

DEVELOPMENT OF PROTEIN ENRICHED SOUP POWDER BY USING PRAWN AND SHRIMP

S Rameshkumar¹, T Deepika & M Nasrin²

¹*Assistant Professor, Department of Agriculture Engineering, Excel Engineering College, Namakkal, Tamilnadu*

²*UG - Agriculture Engineering, Excel Engineering College, Namakkal, Tamilnadu*

ABSTRACT

Protein is a macronutrient that is essential for building muscle mass. Prawn and shrimp is a good source of nutrients. Instant soup is a type of soup designed for fast and simple Preparation. Some are home made, and some are mass produced on an industrial scale and treated in various ways to preserve them. A wide variety of types, styles and flavors of instant Soups exist. Commercial instant soups are usually dried or dehydrated, canned, or treated by freezing. Dried prawn and shrimp is extremely high in protein, up to 93% of calories. Seafood is an excellent Source of protein because it's usually low in fat. Prawn and shrimp are good sources of dietary protein while also supplying essential minerals and heart-healthy omega-3 fatty acids. Protein enriched instant soup is done by prawn and shrimp and dehydrated vegetables. Prawn and Shrimp were subjected to tray drying and grinding. The observed high protein content in product will find promising application in food products. Powder from both Prawn and shrimp varieties were analyzed for proximate Analysis, powder properties and nutritional content. The protein content is observed to be high in the prawn and shrimp powder compared to raw prawn and shrimp. Nutritional parameters analyzed were Protein, Total fat, Carbohydrates, Minerals and Heavy metals. Prawn and shrimp powder had significantly higher protein content apart from other parameters. This finds scope in designing high.Soup mix was Formulated and optimized by RSM software. Analyses were done to the soup mix.

Keywords: prawnand shrimp, tray drying, Seasonings, Soup

1. Introduction

Proteins are basic ingredients of all cells of body and it also supports immune system of body. It also fastens bio chemical reactions and builds muscle. Prawn and shrimp is a low Fat and exceptional protein source. Prawn and shrimp includes of vitamin B2 and Vitamin D. Itaso haveomega 3 fatty acid. Prawn and shrimp is rich in phosphorous and calcium. Prawn and shrimp acts as greater source of Protein, zinc, iron, iodine, minerals. Dried prawn and shrimp powder gives enormous amount of protein. Drying of prawn and shrimp is done by oldest method of tray drying. The drying method is donefor preserving method. Fresh prawn and shrimp is filled with 80% of water and highly perishable product. When the moisture content of prawn and shrimp is abridged, the shelf life will be augmented. Spices, vegetables, prawn and shrimp can be dried completely in tray drier (Varalakshmi Kandanuri 2019). The moisture content of prawn and shrimp attained to 16.23% (wet basis) from 66% (wet basis) in 105 hours of drying in tray dryer. Prawn and shrimp were selected due to their enriched protein content.

The analysis such as proximate composition, minerals, powder properties heavy metals were done. The protein rich Prawn and shrimp powder can be used in food application and develop the functional food ups are consumed for nutritive benefits and also by patients whose intake of solids is considerably reduced due to several pathological reasons. Dehydrated soup mix is a convenient product due to its less volume and long storage life at ambient temperatures. (Rekha et al., 2010) Soup is a generally warm food that is made by combining ingredients such as vegetables green leaves with juice, water, or an-other liquid. Prawn and shrimp muscle contains essential amino acids and 17– 20% protein. Owing to its connective tissue content (2%), it is also very digestible [2, 3]. Lipids

should be rich in polyunsaturated fatty acids (PUFA) and poor in saturated ones for good nutrition (Mol 2005).

2. Materials or Methodology

2.1 Preparation of prawn and shrimp

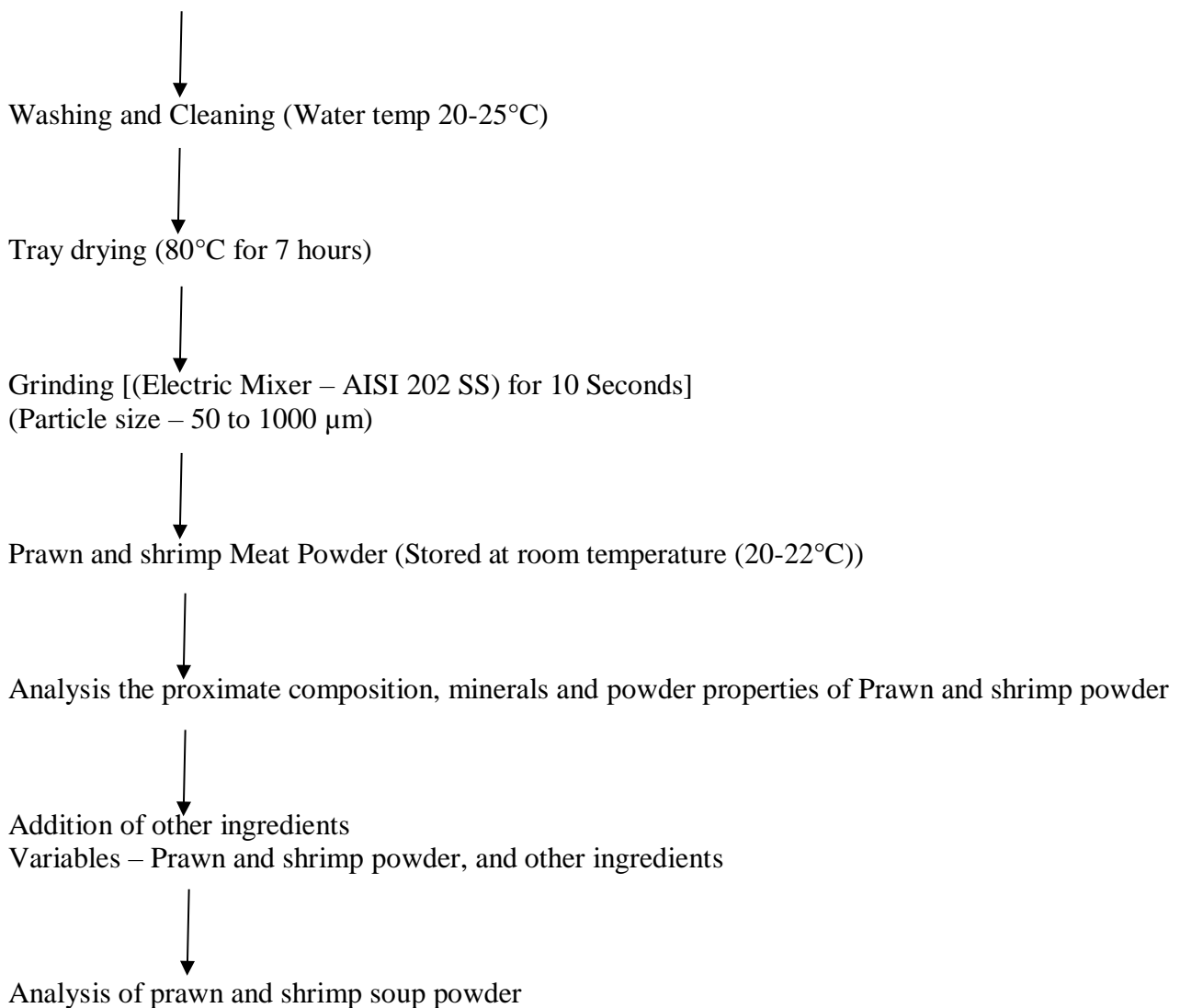
Chilled, fresh prawn and shrimp were procured. The average weight of Prawn and shrimp were 500 Grams. The exoskeleton and head were removed manually. The pre-treated prawn and shrimp were set aside in tray dryer for the purpose of removing moisture content in the food product.

2.2 Preparation of instant soup mix powder making

The dried prawn and shrimp were grinded with the help of Electric mixer – AISI 202 SS until the partial size reduces to 50-1000 Nanometer. Evaluate the nutritional value of the prawn and shrimp powder. Addition of ingredients like salt, pepper powder, garlic powder, ginger powder, cinnamon and clove powder, dried carrot, green peas, MSG, onion powder, tomato powder with the help of RSM software. Determine the nutritional value of the prawn and shrimp soup powder.

2.3 Flow chart

Fresh Prawn and shrimp meat

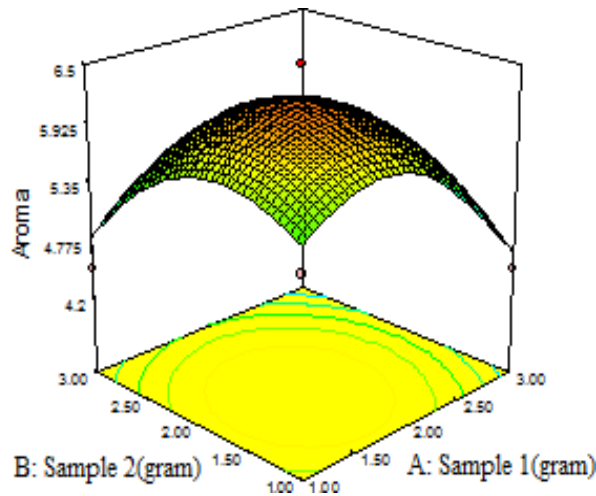


3. Results and Discussion

3.1 Aroma

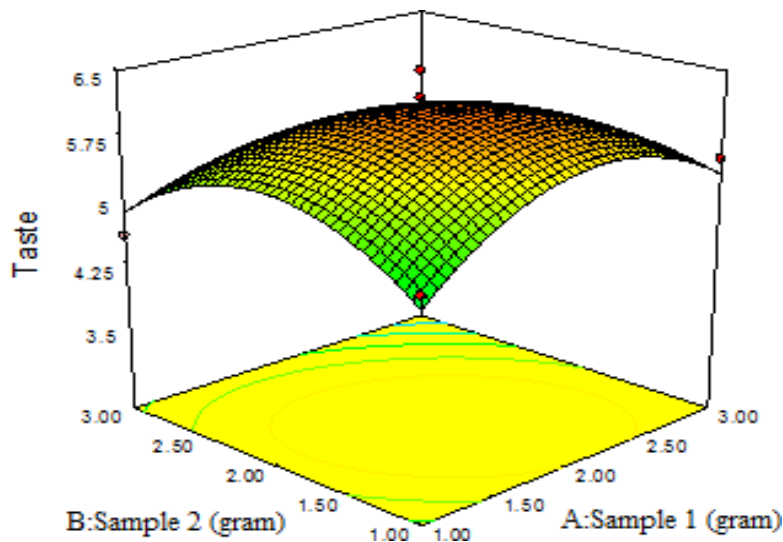
From the response plot (Fig 3.1), it was observed that the Prawn powder had imparted greater positive effect compared to Shrimp powder. It has been inferred that the Factor 1 (Prawn powder) is significant

i.e, (P<0.05) which indicates that Factor 1 influence the aroma. Therefore the aroma is considerably good when the Prawn powder increases. The regression equation obtained for Aroma is given below:
 $Y = +6.2 - 0.30178 * A - 0.21339 * B + 0.15 * A * B - 0.71 * A^2 - 0.59 * B^2$



3.2 Taste

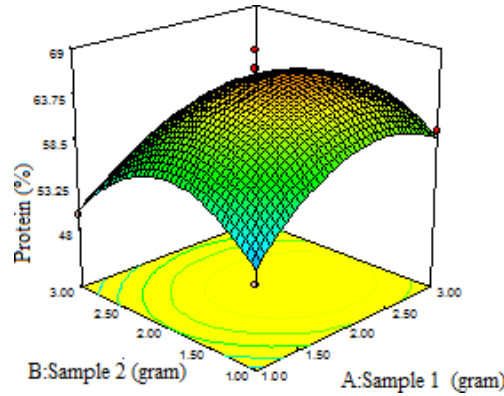
. From the response plot (Fig 3.2), it was observed that the Shrimp powder had imparted greater positive effect compared to Prawn powder. It has been inferred that the Factor 2 (Shrimp powder) is significant i.e, (P<0.05) which indicates that Factor 2 influence the taste. Taste plays a vital role in consumer acceptance. The taste is increased when the Shrimp powder increases. Taste can be altered by changing the factor 2 (Shrimp powder). The regression equation obtained for taste is given below
 $Y = +6.14 - 0.16339 * A - 0.38839 * B - 0.4 * A * B - 0.72 * A^2 - 0.72 * B^2$



3.3 Protein

From the response plot (Fig 3.3), it was observed that the both Prawn and Shrimp powder had imparted greater positive effect. The main objective of the research work is develop protein enriched soup mix. It has been inferred that both Factor 1 and Factor 2 (Prawn powder and shrimp powder) is significant i.e, (P<0.05) which indicates that Factor 1 and 2 influence the Protein. Therefore the protein gets increased when the both Prawn powder and shrimp powder increases. The regression equation obtained for Protein is given below:

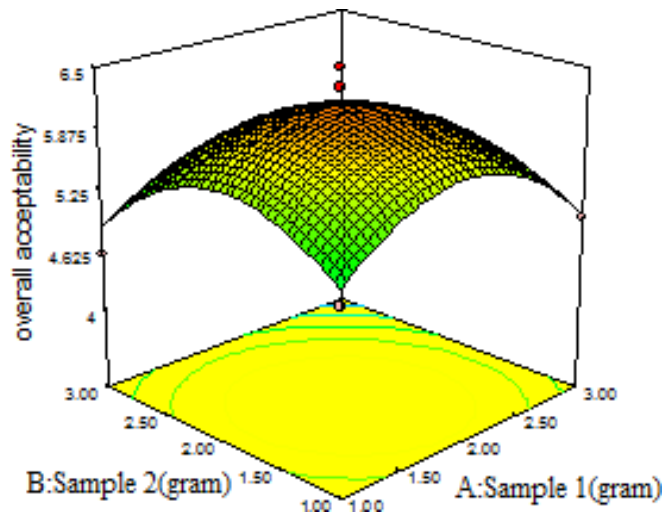
$$Y = +65.424 + 2.420094 * A - 1.92369 * B - 1.0525 * A * B - 5.15325 * A^2 - 6.80575 * B^2$$



3.4 Overall Acceptability

From the response plot (Fig 3.4), it was observed that the both Prawn and Shrimp powder had imparted greater positive effect. has been inferred that both Factor 1 and Factor 2 (Prawn powder and shrimp powder) is significant i.e, ($P < 0.05$) which indicates that Factor 1 and 2 influence the Overall acceptability. Therefore the overall acceptability gets increased when the both Prawn powder and shrimp powder increases. The regression equation obtained for Aroma is given below:

$$Y = +6.16 - 0.21642 * A - 0.28107 * B - 0.15 * A * B - 0.70 * A^2 - 0.655 * B^2$$



3.5 Optimization of soup powder include prawn and shrimp

The soup powder mix is optimized using RSM software. The composition of soup powder includes prawn, shrimp powder and seasonings. Seasonings comprises of tomato powder, onion powder, garlic powder, ginger powder, coriander powder, clove powder, cinnamon powder, green peas, dried carrot, pepper powder. Additionally starch and maltodextrin is added as thickening agents.

Nutrition Value of Prawn and Shrimp soup powder

S.no	Parameters	Prawn	Shrimp
1	Moisture (%)	5.403±0.39	2.79±0.296
2	Ash (%)	4.21±0.30	1.70±0.22
3	Protein (%)	69.14±0.08	71.4±0.29
4	Fat (%)	16.25±0.18	11.54±0.31
5	Carbohydrate (%)	7.82±0.22	9.71±0.48
6	Calorific value	420.42±0.31(kcal/100g)	462.37±0.41(kcal/100g)

Analysis of Minerals

S.no	Minerals	Prawn	Shrimp
1	Calcium (Ca)	16.06±0.11	88.16±0.28
2	Phosphorous (P)	288.23±0.40	275.10±0.17
3	Potassium (K)	325.13±0.23	419.10±0.17
4	Zinc(Zn)	201.60±0.36	211.56±0.35
5	Magnesium(Mg)	12.30±0.20	11.40±0.20

Analysis of heavy Metals

S.no	Heavy metals	Prawn powder Mg/Kg	Shrimp powder mg/Kg
1	Lead (Pb)	3.56±0.32	5.30±0.34
2	Chromium(Cr)	1.33±0.32	1.03±0.05

Ingredients of Instant soup mix

Ingredients	Quantity (%)
Prawn and shrimp powder	49%
Tomato powder	6%
Onion powder	6%
Ginger powder	4%
Coriander Powder	4%
Dried green peas	5%
Dried carrot	4%

Salt	2%
Cinnamon powder	4%
Clove powder	4%
Garlic powder	4%
MSG	1%
Pepper powder	5%

Central composite matrix and observed response

	Factor 1	Factor 2	Response 1	Response 2	Response 3	Response 4
S.no	A: Prawn powder	B: Shrimp powder	Taste	Aroma	Protein	Overall Acceptability
	Grans	grams	9 pt hedonic scale	9 pt hedonic scale	(%)	9 pt hedonic scale
1	1	3	4.6	4.5	49.71	4.6
2	2	2	6	6	63.24	6
3	3.4	2	4.5	4.5	56.64	4.5
4	2	0.5	5	5.5	55.12	5.3
5	2	2	6	6	64.72	6
6	3	3	3.5	4.3	54.86	4
7	0.5	2	5	5.5	53.21	5.3
8	2	1	5	5.3	50.35	5
9	3	2	6.5	6.5	63.72	6.5
10	2	3.4	4.5	5	48.12	4.7
11	3	1	5.5	4.5	59.71	5
12	2	2	6	6	66.72	6
13	2	2	6.2	6.5	68.72	6.3

Proximate composition of soup mix powder

S.No	Parameters	Soup mix
1	Moisture (%)	3.19±0.296
2	Ash (%)	2.73±0.30
3	Protein (%)	65.38±0.29
4	Fat (%)	13.1±0.18
5	Carbohydrate (%)	8.11±0.22
6	Calorific value	421.12 ±0.31

Minerals of soup mix powder

S.no	Minerals	Soup mix (mg/100g)
1	Calcium (ca)	23±0.28
2	Phosporous (p)	280±0.1
3	Potassium (k)	372±0.1
4	Zinc(zn)	207.1±0.3
5	Magnesium(mg)	12.1±0.2

Heavy metals of soup mix powder

S.No	Heavy metals	Soup mix(mg/kg)
1	Lead (pb)	3.9±0.3
2	Chromium(cr)	1.1±0.0

Conclusion

Soup is a primarily liquid food, generally made by combining ingredients of meat and vegetables with stock or water. Prawn and Shrimp is being used as important element for making many types of instant food by value addition. It can be a great source of protein in healthy diet. It is very practical in preparation and taking only short time to serve. This study shows that dried prawn and shrimp powder is highly nutrient that can be used in food application.

5. References

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