a solidifier and control release agent in pharmaceuticals; and a resin lubricant. It is also used in cosmetics and hair care products.

GMS is largely used in baking preparations to add "body" to the food. It is responsible for giving ice cream and whipped creamits smooth texture. It is sometimes used as an anti-staling agent in bread

Material and Methods

The experimental work was carried out in the research laboratory of department of Dairy, Technology, Warner college of Dairy Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad. Soyabean oil, groundnut oil, skim milk powder and salt was procured from local markets and Soya protein isolate, Groundnut protein isolate, sunfiber were procured from scientific corporation, Allahabad. The table spread were prepared by varying different types of emulsifiers (GMS and Lecithin) at a level of (0.6%). Soya protein isolate (9%) and sunfiber (4%). The different treatment combinations used in the experimental are as follows:

T1= Soya Protein isolate (9%)+Glycerol Mono Stearate (0.6%)+sunfiber (4%)

T2=Soya Protein isolate (9%)+ Lecithin (0.6%)+ sunfiber (4%)

T3=Groundnut Protein isolate (9%)+ Glycerol Mono Stearate (0.6%)+ sunfiber (4%) T4=Groundnut Protein isolate (9%)+ Lecithin (0.6%)+ sunfiber (4%)

Spread was prepared by soya protein isolate and Groundnut protein isolate in prescribed level of protein. Sunfiber as dietary fibre at different levels were mixed with aqueous phase. A fat blend consisting of milk fat and vegetable oil blend was prepared separately. Calculated amount of fat blend was mixed with aqueous phase for emulsification. Different type and levels of emulsifiers were used to provide an stable emulsion. The pH of prepared emulsion was adjusted to 5.2 using lactic acid as acidifying agent. The emulsion was then be pasteurized, cooled and packed in suitable containers. Type and level of additives were selected through sensory characteristics and textural analysis. The table spread prepared using selected level of ingredients was used further for selection of level of salt and flavouring material. The level of salt and flavouring material was selected based on sensory evaluation of the product. The final product was subjected for sensory evaluation by the panel of judges with the help of nine point hedonic scale (Sri Lakhmi, 2006). Numbers of treatments were 4.which were replicated 5times.

Result and Discussion

The present study was based to evolve "Effect of GMS and Lecithin on Sensory Parameters of Soya Spread and Groundnut Spread". The data collected on different aspects were tabulated & analyzed statistically using the methods of analysis of variance & critical difference. The significant & non-significant differences observed have been analyzed critically within & between the treatment combinations. The results obtained from the analysis are presented in this chapter under the following headings:

- **Sensory Analysis Of Spread:**

Table 1: Sensory Scores for Table Spread

	T1	T2	T3	T4
Body And Texture	8.24	6.72	8.48	8.08
Flavour	8.32	7.72	7.36	7.98
Colour And Appearance	7.74	6.96	8.58	8.32
Spreadability	8.72	7.98	7.86	8.94
Overall Acceptability	8.68	7.74	8.44	7.9

Soya protein Isolate and Groundnut protein isolte was incorpoated at level (9%) and sunfiber also incorporated in two levels (4%).Two types of emulsifiers (GMS and Lecithin) were used at a. level of 0.6% T1 (9% soya protein isolate, 0.6%glycerol monostearate and 4% sunfiber) was found to be best with average score of (8.24) for body and texture, (8.32) for flavor. (7.74) for colour and appearance, (8.72) for spreadability and (8.68) for overall accepatability.

From table 1 and Fig no.1 it is evident that the Highest scores for body and texture was found to be 8.48 in T3 and the lowest score for Body and texture was found to be 7.72 in T2. Most body and texture combinations differed significantly.

Highest score for flavor was found to be 8.92 in T2 and the lowest scores for flavor was found to be 7.36 for T3. In most flavor combinations differed significantly. The negative influence of excessive hydrocolloids usage on the flavour profile of food products has been observed by (Malkki *et al*., 1993; Hollowood *et al*., 2002) [6], [4]. Highest colour and appearance was found to be 8.58 for T3 and the lowest colour and appearance was found to be 7.74 for T1. Most colour and appeareance combinations differed significantly. Highest spreadability was found to be 8.94 for T4 and the lowest score for spreadability was found to be 7.86 for T3 because Addition of hydrocolloids can effectively bind water in the high moisture content system and prevent phase separation (Patel, 1988).Most spreadability combinations differed significantly. Highest score for overall acceptability was found to be 8.68 for T1 and the lowest score for overall acceptability was found to be 7.90 in T4. In most overall acceptability combinations differed significantly. It was suggested by (Deshpande and Thompkinson, 2000) [2] that Proteins are added to the spread for their organoleptic, functional and nutritional properties. They impart a creamy taste, thereby improving the consumer acceptability.

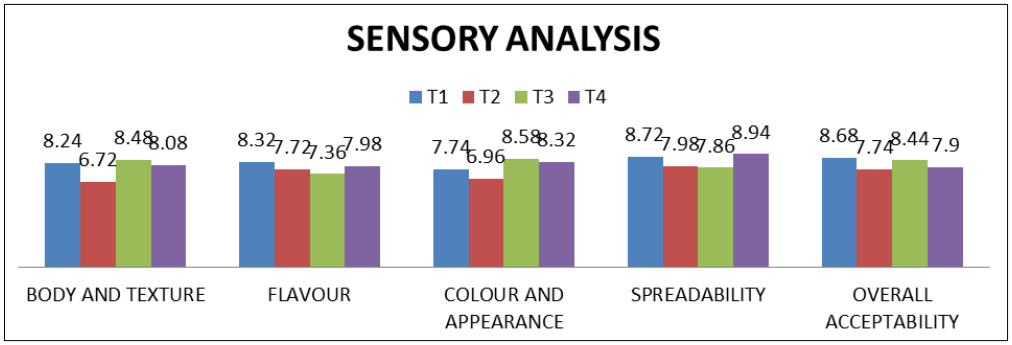

Fig 1: sensory analysis of table spread

Conclusion

It can be concluded that on comparing the soya spread and groundnut spread with two different types of emulsifier, the best results on sensory basis was obtained for soya spread containing GMS as a emulsifier at 0.6 %. Hence soya spread with GMS as a emulsifier can be used for the commercial pourpose.

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