International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Shat- Pro-Let Food be the Medicine and Medicine be the Food

Monali Parbhane[1], Suyog Jasud[2], Arpita Kharat[3], Dwarkadas Baheti[4]

SCSSS's Sitabai Thite Collage of Pharmacy, Shirur, Pune, Maharashtra, India
mkparbhane[at]gmail.com

Abstract: ***Total protein required for men need 60gm/day, women need 50gm/day and pregnant women needs 78gm/day. According to several studies, over 70% of Indians have protein deficiency cause due to hybridization and improper diet. For Pregnancy requires a healthy diet that includes an adequate intake of energy, protein, vitamins and minerals to meet maternal and fetal needs. However, for many pregnant womens dietary intake of vegetable, meat, dairy product and fruit is often insufficient to meet these needs, particularly in low and middle income countries. Where multiple nutrient deficiency often coexists. Most of the people doesn't know about the requirement of protein in day to day life that the protein made in our body by consumption of food that is not full fill the body's requirement. Additional protein supplement is required to get desire amount the body protein. Shat-Pro is the best choice for protein supplement compare to other marketed product. It is cost effective and chemical free which are fully made up from natural resources. ShatPro is the best choice as a protein supplement for pregnant women as compared to marketed product ShatPro is having advantage over them such as it is free from preservative, completely nutrient base and cost effective. It does not fill the daily requirement but also need of mineral, vitamin and all essential elements. Shatavari is present in the formulation boost the uterine muscle strength as well as improve the lactation process. Shatavari have strong antidepressant abilities. They also impacted neurotransmitters in brain.***

Keywords: Supplements, Natural Herbs, Neutraceutical, Shatavari, Shat-Pro.

1. Introduction

Neutraceutical derives from the combination of the words "nutrient" and "pharmaceutical." As the name implies, neutraceuticals are compounds derived from food sources and other types of intake that have particular beneficial health effects other than their nutritional value. The term "neutraceutical" was coined in 1989 by Stephen De Felice, founder and chairman of the Foundation for Innovation in Medicine, an American organization which encourages medical health research. He defined a neutraceutical as a "food, or parts of a food, that provide medical or health benefits, including the prevention and treatment of disease".

Need of neutraceutical

Neutraceuticals are medicinal foods that enhance health, modulate immunity and thereby prevent and cure specific diseases. The new lifestyle adopted by people today has changed the basic food habits of the latter. Consumption of the junk food has increased manifold leading to a number of diseases caused due to improper nutrition. Obesity is now recognized as a global issue. Heart disease continues to be a primary cause of death in most of the developing countries worldwide, followed by cancer, osteoporosis, arthritis and many others. Consumers being frustrated with the expensive, high-tech, disease-treatment approach in the modern medicines are seeking complementary or alternative beneficial products and the red tape of managed care makes neutraceuticals particularly appealing. Neutraceuticals are the emerging class of natural products that makes the line between food and drugs to fade. Neutraceuticals covers most of the therapeutics areas such as anti-arthritic, cold and cough, sleeping disorders, digestion and prevention of certain cancers, osteoporosis, blood pressure, cholesterol control, pain killers, depression and diabetes.

Commercial neutraceuticals

New molecule is difficult to discover and more expensive and risky than ever before. Many pharmaceutical companies are now trying to manufacture neutraceutical because there is undoubtedly a very huge and growing market. Neutraceuticals cover most of the therapeutic areas, such as anti-arthritic, cold and cough, sleeping disorders, digestion and prevention of certain cancers, osteoporosis, blood pressure, cholesterol control, pain killers, depression and diabetes. Recognition of health benefits from consumption of omega-3 rich sea foods is one of the most promising developments in human nutrition and disease prevention research in the past three decades.

Protein powder

Protein powder is a popular nutritional supplement. Protein is an essential macronutrient that helps build muscle, repair tissue, and make enzymes and hormones. Using protein powder may also aid weight loss and help people tone their muscles.

Uses of protein powder

Weight management, Muscle growth, Recovery after exercise

Importance of protein-

Increases Muscle Mass and Strength, Building and repairing body tissue, Energy, Antibodies, Transportation and Storage of Molecules, Boost Metabolism.

Requirement of protein (Approx.): -

In everyday life, men need 60gm/day, women need 50gm/day and pregnant women needs 78gm/day.

The majority of India's population consumes protein-deficient diets. According to several studies, over 70% of Indians have protein deficiency. One of the implications of this protein deficiency could be poor muscle health.

According to the in body-IPSOS study of 2018, 71 per cent of Indians have poor muscle health, while 68 per cent have lower than adequate protein content in their bodies.

Nutrition is one of the essential pillars of physical health and mental abilities. It is well said that 'we are what we eat'. It is considered as one of three major macro nutrients that make up our diet (Protein, carbohydrates and fats).

India, being a country in developmental transition, faces the burden of protein- calorie under nutrition According to the latest survey with IPSOS (2018), a leading global market and opinion research firm, "About 68 % people in India are protein deficient, while 71% have poor muscle health".

Hence our aim is “To prepare a healthy and tasty protein powder which is free from chemicals, preservatives and have better consumer compliance.”

The objective is to reduce the cost of protein powder, provide best protein supplement which fulfil daily requirement of protein, produce free from chemicals & preservatives, can serve to women’s during & after pregnancy to improve health of neonate as well as mother.

According to market basis cost of 500gm powder is around 480-750 Rs. Poor people doesn’t afford it. Protein powder may contain chemicals which are hazardous to health.

2. Literature Survey

1) Literature review on the benefits of protein supplementation for muscle Hypertrophy

Layth mithim mahdi 2017.

The debate of whether protein supplementation in addition to that of diet is of any benefit is still on going as there are seemingly equivocal studies on both sides. This literature review attempts to examine the current studies and to find a pattern and a potential answer to this question. After looking at protein supplementation for the elderly and the active, the type of protein and the timing of the supplementation, it is concluded that the protein supplementation is most likely of no major benefit as long the individual is getting enough protein from diet. The timing of the supplementation is likely not nearly as important as the total protein intake. In addition, the RDA seems to be inadequate for the active and the elderly so it is of importance to continue conducting further studies to find an appropriate RDA range of protein for different population demographics.

2) The Preference of Protein Powders Among Adult Males and Females: A Protein Powder Taste Study

Joshua Manter et al. 2009

Protein is essential in one’s diet because it is an important component in many organs and tissues throughout the body. Athletes ingest protein in order to stimulate protein synthesis and increase lean muscle mass. In order to assist with obtaining
adequate amounts of protein, athletes and bodybuilders purchase supplemental protein in the form of protein powders. Protein metabolism and digestion play key roles in this because if the protein is not metabolized or digested effectively, then those who are wishing to gain fat free mass will not be successful. A high quality protein will be digested, metabolized, and directed towards lean tissue accretion more efficiently than a lower quality protein. In order to be a high quality protein, it must contain the essential amino acids. Fortunately, whey protein is a high quality protein because it contains an abundant supply of the essential amino acids. Whey protein is a high quality protein; hence, many athletes and physically active individuals purchase whey protein supplements. Some individuals do not care about taste and overcome awful protein powder taste, while others value a good tasting whey protein. After extensive research, it appears that scientific taste tests on protein supplements are lacking. The purpose of this study was to test some of the most popular protein supplements (Muscle Milk, BSN, Nesquik Vanilla Milk and Optimum Nutrition) and discover which one tasted the best.

3) The consumption and attitudes of protein supplements among young adults in Finland

Jarva Elisa et al. 2021.

The objective of this thesis was to examine the consumption patterns and attitudes of young Finnish adults towards protein supplements. The aim of this research was to give insight on how 18 to 29 years old Finnish are as consumers, what are their brand preferences, which factors and who influence their purchase decision, and which product attributes they value in protein supplements. The theoretical part of the thesis was based on the concepts of consumer behavior and studies related to the field, with the focus on factors that affect consumers’ purchase decision, also referred to as “heuristics”. To reach the objectives, mainly quantitative research method was exploited. An online survey was created and shared via email to students at Satakunta University of Applied Sciences, as well as the author’s acquaints. The survey, which targeted Finnish between the ages 18 to 29, collected 90 responses.

The research findings showed how young Finns prefer foreign and well-known protein supplement brands and like to stick to brands they are already familiar with. The consumption of protein supplements was clearly associated with exercise, and the product attributes the respondents found the most important were taste and price of the product. When it comes to the people who influence the purchase decision of young Finns, a surprising finding was that it is the family members and friends whose recommendations they listen to, not influencers or authority figures.

4) Protein Malnutrition in Pregnancy

LOUISE M. SHEDDAN 1944.

In the past ten years we have seen a great increase in the amount of research carried on in the field of nutrition. It requires considerable reading and attention for us to keep up with even the changes in terminology used from time to time, let alone the real meaning back of these new words.

For some time, I have been interested in the part which diet plays in the treatment of toxemia of pregnancy. This is a

brief review of current literature relating to some of the less technical aspects of protein malnutrition in pregnancy and certain factors in this field which should be of interest to nurses.

Since we frequently hear it said that pregnancy is a normal physiological function, why then are we so concerned with dietary requirements during this period? A. L. Potter has pointed out that there are several reasons for this (1). In the first place, the patient's food habits may never have been good; or for economic reasons she may not be free to choose her diet. Anorexia, nausea, and vomiting may prevent her from taking or retaining sufficient food. In the second place, "the pregnant patient is unique in that she harbors a parasite, the growing fetus." Our concern is not only with the dietary requirements of the patient, but those of her baby also. Although the patient may have been in metabolic balance normally, she is not when the fetal requirements are added. There is a slight fall in the basal metabolism during the first three months of pregnancy. Thereafter, the metabolic rate slowly increases "probably chiefly due to the additional tissue of the fetus, and to a smaller degree to the increased mass of maternal tissue".

5) Protein intakes of pregnant women and children in India—protein quality implications

Sulagna Bandyopadhyay et al. 2019

The recent National Family Health Survey (NFHS-4, 2016) reports a national average of 18% for low birth weight (LBW) and 38% for stunting in children <5 years. Nutrition and environmental influences (chronic enteric pathogenic exposure through poor water, sanitation, and hygiene) are two critical factors that impact the health out-comes of the population. This is particularly relevant for vulnerable age groups such as pregnant women and children <5 years, who bear long-lasting and intergenerational consequences of impoverished nutrition and suboptimal living conditions. The present review provides, for the first time, an analysis of indispensable amino acid (IAA) requirements for pregnant women, separately for the second and third trimesters, using protein accretion data from a recent Indian study. Furthermore, using these estimates for pregnancy, and the current IAA requirements for young children, the quality of protein was assessed in Indian diets consumed by pregnant women and children (1–3 and 4–6 years) from national representative rural National Nutrition Monitoring Bureau survey. The assessment was considered in the context of an adverse environment and in relation to outcomes such as LBW, stunting, and underweight. Finally, an assessment was made of the proportion of the surveyed population at risk of dietary quality protein inadequacy and implications for planning nutrition intervention programs. Specifically, state-wise estimates of the risk of quality protein inadequacy is provided, in addition to evaluations of additional dietary supplementation, which could inform the policy of supplementary nutrition programs to improve health outcome.

6) Health effects of protein intake in healthy adults:

Agnes N Pedersen et al. Food Nutr Res. 2013.

The purpose of this systematic review is to assess the evidence behind the dietary requirement of protein and to assess the health effects of varying protein intake in healthy adults. The literature search covered the years 2000–2011. Prospective cohort, case-control, and intervention studies were included. Out of a total of 5,718 abstracts, 412 full papers were identified as potentially relevant, and after careful scrutiny, 64 papers were quality graded as A (highest), B, or C. The grade of evidence was classified as convincing, probable, suggestive or inconclusive. The evidence is assessed as: probable for an estimated average requirement of 0.66 g good-quality protein/kg body weight (BW)/day based on nitrogen balance studies, suggestive for a relationship between increased all-cause mortality risk and long-term low-carbohydrate–high-protein (LCHP) diets; but inconclusive for a relationship between all-cause mortality risk and protein intake per suggestive for an inverse relationship between cardiovascular mortality and vegetable protein intake; inconclusive for relationships between cancer mortality and cancer diseases, respectively, and protein intake; inconclusive for a relationship between cardiovascular diseases and total protein intake; suggestive for an inverse relationship between blood pressure (BP) and vegetable protein; probable to convincing for an inverse relationship between soya protein intake and LDL cholesterol; inconclusive for a relationship between protein intake and bone health, energy intake, BW control, body composition, renal function, and risk of kidney stones, respectively; suggestive for a relationship between increased risk of type 2 diabetes (T2D) and long-term LCHP-high fat diets; inconclusive for impact of physical training on protein requirement; and suggestive for effect of physical training on whole-body protein retention. In conclusion, the evidence is assessed as probable regarding the estimated requirement based on nitrogen balance studies, and suggestive to inconclusive for protein intake and mortality and morbidity. Vegetable protein intake was associated with decreased risk in many studies. Potentially adverse effects of a protein intake exceeding 20–23 E% remain to be investigated.

3. Materials and Equipments

The materials used are Whole milk powder, almonds, cashew nuts, walnuts, pumpkin seeds, watermelon seeds, sunflower seeds, quinoa, shatavari, oats, *dhaga mishree.* All materials were collected from local market.

Nutritional value

Table 1: Nutritional value

Name	Whole milk powder	Almond	Walnut	Cashewnut	Pumpkin seed	Watermelon seed	Sunflower seed	Shatavari	Quinoa	Oat	Dhaga Mishri
Protein	34%	21%	15%	15%	37%	62%	43%	4%	28%	11%	36%
Iron	0.8%	21%	16%	32.8%	18%	40%	38%	11%	35%	14%	32%
Vit C	4.6%	0%	2%	0%	0%	0%	2%	9%	0%	0%	1%

Vit A	6%	0%	0%	0%	1%	0%	1%	0%	0%	0.2%	0%
Calcium	22%	21%	2%	3.2%	0%	4%	12%	2%	4%	2.96%	26%
Other	-	(B2) 88%	(B6) 25%	-	-	-	-	(B6) 5%	(K) 20%	-	-

The equipments used are mixer/ grander, beaker, sigma blender, oven, weighing balance

4. Methodology

1) Selection of ingredients

Eleven ingredients from all the food groups were selected for developing the enteral formula feeds. The selection was based on the nutritional potential, adaptability to the processing, keeping quality and availability of the ingredient.

Table 2: Ingredients

Food group	Ingredients
Cereals & millets	Oats
Milk & milk products	Whole milk powder
Nuts	Almond, cashew nut, walnut
seeds	Sunflower, pumpkin, watermelon
grains	quinoa
herb	Satavari
Others	Sugar

Nutritional Analysis of the Ingredients (Pre Processing stage)

All the selected ingredients were analyzed for their nutrient content at "pre" and "post" processing stages by using standard analytical procedures. At the preprocessing stage all the macro nutrients i.e. crude protein, crude fat, crude fiber, carbohydrates and vitamin C content and micronutrients i.e. vitamin A, folic acid, iron and sodium were measured by using outside sources.

2) Method of preparation

a) Oven toast at 160 ^{0} c for 4 to 5 min or pan roast on low flame. Do not burn.
b) Dry roast pumpkin seed, watermelon seed, sunflower seed, and oats separately in a pan on low flame. Do not burn. After roasting let it cool down on an open surface.
c) Combined all the ingredients in a blender jar, grind to get a fine powder.
d) Transfer the powder to an airtight container use as requirement.

3) Formula (theoretical batch)

Table 3: Theoretical batch formula

Formula no.	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
Name	%	%	%	%	%	%	%	%	%	%
whole milk powder	32	32	35	38	40	35	38	38	50	55
almonds	2	3	4	1	1	2	2.5	3	5	4
walnut	2	2	3	1	0.5	1	1	2	2	2
cashew nut	2	3	4	1	1	2	1	2	2.5	2.5
pumpkin seed	5	2	2	2	1.5	2	1.25	2	2	2
watermelon seed	2	3	2	2	1.5	2	1.25	1	5	5
sunflower seed	1	2	2	2	1.5	2	1.5	2	2	2
satavari	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5
quinoa	1	1	1	2	1	1	1	1	1	1
oats	25	15	25	20	35	35	35	31.5	15	12.5
mishree	15	17	12	11	17	17	17	17	15	13.5
Total	100	100	100	100	100	100	100	100	100	100

4) Determination of moisture content

Procedure:

- Weight accurately about 5gm of prepared sample in the Moisture dish.
- Place the dish in the oven maintained at 105+ 2^0 C for 4 hrs.
- Cool in the desiccator & weigh.
- Repeat the process of drying cooling and weighing at 30min intervals until the difference between two conjugative weighing is less than 1mg.

Calculation:

Moisture, percent by mass = $\frac{(W2-W3)}{(W2-W1)} \times 100$

W1= weight of empty plate,
W2=weight of plate with sample,
W3= final weight,

5) Determination of ash content

Procedure

- Weight accurately about 5gm of prepared sample in the silica Crucible.
- Ignite the material in the silica crucible with the Flame of a suitable burner for 1 Hrs.
- Complete the ignition by keeping in a muffle furnace at 500+10^{0}C until gray ash reading
- Cool desiccator & weigh.
- Repeat the process of igniting cool and weighing at 1hr intervals until the difference between two successive weighing is less than 1mg note the lowest mass.

Calculation

Total Ash (on dry basis), percent by mass = $\frac{(W2-W3)}{(W2-W1)} \times 100$

W1= weight of empty crucible,
W2=weight of plate with sample,

W= final weight,

6) Determination of protein

Procedure:

Digestion - Accurately weigh 0.7 to 2.2 g of the sample into the digestion flask. Add 10g anhydrous sodium sulphate, and then add 0.7 g copper sulphate and 25 ml sulphuric acid. Place the flask in an inclined position on a heating mental. . Boil vigorously until the solution becomes clear and then continues boiling it for 1 to 2 hours.

Distillation - Cool, add about 200 ml distilled water. Mix to precipitate the mercury. Add a few zinc granules to prevent bumping, incline flask, and add without agitation 25 g of sodium hydroxide as solid or equivalent as solution, to make solution strongly alkaline. Immediately connect flask to distillation bulb or trap on condenser, and, with tip of the condenser immersed in a measured quantity standard acid (0.1 N HCL) in the receiver, rotate flask to mix the contents thoroughly then heat immediately until all ammonia has distilled over (at least 150 ml distillate). Back-titrate excess acid with standard 0.1 N sodium hydroxide, using methyl red as indicator.

Blank - Conduct determinations using all reagents and 2 g of sugar.

Calculation:

$$\text{Nitrogen: } \frac{(\text{Blank} - \text{Back}) \times 0.14 \times 100}{a \times 50}$$

Where, a= wt. of sample

Protein: nitrogen x 6.25

7) Determination of fat

Procedure:

- Weigh accurately about 10 to 30 g of the material sufficient to give about 1.0 g (If fit in a suitable thimble and dry for hours at 100 ± 2°C.
- Place the thimble in the soxhlet extraction apparatus and extract with the solvent for about 16 hours.
- Dry the extract contained in the Soxhlet flask, the empty mass of which has been previously determined by tearing at 95 to 100°C for an hour.
- Cool in a desiccator and weigh.
- Continue the alternate drying and weighing at 30 minutes intervals until the loss in mass between two successive weighing's is not more than 2 mg.
- Record the lowest mass. Preserve the fat for the determination of acidity.

Calculation:

W= Weight of sample

W1= Initial Weight

W2= Final Weight

$$\text{Fat} = \frac{(W2 - W1) \times 100}{W}$$

5. Result

(Result of F9 Batch)

1) Determination of moisture content

Calculation**:**

$$\text{Moisture, percent by mass} = \frac{(W2 - W3) \times 100}{(W2 - W1)}$$

W1= weight of empty plate, = 42.9923gm

W2=weight of plate with sample, =47.3927gm

W3= final weight, 47.2856gm

$$\text{Moisture, percent by mass} = \frac{(47.3927 - 47.2856) \times 100}{(47.3927 - 42.9923)}$$

$$= \frac{0.1071 \times 100}{4.4004}$$

$$= 2.43\%$$

2) Determination of Ash content

Calculation

$$\text{Total Ash (on dry basis), percent by mass} = \frac{(W2 - W3) \times 100}{(W2 - W1)}$$

W1= weight of empty crucible, = 34.2331gm

W2=weight of plate with sample, =37.0943gm

W= final weight, 34.3309gm

Total Ash (on dry basis), percent by mass

$$= \frac{(34.3309 - 34.2331) \times 100}{(37.0943 - 34.2331)}$$

$$= \frac{0.0978 \times 100}{2.8612}$$

$$= 3.418\ \%$$

3) Determination of Protein

Calculation:

Weight of sample= 0.9061gm

Back reading= 24.4ml

Blank= 38ml

$$\text{Nitrogen: } \frac{(\text{Blank} - \text{Back}) \times 0.14 \times 100}{a \times 50}$$

$$= \frac{(38 - 24.4) \times 0.14 \times 0.97087 \times 100}{0.9061 \times 50}$$

$$= \frac{13.6 \times 0.14 \times 0.97087 \times 100}{45.305}$$

$$= 4.0802$$

Where, a= wt. of sample

Protein: nitrogen x 6.25

Protein= 4.0802x6.25

=25.5012%

4) Determination of Fat

Calculation:

W= Weight of sample = 10.2340 gm

W1= Initial Weight = 51.3121 gm

W2= Final Weight = 52.0011 gm

$$\text{Fat} = \frac{(W2 - W1) \times 100}{W}$$

= (52.0011-51.3121) x 100
10.2340

= 0.689x100
10.2340
= 6.73246%

5) Determination of Carbohydrates

Carbohydrates = 100-(2.43+3.41+25.50+6.73)
= 100-38.07
= 61.73

6) Determination of Energy

Energy= (61.73+25.50)4+9x6.73
= 349.72+60.57
= 410.29 Kcal.

Table 4: Result

PARMETER	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
Moisture content	2.41	2.41	2.41	2.42	2.42	2.42	2.43	2.42	2.43	2.44
Mineral content	3.38	3.38	3.39	3.4	3.39	3.42	3.4	3.4	3.41	3.42
Fat content	5.56	5.75	5.68	5.93	6.04	6.29	6.54	6.63	6.73	6.82
Protein content	20.47	20.92	21.66	22.71	22.98	23.65	24.29	24.9	25.5	25.98
Carbohydrate content	68.18	67.54	66.86	65.54	65.17	64.22	63.34	62.65	61.93	61.34
Energy value	404.64	450.59	405.2	406.37	406.96	408.09	409.38	409.87	410.29	410.66

6. Discussion

As per our study report the F9 formula contains a specific quantity of the materials which having good test and contain sufficient amount of macromolecules.

We perform our study in future to estimate vitamins, minerals to ensure the best result of the formula of Shat-Pro.

Table 5: Comparison with marketed preparations

Sr. no.	name	Protein per scoop (in 25 gm)	Price per 500 gm
1	Shat-pro (Our product)	7gm	375rs
2	Ensure	6.5gm	915rs
3	Horlicks Mother's plus	5gm	613rs
4	Geofit Mom	6.5gm	750rs
5	Vivamom	8.25gm	815rs

7. Conclusion

As per result found we can conclude that Shat-Pro is the best choice as a protein supplement for pregnant women as compared to marketed product Shat-Pro is having advantage over them such as it is free from preservative, completely nutrient base and cost effective. It does not fill the daily requirement but also need of mineral, vitamin and all essential elements. Shatavari is present in the formulation boost the uterine muscle strength as well as improve the lactation process.

References

[1] Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhale (2007), 37th Edition, Nirali Prakashan, New Delhi, Page No. 167-174.
[2] Pharmacognosy & Phytochemistry (Vol I) by Rangari V.D. (2009) Career Pub., Nashik, Page No. 154- 157.
[3] Pharmacognosy & Phytochemistry (Vol II) by Rangari V.D. (2009) Career Pub., Nashik, Page No. 204-215.
[4] Herbal drug industry by R.D. Chaudhary (1996), 1st Edition, Eastern Publisher, New Delhi, Page No. 97-102.
[5] Essentials of Pharmacognosy, Dr. S H. Ansari, 2nd edition, Birla publications, New Delhi, 2007, Page No.208-217
[6] https://www.cult.fit/live/recipe/homemade-protein-powder/RECIPE540
[7] https://drbest .in/health-benefits-of-protein-powder-supplementation

Author Profile

Monali Baban Parbhane had accomplished B. Pharm from Sitabai Tithe College of Pharmacy, Shirur, (SPPU), M. Pharm from IBSS College of Pharmacy, Malkapur. (SGBAU, Amaravati). At present she is working as assistant professor at Sitabai Thite College of Pharmacy and Having more than 10 years' experience in teaching and 2 years in industry. She has extensive work in the field of Pharmaceutical Sciences and has added more than 5 national and 3 international research and review article publications in high alleged international and national journals.

Suyog Jagannath Jasud is student of B. Pharm from Sitabai Tithe College of Pharmacy, Shirur, (SPPU).

Arpita Sahebrao Kharat is student of B. Pharm from Sitabai Tithe College of Pharmacy, Shirur, (SPPU).

Dwarkadas G. Baheti had accomplished B. Pharm from Swami Ramanad Teerth Marathwada University, Nanded. M. Pharm and Ph. D from Bharti Vidyapeeth Deemed University, Pune. At present he is working as principal at Sitabai Thite College of Pharmacy and Having more than 35 years experience in teaching. He has extensive work in the field of Pharmaceutical Sciences and has added number of national and international research and review article publications in high alleged international and national journals along with books.