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## Development of instant innovative egg Omelette premixes from various types of Eggs by using tray dryer

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### Abstract

This Abstract explores about An Instant Innovative Egg Omelet premix from various types of eggs i.e. broiler, hybrid and Gavraan eggs, incorporating with ingredients such as- coriander leaves, curry leaves, onion, salt, red chili & turmeric powder. The bulkiness, fragility, and high perishability of fresh eggs make them challenging to transport. For these issues, powdered egg offers a nearly comprehensive answer. An Instant Innovative Egg Omelette Premixes were developed which provides a Nutritive, Convenient & Healthier choice to the busy job personnel's, Army soldiers, and trekkers. The Premixes obtained were coded as- S1 (broiler egg premix), S2 (hybrid egg premix) & S3 (Gavraan egg premix) and subjected for Chemical Analysis & Sensory evaluation. The observations in respect of Chemical Analysis were found to be Moisture- 5.37%, 5.23% & 4.10, Ash- 3.61%, 3.12% & 5.44%, Protein- 11.73%, 10.39% & 12.91%, Fat- 9.83%, 8.27% & 9.98%, Fiber- 0.2%, 0.1% & 0.2%, Carbohydrate- 74.53%, 78.12% & 71.47%, Energy 433.91, 428.47 & 427.34Kcal and the observed results for Sensory evaluation were 9,8 & 9

**Keywords:** Explores, incorporating, bulkiness, perishable, convenient, fragility, nutritive, instant healthier

### Introduction

Global egg production has increased by 203.2% in the last 35 years as a result of the developing world's fast rising demand for proteins. Eggs are an important part of basic nutrition since they are a source of protein, lipids, and vitamins. Although eggs are cheap, their content can vary depending on a number of factors, including the hen's food, age, strain, and climatic conditions. Eggs as a reasonably priced, nutrient-dense food item with highly digestible ingredients, they are essential to human diet and nutrition. One of nature's most adaptable and nearly ideal foods is the egg. Protein, amino acids, vitamins, and the majority of mineral compounds are abundant in it. The white and yolk parts are easily digested and have significant biological value.

Eggs are considered to be very essential and good source of protein. Eggs are used in a variety of cuisines because they have significant culinary uses. Their emulsifying, thickening, and foaming functional qualities. Additionally, moisturizing aids in the physical functions and desirable qualities of many food products that they are used in. Other than milk, eggs are recognized as the finest source of proteins. In order to obtain the amino acids that our bodies require, we rely on both animal and vegetable protein.

An average large egg contributes 6.25 g of high-quality protein based on 10- 12.5% of the Daily Reference Value for protein, and 5 grams of mostly unsaturated fat. As an excellent source of high-quality protein, 44% is found in the yolk and 56% in the egg white. The proportion of potassium and phosphorus in eggs is balanced. Because the iron in egg yolks is highly accessible, just like the iron in meat, they could be a valuable addition to the diets of lacto-ovo-vegetarians and those with iron deficiency. Regrettably, raw eggs have a limited shelf life of two to three weeks in tropical ambient settings, although they can last a little longer in refrigeration (Surai and Sparks, 2001) <sup>[31]</sup>.

Spray drying is a method used in industry to preserve eggs and turn them into egg powder (Rannou *et al.*, 2013) [26]. In recent years, the manufacturing of dried foods has increased. The development of the egg market is significantly influenced by the production of dried powdered products.

As part of the post-harvest procedure, the produce is dried quickly until it reaches the "safe-moisture" threshold. Reducing the moisture content is the goal of drying so that it can be stored safely and processed further. In order to promote sustainable global development, drying is crucial. According to Digvir S. Jaya, drying is one of the most energy-intensive industrial processes, accounting for 7-15% of overall industrial energy consumption in the majority of countries.

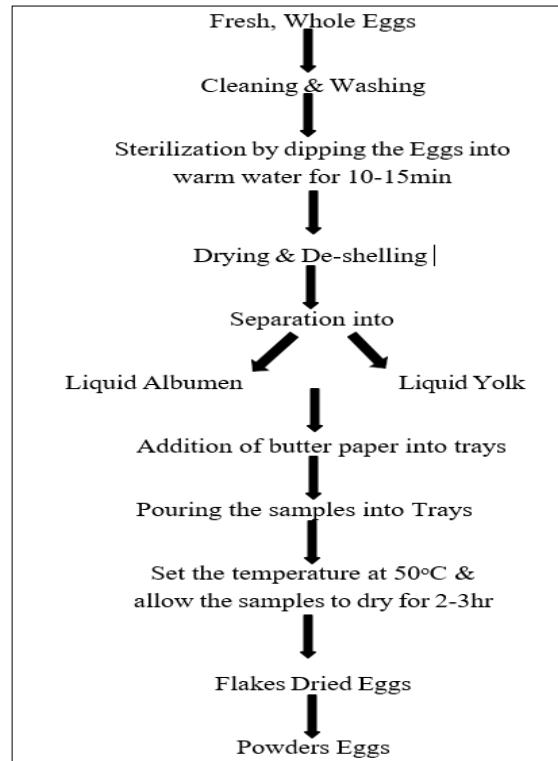
Consumer demand for convenient, high-quality ready-to-eat (RTE) food products is rising, which has increased the commercial production of these products. To get the instant ready to eat product to the consumers. By keeping all these points in view, An Instant Innovative egg omelet premixes by using tray dryer were developed and tested at Department of B (Voc) food technology, VPASC College, Baramati-413133.

## Materials and Methodology

### Materials

**1Fresh Eggs:** Eggs are the main Ingredient for the development of Egg Omelet Premix as they are considered

### 2.2 Methodology



**Fig1:** Standard Flow diagram of Whole egg processing into powder with some modifications & by using Tray dryer

as a versatile ingredient which enhances the overall quality of the Premix. Fresh Eggs serve as a binding agent, giving the premix structure and nutritional content. They also contribute to the texture, flavors, and color making it a wholesome and satisfying meal option. We will need fresh & different varieties of Hen's Eggs such as:

Broiler, Hybrid & Gavraan/Desi Eggs

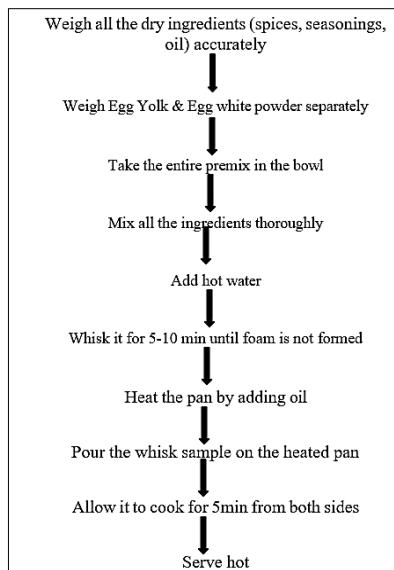
**2. Spices:** Spices might include seeds, fruits, roots, bark, or other plant materials that are mostly used to color or taste food. (P.A. Borkar and others) When it comes to improving the taste and flavor of processed meals, spices are crucial. The components of flavor in food are spices.

Spices required for Development of Egg Omelet Premix such as: red chilli powder and Turmeric powder.

**3. Seasonings:** Seasonings plays a key role in balancing the flavors and ensuring a well-rounded taste in the final product. Seasonings required for the Development of the Egg Omelet Premix are: Salt & Pepper.

**4. Butter or Oil:** Butter or Oil serves as a cooking medium for preparing the omelet premix. They also help in preventing sticking and ensure even cooking of the ingredients. Butter adds Richness. Oil provides a Neutral base for cooking.

**5. Vegetables:** Vegetables enhance the taste and texture of the product, it also provides additional Nutrients and visual appeal. Vegetables used were: Onion and Coriander leaves.



**Fig 2:** Standard Flow diagram of Development of Egg Omelette Premix & Preparation of Egg Omelette from developed Premix.

## Results and Discussion

### Compositions

The following are the compositions used for the preparation of Premixes of 03 types of Egg -

#### 1. Sample 01- Broiler Egg Omelette Premix

Broiler Egg White 20 gm + Broiler Egg Yolk 20 gm + Red chili powder 1.5 gm + Turmeric powder 1.5 gm + Dried Coriander leaves powder 1.5 gm + Dried Curry leaves powder 1.5 gm + Onion Powder 2 gm + Salt-2 gm.

#### 2. Sample 02- Hybrid Egg Omelette Premix

Hybrid Egg White 20 gm + Hybrid Egg Yolk 20 gm + Red chili powder 1.5 gm + Turmeric powder 1.5 gm + Dried Coriander leaves powder 1.5 gm + Dried Curry leaves powder 1.5 gm + Onion Powder 2 gm + Salt-2 gm.

#### 3. Sample 03- Gavraan Egg Omelette Premix

Gavraan Egg White 20 gm + Gavraan Egg Yolk 20 gm + Red chili powder 1.5 gm + Turmeric powder 1.5 gm + Dried Coriander leaves powder 1.5 gm + Dried Curry leaves powder 1.5 gm + Onion Powder 2 gm + Salt-2 gm.

## Chemical Analysis

An Instant Innovative Egg Omelette Premixes were subjected for Chemical analysis to know the Nutritive Value of the 03 Types of Egg Omelet Premixes by using standard procedures and the proximate compositions were determined.

**Table1:** Chemical Analysis of all 03 Samples

Sr No.	Parameters	Sample - 1	Sample - 2	Sample - 3
1.	Moisture	5.37	5.23	4.10
2.	Total Ash	3.61	3.12	5.44
3.	Crude Protein	11.73	10.39	12.91
4.	Crude Fat	9.83	8.27	9.98
5.	Crude Fiber	0.2	0.1	0.2
6.	Carbohydrate	74.53	78.12	71.47
7.	Energy	433.91	428.47	427.34

The following data shows the results of Chemical Analysis of Egg Omelette Premixes (S1-Broiler, S2-Hybrid & S3-Gavraan).

- The Percentage of Moisture - 5.37% in S1, 5.23% in S2, 4.10% in S3.
- The Percentage of Ash - 3.61% in S1, 3.12% in S2, 5.44% in S3.
- The Percentage of Crude Protein - 11.73% in S1, 10.39% in S2, 12.91% in S3.
- The Percentage of Crude Fat - 9.83% in S1, 8.27% in S2, 9.98% in S3.
- The Percentage of Fiber - 0.2% in S1, 0.1% in S2, 0.2% in S3.
- The Percentage of Carbohydrate - 74.53% in S1, 78.12% in S2, 71.47% in S3.
- The Percentage (Kcal) of Energy - 433.91Kcal in S1, 428.47Kcal in S2, 427.34Kcal in S3.

From the Table-1 it was analyzed that Sample-03 (Gavraan Egg Omelette Premix) truly work the best during the Chemical Analysis.



**Fig 3:** Dried Hybrid Egg powders - egg white, egg yolk & egg shell powder.



**Fig 4:** Dried Gavraan Egg powders - egg white, egg yolk & egg shell powder.



**Fig 5:** Dried Broiler Egg powders - egg white, egg yolk & egg shell powder.

## Weight of Dried Samples in Tray dryer

**Table 2:** Weight of dried samples in Tray dryer

Sr No.	Samples	Temperature	Initial Weight	Final Weight
1.	Broiler Egg White	50 °C	706 gm	112 gm
2.	Broiler Egg Yolk	50 °C	591 gm	89 gm
3.	Broiler Egg Shells	50 °C	71 gm	38 gm
4.	Hybrid Egg White	50 °C	671 gm	106 gm
5.	Hybrid Egg Yolk	50 °C	587 gm	82 gm
6.	Hybrid Egg Shells	50 °C	76 gm	41 gm
7.	Gavraan Egg White	50 °C	379 gm	64 gm
8.	Gavraan Egg Yolk	50 °C	449 gm	76 gm
9.	Gavraan Egg Shells	50 °C	63 gm	31 gm
10.	Onion	50 °C	480 gm	145 gm
11.	Coriander Leaves	50 °C	59 gm	16 gm
12.	Curry leaves	50 °C	23 gm	09 gm



**Fig 6:** Separated Broiler Egg yolk, white, & shell.



**Fig 8:** Separated Gavran Egg yolk, white, & shell.



**Fig 9:** Drying of Egg white & Egg yolk on butter paper.



**Fig 7:** Separated Hybrid Egg yolk, white, & shell.



**Fig 10:** Drying of Coriander, Onion & Curry leaves.

## Percent Moisture loss of samples in tray dryer.

**Table 3:** Percent Moisture loss samples in Tray dryer

Sr. No.	Sample	Temperature (°C)	Time (hr)	% Moisture Loss
1	Broiler Egg White	50	1.0	0.4
			2.0	1.6
			3.0	2.0
2	Broiler Egg Yolk	50	1.0	0.6
			2.0	1.3
			3.0	2.5
3	Broiler Egg Shell	50	1.0	1.2
			2.0	2.7
			3.0	3.8
4	Hybrid Egg White	50	1.0	0.9
			2.0	1.4
			3.0	2.3
5	Hybrid Egg Yolk	50	1.0	1.0
			2.0	1.8
			3.0	2.9
6	Hybrid Egg Shell	50	1.0	1.6
			2.0	2.9
			3.0	3.4
7	Gavraan Egg White	50	1.0	1.0
			2.0	1.6
			3.0	2.5
8	Gavraan Egg Yolk	50	1.0	1.3

9	Gavraan Egg Shell	50	2.0	2.2
			3.0	3.0
			4.0	3.4
10	Onion	50	1.0	1.4
			1.5	2.0
11	Coriander Leaves	50	1.0	4.3
			2.0	9.7
12	Curry Leaves	50	0.5	3.9
			1.0	8.0
			0.5	3.4
			1.0	7.2

### Sensory Evaluation

All the finished Egg Omelette and their Premixes were served to the 05 Panel of Judges. The following Table shows the overall acceptability of each product & premix for the Samples-01, 02 & 03.

**Table 4:** Average Score of sensory evaluation of all 03 Samples given by the Panelist.

Sr No.	Samples	Score	Like
1.	S - 1	9	Like Extremely
2.	S - 2	8	Like Very Much
3.	S - 3	8	Like Very Much

It was analyzed that the average Scores obtained for all the samples were Like Extremely (S1), Like very much (S2) & Like Very much (S3) with the scores 9, 8 & 8 and it was found that the sample (S1) i.e., Broiler Egg Omelette Premix was truly work the best and like the most during the Sensory Evaluation by the Panel members among the three samples.



**Fig 11:** Sensory Evaluation of Egg premixes and Prepared egg omelettes.

### Conclusion

On the basis of findings and result the following major conclusions were drawn:

The data presented describes the proximate composition of various types of egg varieties for the preparation of Egg Omelet Premixes.

Out of the three different types of Egg Omelet Premixes, all of them truly work best for chemical as well as sensory evaluation. It is seen that the Gavraan variety Egg Omelet Premix (Sample- 03) is truly work the best for chemical analysis due to its high protein content and the Broiler variety Egg Omelet Premix (Sample- 01) is truly work the best for Sensory Evaluation with a score - 9 i.e., Like extremely.

The Premix was developed with a blend of ingredients to enhance the flavor, texture, and nutritional value of the omelets and it can be easily stored & used for quick and easy meal preparation.

It is also Found that the various types of Egg Omelette Premixes are cost effective & affordable to everyone i.e., the

premixes vary with the quantities i.e., 100 gm, 200 gm, 500 gm, 750 gm and 1 Kg. The cost of 1 Kg Pack of premixes varies in the range of 218.06Rs (Broiler), 189.31Rs (Hybrid), and 249.31Rs (Gavraan) and also easy to cook.

The Consumers can now enjoy delicious and nutritious omelets with a longer shelf life by simply rehydrating the premix and cooking it according to the instructions given.

This product can also be combined in many food products as a protein powder in baking industry, Use for production of goods i.e., Mayonnaise, Salad dressing & Pasta and also as a foaming agent, a rich source of protein etc. It can be the most convenient Ready-to-eat product for the Mountain trekkers, Soldiers and Busy Job persons. Not only nutritive but also convenient to everyone.

### References

1. Abdullahi AA. Processing yield and quality of powder from the eggs of chicken, quail and turkey. MSc Thesis. Ibadan (Nigeria): University of Ibadan; 2016. p. 125-133.
2. Anton M. Composition and structure of hen egg yolk. In: Huopalaiti R, López-Fandiño R, Anton M, Schade R, editors. *Bioactive egg compounds*. Berlin: Springer; 2007. p. 1-6.
3. Alderton G, Ward WH, Fevold HL. Isolation of lysozyme from egg white. *J Biol Chem*. 1946;157:43-58.
4. Ali A. Proximate composition of some less known processed and fresh fish species for determination of nutritive values in Iran. *Journal of Agricultural Technology*. 2012;8(3):917-922.
5. Al-Mashikhi SA, Nakai N. Separation of ovotransferrin from egg white by immobilized metal affinity chromatography. *Agric Biol Chem*. 1987;51:2881-2887.
6. Sauter EA, Petersen CF. Omelets from pasteurized frozen whole egg by use of fresh, freeze-dried, or spray-dried egg white. Moscow (ID): Animal Science Department, University of Idaho; 1979. p. 1-12.
7. Association of Official Analytical Chemists. *Official methods of analysis*. 15th ed. Arlington (VA): AOAC; 1990.
8. Ayadi MA, Khemakhem M, Belgith H, Attia H. Effect of moderate spray drying conditions on functionality of dried egg white and whole egg. *Journal of Food Science*. 2008;73(6):E281-E287.
9. Ayo JA, Okoliko A. The effect of spray drying on the functional properties of egg white. In: Proceedings of the 23rd Annual NIFST Conference; 1999; Nigeria. p. 45-52.
10. Bain MM, Nys Y, Dunn IC. Increasing persistency in lay and stabilizing egg quality in longer laying cycles:

what are the challenges? *Journal of Poultry Science*. 2016;57:330-338.

11. Baron F, Gautier M, Brule G. Moisture content and particle size of dehydrated egg yolk affect lipid and cholesterol extraction using supercritical carbon dioxide. Lincoln (NE): University of Nebraska-Lincoln; 1997. p. 1-15.
12. Caboni MF, *et al*. Effect of processing and storage on the chemical quality markers of spray-dried whole egg. *Food Chemistry*. 2005;92(2):293-303.
13. Cunningham FE. Egg product pasteurization. In: Stadelman WJ, Cotterill OJ, editors. *Egg science and technology*. 4th ed. New York: Food Products Press; 1995. p. 289-316.
14. Cunningham FE, Proctor VA, Goetsch SJ. Egg-white lysozyme as a food preservative: an overview. *World's Poultry Science Journal*. 1991;47:141-163.
15. Dunn IC, Joseph NT, Bain M, Edmond A, Wilson PW, Milona P, *et al*. Polymorphisms in eggshell organic matrix genes are associated with eggshell quality measurements in pedigree Rhode Island Red hens. *Animal Genetics*. 2009;40:110-114.
16. De Reu K, Grijspoor K, Meissen W, Hendrick M, Uyttendaele M, Debevere J, *et al*. Eggshell factors influencing eggshell penetration and whole egg contamination by different bacteria, including *Salmonella enteritidis*. *Int J Food Microbiology*. 2006;112:253-260.
17. Du M, Ahn DU. Effect of antioxidants and packaging on lipid and cholesterol oxidation and color changes of irradiated egg yolk powder. *Journal of Food Science*. 2000;65:625-629.
18. Fisher FR. Freeze-drying of foods. Washington (DC): National Academy of Sciences-National Research Council; 1962. p. 1-85.
19. Wehling RL, Cuppett SL, Pierce MM, Niemann L, Siekman DK. Extraction of cholesterol and other lipids from dried egg yolk using supercritical carbon dioxide. *Journal of Food Science*. 1990;55:95-98.
20. Funk K, Zabik ME. Comparison of frozen, foam-spray-dried, freeze-dried and spray-dried eggs: coagulation patterns of slurries prepared with milk and whole eggs, yolk or albumen. *Journal of Food Science*. 1971;36:715-717.
21. Guardiola F, *et al*. Oxysterol formation in egg powder and relationship with other quality parameters. *Journal of Agricultural and Food Chemistry*. 1995;43:1903-1907.
22. Herman L. Effect of oven drying on the functional and nutritional properties of whole egg and its components. *African Journal of Food Science*. 2010;4(5):254-257.
23. Ijichi K, Palmer HH, Lineweaver H. Frozen whole eggs for scrambling. *Journal of Food Science*. 1970;35:695-698.
24. Cotterill OJ, Glauert HP. Residual moisture in freeze-dried egg mixtures. Columbia (MO): University of Missouri; 1975. p. 1-10.
25. Okubo T, Akachi S, Hatta H. Structure of hen eggs and physiology of egg laying. In: Yamamoto T, Juneja LR, Hatta H, Kim M, editors. *Hen eggs: their basic and applied science*. Boca Raton (FL): CRC Press; 1997. p. 1-12.
26. Rannou C, Texier F, Moreau M, Couscous P, Meynier A, Prost C. Odor quality of spray-dried hens' egg powders: influence of composition, processing and storage conditions. *Food Chemistry*. 2013;138(2):905-914.
27. Rodriguez-Navarro A, Kalin O, Nys Y, Garcia-Ruiz JM. Influence of the microstructure on the shell strength of eggs laid by hens of different ages. *British Poultry Science*. 2002;43:395-403.
28. Sellier N, Vidal ML, Baron F, Michel J, Gautron J, Protails M, *et al*. Estimations of repeatability and heritability of egg albumen antimicrobial activity and of lysozyme and ovotransferrin concentrations. *British Poultry Science*. 2007;48:559-566.
29. Sloan DR, Harms RH, Abdullah AG, Kuchinski KK. Variation in egg content density makes egg specific gravity a poor indicator of shell weight. *Journal of Applied Animal Research*. 2000;18:121-128.
30. Soderberg J. Functional properties of legume proteins compared to egg proteins and their potential as egg replacers in vegan food. Uppsala (Sweden): Swedish University of Agricultural Sciences; 2013. p. 1-78.
31. Surai PF, Sparks NHC. Designer eggs: from improvement of egg composition to functional food. *Trends in Food Science and Technology*. 2001;12(1):7-16.
32. Van der Plancken I, Van Loey A, Hendrickx ME. Foaming properties of egg white proteins affected by heat or high-pressure treatment. *Journal of Food Engineering*. 2007;78:1410-1426.
33. Vidal MV, Gautron J, Nys Y. Development of an ELISA for quantifying lysozyme in hen egg white. *Journal of Agricultural and Food Chemistry*. 2005;53:2379-2385.
34. Wakamatsu T, Sato Y, Saito Y. Sodium chloride action in the gelation process of low-density lipoprotein from hen egg yolk. *Journal of Food Science*. 1983;48:507-516.
35. Yang RX, Li WZ, Zhu CQ, Zhang Q. Effects of ultra-high hydrostatic pressure on foaming and physicochemical properties of egg white. *Journal of Biomedical Science and Engineering*. 2010;2:617-620.
36. Yang S, Baldwin R. Functional properties of eggs in foods. In: Stadelman WJ, Cotterill OJ, editors. *Egg science and technology*. 4th ed. New York: Food Products Press; 1995. p. 405-452.
37. Zeidler G. Further-processing eggs and egg products. In: Bell D, Weaver WD, editors. *Commercial chicken meat and egg production*. 5th ed. New York: Springer; 2002. p. 1163-1197.
38. Zhang W, Liu F, Nindo C, Tang J. Physical properties of egg whites and whole eggs relevant to microwave pasteurization. *Journal of Food Engineering*. 2013;118(1):62-69.