

	<p>Department of Food Science and Technology</p> <p>Post Graduate Institute</p> <p>Mahatma Phule Krishi Vidyapeeth</p> <p>Rahuri-413 722, Dist. Ahmednagar (MS)</p>	
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Preamble

Agricultural production in the country is growing at the rate of 3.5% per annum resulting in marketable surplus in food grains and other agricultural commodities such as horticultural produce, fisheries and animal products etc. The post harvest losses in the country today are very high (about approximately 30% of total production) in comparison with the post harvest losses (about 5% or less) in most developed countries and some of the developing countries. This is causing tremendous economic loss and making the agricultural activity a commercially unviable proposition to the farmers. The value of post harvest losses has been estimated to be approximately more than Rs. 50,000 crores at national and nearly Rs. 5,000 crores per year at state level. So, there is an urgent need for post harvest processing of these commodities. Presently, only 2-3% of all agricultural production is processed in the country or state with a low value addition of 35% or so. This is appreciably low in comparison with the reported 50-70% processing and 400-500% value addition in most developed and some of the developing countries around the world. The agro-processing adds value to the produce and helps farmers to get remunerative prices. This can make agriculture a sustainable and a commercially viable activity in the State.

Keeping in view the globalization, privatization and liberalization policies in international trade for agriculture based produce and products, the food processing industry will grow and expand rapidly. To operate this sector most efficiently, increased skilled manpower will be required. The Western Maharashtra comprising of 10 districts has a lead in the production of food grains, pulses, oilseeds and most fruits and vegetables over other parts of the State. This region has several geographical and trade advantages for establishment of food processing industries. Looking in to these aspects the Government of Maharashtra approved the proposal vide letter No. MPKV / 1281 / 66629 / 20-A, dated. May 30, 1981 for establishment of Department of Food Science and Technology under MPKV, Rahuri. Accordingly, Department of Food Science and Technology was established and started functioning in this University with Prof. A. K. Thorat, as the first Head. The Department was subsequently led by Dr. S. S. Kadam, Dr. J. K. Chavan, Dr. V. D. Pawar, Dr. S. S. Thorat and presently Dr. U.D. Chavan is working as the Head of the Department. Presently total 9 M.Sc. and 2 Ph.D. students are admitted every year. In addition over and above this some Indian and foreign students are also admitted. Since inception, the Department is carrying out activities of teaching, research and extension education related to postharvest technology mainly of cereals, legumes, oilseeds, fruits and vegetables, milk and milk products, medicinal plants etc. and in addition conducting one month training courses each in Processing of Fruit

and Vegetable and Bakery Technology for unemployed youths, women and Self Help Groups.

The discipline of Food Science and Technology has a potential for job opportunities in public and private sector as well as setting up small-scale food processing units to generate employment and self-employment.

Faculty

S. N.	Name	Designation	Phone No.	Email
1.	Dr. U. D. Chavan	Professor & Head	09657214838	uttamchavan08@gmail.com
2.	Dr. P. M. Kotecha	Assistant Professor	09209218395	pmkfst2003@yahoo.com

Academic Programme

Annual intake capacity of M.Sc. and Ph.D. students

M.Sc. : 9

Ph.D. : 2

M.Sc. (Agri.) Course Layout Minimum Credit Requirements

Sr. No.	Subject	Minimum credit(s)
1.	Major	20
2.	Minor	09
3.	Supporting	06
4.	Seminar	01
5.	Research	20
	Total Credits	56
	Compulsory Non Credit Courses	06

Sr. No.	Course No.	Course Title	Credits
Major Courses (Min. 20 credits)			
1.	FST 501	Food Chemistry and Nutrition	2+1=3
2.	FST 502	Food Microbiology	2+1=3
3.	FST 503	Food Engineering	2+1=3
4.	FST 504	Principles of Food Processing	2+1=3

5.	FST 505	Food Packaging Technology	1+1=2
6.	FST 506	Food Quality Systems and Management	2+1=3
7.	FST 507	Techniques in Food Analysis	1+2=3
		Total	12+8=20
Minor Courses (Min. 09 credits)			
Group I			
1.	FST 512	Technology of Fruits and Vegetable Processing	2+1=3
2.	FST 513	Technology of Cereals , Pulses and Oilseeds	2+1=3
Group II			
1.	FST 523	Nutraceuticals and Health Foods	2+1=3
		Total	6+3=9
Supporting Courses (Min. 06 credits)			
1.	STAT 511	Statistical Methods for Applied Science	2+1=3
2.	FST 533	Business Management and International Trade	3+0=3
		Total	5+1=6
Seminar (01 credit)			
1.	FST 591	Master's Seminar	1+0=1
		Total	1+0=1
Research (20 credits)			
1.	FST 599	Master's Research	0+20=20
		Total	20
Compulsory Non-credit Courses			
1.	PGS 501	Library and Information Services	0+1=1
2.	PGS 502	Technical Writing and Communication Skills	0+1=1
3.	PGS 503	Intellectual Property and its Management in Agriculture	1+0=1
4.	PGS 504	Basic Concepts in Laboratory Techniques	0+1=1
5.	PGS 505	Agricultural Research, Research Ethics and Rural Development Programmes	1+0=1
6.	PGS 506	Disaster Management	1+0=1
		Total	3+3=6

Total Credits: 56 (36 course work + 20 thesis)

**Ph. D. Course Layout
Minimum Credit Requirements**

Sr. No.	Subject	Minimum credit(s)
1.	Major	18
2.	Minor	09
3.	Supporting	06
4.	Seminar	02
5.	Research	45
	Total Credits	80
	Compulsory Non Credit Courses	06

Sr. No.	Course No.	Course Title	Credits
Major Courses (Min. 18 credits)			
1.	FST 601	Advances in Food Chemistry and Nutrition	2+1=3
2.	FST 602	Modern Food Microbiology	2+1=3
3.	FST 603	Advances in Food Engineering	2+1=3
4.	FST 604	Food Processing	2+0=2
5.	FST 605	Food Packaging	1+1=2
6.	FST 606	Food Analysis	0+2=2
7.	FST 625	Confectionery Technology	2+1=3
		Total	11+7=18
Minor Courses (Min. 09 credits)			
1.	FST 611	Advances in Food Biotechnology	2+1=3
2.	FST 618	Juice Processing Technology	2+1=3
3.	FST 624	Protein Chemistry and Technology	2+1=3
		Total	6+3=9
Supporting Courses (Min. 06 credits)			
1.	STAT 601	Advanced Statistical Methods	2+1=3
2.	FST 533	Business Management and International Trade	3+0=3
		Total	5+1=6
Seminar (02 credits)			
1.	FST 691	Doctoral Seminar-I	1+0=1
2.	FST 692	Doctoral Seminar-II	1+0=1
		Total	2+0=2
Research (45 credits)			
1.	FST 699	Doctoral Research	0+45=45
		Total	0+45=45
Compulsory Non-credit Courses			
1.	PGS 501	Library and Information Services	0+1=1
2.	PGS 502	Technical Writing and Communication Skills	0+1=1
3.	PGS 503	Intellectual Property and its Management in Agriculture	1+0=1
4.	PGS 504	Basic Concepts in Laboratory Techniques	0+1=1
5.	PGS 505	Agricultural Research, Research Ethics and Rural Development Programmes	1+0=1
6.	PGS 506	Disaster Management	1+0=1
		Total	3+3=6

Total Credits: 80 (35 course work + 45 thesis)

Number of Theses submitted

M.Sc. - 200

Ph.D. - 09

Laboratories and Instruments

Department of Food Science and Technology have 2 laboratories for students' research purpose.



Spray drier



Laminar flow



Vacuum packing machine



Freeze drier



Incubator



Grinding mill

Research Programme (Ongoing)

1. Studies on physic- chemical properties of kodo millet and its exploration in cookies
2. Preparation of pearl millet papad
3. Preparation of peanut chikki with incorporation of pomegranate peel powder
4. Preparation of value added products from cress seed
5. Preparation of cookies from little millets
6. Preparation of medicinal cookies
7. Preparation of ginger candy
8. Preparation of biscuits by incorporation of orange peel

Research Recommendations

1. For high recovery of decorticated *ragi* (Finger millet), steaming of cleaned *ragi* in pressure cooker for 6 minutes, followed by

- (i) Drying in drier at 60°C for 5 hrs
- (ii) Conditioning with 2% water
- (iii) Tempering for 1 hr
- (iv) Shed drying for 2 hrs
- (v) Polishing in polisher is recommended.

2. The substitution of maida with 30 % decorticated *ragi* (Finger millet) flour resulted in cookies with better nutritional and sensory quality.

3. Following process is recommended for preparing quality wine from dried mahua flowers:

- Extraction of sugar: (15 °Brix TSS) obtained by grinding dried flowers in mixer and addition of 6 times water and heating at 80°C for 30 min.
- Capitalization: optimization of TSS at 24°Brix with addition of sucrose
- Fermentation: With addition of 4% yeast (*Saccharomyces cerevisiae* var. *ellipsoidus*) and 0.07% ammonium sulphate, at 20°C for minimum 10 days.
- Clarification: Addition of bentonite @ 400mg/lit at weekly interval up to 4 weeks.
- Cold stabilization: 4°C for 10 days.

4. Quality aonla candy is prepared in short period (4 days) by adopting following process:

- Syruping the segments of the aonla in 70 °Brix at vacuum for 15 minutes followed by adjusting 70 °Brix after 24 hrs and re-vacuuming for 10 min.
- The segments are separated from syrup after 48 hrs
- Shed drying for 2 days.

5. The improved technology is recommended for the preparation of dried ginger and its powder from fresh ginger.

Improved technology

- Soaking of ginger in water for 8 hrs.
- Peeling of soaked ginger
- Soaking of peeled ginger in $\text{Ca}(\text{OH})_2$ solution for 6 hrs.
- Fumigation with 2 g/Kg sulphur for 12 hrs.
- Soaking again in $\text{Ca}(\text{OH})_2$ solution for 6 hrs.
- Again fumigation with 2g/Kg sulphur for 12 hrs.
- Drying at 55°C for 20 to 22 hrs (dried ginger)
- Grinding (ginger powder).
- The yield of dried ginger is 18 to 21% or 15 to 17% powder from fresh ginger.

6. The improved technology is recommended for the preparation of fig leather

Improved technology

- Washing the figs.
- Blanching treatment at 70°C , 8 min.
- Preparation of fig pulp.
- Adjustment of TSS at 25 °Brix and acidity at 0.5%.
- Homogenization of pulp.
- Sheeting of pulp in aluminum trays which are already smeared with vanaspati ghee up to 1 cm thickness.
- Drying of pulp at 60°C for 8 hrs.
- Keeping the sheets one above the other in to three layers.
- Roller pressing.
- Again drying at 60°C for 12 hrs.
- Cutting in to attractive pieces of fig leather.
- Packing and storage in polythene bags.
- It can store 60 days at ambient temperature and 90 days at refrigerated temperature.

7. The improved technology is recommended for the preparation of popped wheat from durum wheat cultivar Godavari

Improved technology

- Soaking wheat for 3 days, boiling in water containing NaHCO_3 + salt 1.5% each for 60 min and drying to 12-12% moisture.
- Popping of pretreated wheat at 220-240°C.
- The snack(*Chiwada*) prepared by using pops, packed in polythene bags can be stored at ambient condition for one month.

8. Dehydrated onion flakes

It is recommended that good quality dehydrated onion flakes with higher yield and rehydration ratio (1:6) can be prepared from cv. Phule Safed by adopting following process:

1. Cutting the onion slices (2.5 to 3.5mm)
2. Pre treating the slices with 0.2% KMS and drying at 55°C for 8 to 9 h.
3. Packaging of flakes in laminated pouches for storage up to 90 days at ambient temperature.

9. Use of maltodextrin as a coating material for microencapsulation of beta carotene

Use of maltodextrin as a coating material for microencapsulation of beta carotene is recommended for better encapsulation efficiency (75%) with higher β -carotene retention (75% and 81% at ambient and refrigerated conditions, respectively) up to 60 days of storage with low cost as compared to potato starch and gelatin.

10. Preparation of iron enriched cookies

Iron (4 mg/100g) and β -carotene (2.5mg/100g) enriched cookies can be prepared by using 60% maida, 40% pearl millet flour of cv. *Dhanshakti* and addition of 4% microencapsulated beta carotene and can be stored well up to 6 months in laminated pouches.

11. Preparation of Phule Amaranthus cookies

Phule Amaranthus cookies technology is recommended for making gluten free cookies from 100 % amaranthus flour which are enriched in iron, calcium and fibre having good shelf life (90 days).

12. Preparation of Phule Horse gram malt

Phule horse gram malt technology is recommended for good quality dried sprouted beans.

1. Steeping/ soaking horse gram in water containing 0.1% KMS for 12h. Wash the horse gram after every 4 hours.
2. Sprouting for 24hr at 30°C in incubator,
3. At last drying in cabinet drier at 60°C ± 2°C for 1.5 h.
4. The malt could be stored up to 90 days at ambient conditions without affecting quality cleaning and can be used for preparation of *usal*.

13. Preparation of iron rich sponge cake

The replacement of 30 per cent wheat flour with the flour of high iron content Dhanshakti pearl millet for making iron rich sponge cake is recommended.

14. Preparation of essential omega 3 and omega 6 fatty acid rich cookies

The addition of 10% garden cress seed oil and 90 % *vanaspati* fat and storage in aluminum foil for 90 days is recommended for preparation of essential omega 3 and omega 6 fatty acid rich cookies.

15. The process for preparation of 100 per cent foxtail millet flour cookies rich in calcium which can be stored up to 90 days at ambient conditions without affecting their quality is recommended.

16. The following process is recommended for preparation of good quality jelly from dragon fruit:

- i. Extraction of juice by addition of water (fruit pulp: water, 1:1), boiling for 20-30 min and filtration through muslin cloth.
- ii. Addition of 550g sugar, 11g pectin, 2g citric acid and 300 ppm potassium metabisulphite (KMS) /kg pulp extract and boiling upto 67.0°B.
- iii. Filling hot jelly in clean PET bottles, cooling and sealing. The jelly could be stored up to 90 days at ambient temperature without affecting quality.

Publications

Dr. U. D. Chavan

a. Research papers

1. Chavan, U. D., Patil, J. V. and Shinde, M. S. (2012). Nutritional quality of high yielding rabi sorghum genotypes. *J. Agric. Res. Technol.*, 37 (1): 46-50.
2. Mandhare, V. K., Deshmukh, G. P., Patil, J. V., Kale, A. A. and Chavan, U. D. (2011). Morphological, Pathogenic and Molecular characterization of *Fusarium oxysporum* F. Sp. ciceri isolates from Maharashtra, India. *Indonesian Journal of Agricultural Science*. 12 (2): 47-56.
3. Ratnavathi, C. V., Kalyana Chakravarthy, S., Komala, V. V., Chavan, U. D. and Patil, J. V. (2011). Sweet sorghum as feedstock for biofuel production: A Review. *Sugar Tech*. 13 (4): 399-407.
4. Dalvi, U. S., Chavan, U. D. Shinde, M. S. and Gadakh, S. R. (2011). Assessment of sweet sorghum cultivars for efficient ethanol production. *Sugar Tech*. 13 (3): 186-190.
5. Kulthe, A. A., Pawar, V. D., Kotecha, P. M. and Chavan, U. D. (2011). Development of high protein and low calorie cookies. *J. Food Sci. Technol.* 48 (3): 460-465.
6. Dalvi, U. S., Chavan, U. D., Dethé, A. M. and Naik, R. M. (2011). Biochemical analysis of Fusarium wilt resistant and susceptible cultivars of chickpea. *J. Food Legumes*. 24 (1): 75-76.
7. Mahamuni, S. R., Dalvi, U. S., Chavan, U. D., Chavan, J. K. and Naik, R. M. (2011). Variations in proline metabolism and DNA polymorphism in sorghum cultivars differing in osmotic stress tolerance. *Indian J. Plant Physiol.* 16 (2): 195-199.
8. Chavan, U. D. and Dhumal, S. S. (2013). Preparation of toffees from various Indigenous Fruits. *Beverage and Food World*. 40 (11): 28-32.
9. Chavana, U. D., Amarowicz, R. and Shahidi, F. (2013). Hardness phenomenon in beach pea (*Lathyrus maritimus* L.). *Indonesia J. Agric. Sci.* (1): 36-43.
10. Gadakh, S. R., Shinde, M. S., Gaikwad, A. R., Nirmal, S. V. and Chavan, U. D. (2013). Phule Suchitra: A new rabi sorghum variety for medium soils. *Crop Res.* 45 (1, 2 & 3): 136-140.
11. Chavan, U. D., Dalvi, U. S., Pawar, G. H. and Shinde, M. S. (2013). Selection of genotype and development of technology for sorghum *hurda* production. *International Food Research Journal*. 20 (3): 1713-1716.
12. Chavan, U. D. and Amarowicz, R. (2013). Effect of various solvent systems on extraction of phenolics, tannins and sugars from beach pea (*Lathyrus maritimus* L.). *International Food Research Journal*. 20 (3): 1139-1144.
13. Patil, J. V., Mishra, J. S., Chapke, R. R., Gadakh, S. R. and Chavan, U. D. (2013). Soil moisture conservation agro-techniques for rainfed rabi sorghum. *Indian Farming*. 62 (2): 04-07.
14. Lonkar, P. B., Chavan, U. D., Pawar, V. D., Bansode, V. V. and Amarowicz, R. (2013). Studies on preparation and preservation of lemongrass [*Cymbopogon flexuosus* (Steud) Wats] powder for tea. *Emir. J. Food Agric.* 25(8), doi: 10.9755/ejfa.v25i8.15218.
15. Chavan, U. D., Patil, J. V. and Shinde, M. S. (2013). Nutritional quality of high yielding rabi sorghum genotypes. *J. Agric. Res. Technol.* 38 (1): 87-91.
16. Dalvi, U. S., Chavan, U. D., Shinde, M. S., Gaikwad and Gadakh, S. R. (2013). Seasonal impact on biomass, juice quality and sugar attributes of sweet sorghum. *J. Acad. Indus. Res.* 1 (8): 431-434.
17. Chavan, U. D., Katkale, S. V. and Chavan, K. D. (2014). Effect of subsequent cutting on nutritional quality of fodder grasses. *J. Agric. Res. Technol.* 39(3): 381-385.
18. Nalage, A. B., Chavan, U. D. and Amarowicz, R. (2014). Studies on preparation of mixed toffee from aonla and ginger. *Ital. J. Food Sci.* 26: 127-133.

19. Chavan, U. D., Chandanshive, S. J. and Dalvi, U. S. (2014). Effect of packaging and storage temperature on chemical composition of some gourd vegetables. *J. Agric. Res. Technol.* 39(2): 304-306.
20. Ahire, A. A. and Chavan, U. D. (2014). Preparation of intermediate moisture food products from guava. *Beverage and Food World.* 41(4): 43-44.
21. Chavan, U. D. and Ahire, A. A. (2014). Guava processing into powder, RTS, Milk Shake and Perukhand. *Beverage and Food World.* 41(4): 34-35.
22. Chavan, U. D. and Dhumal, S. S. (2013). Preparation of toffees from various Indigenous Fruits. *Beverage and Food World.* 40 (11): 28-32.
23. Chavana, U. D., Amarowicz, R. and Shahidi, F. (2013). Hardness phenomenon in beach pea (*Lathyrus maritimus* L.). *Indonesia J. Agric. Sci.* 14 (1): 36-43.
24. Gadakh, S. R., Shinde, M. S., Gaikwad, A. R., Nirmal, S. V. and Chavan, U. D. (2013). Phule Suchitra: A new *rabisorghum* variety for medium soils. *Crop Res.* 45 (1, 2 & 3): 136-140.
25. Chavan, U. D., Dalvi, U. S., Pawar, G. H. and Shinde, M. S. (2013). Selection of genotype and development of technology for sorghum *hurda* production. *International Food Research Journal.* 20 (3): 1713-1716.
26. Bajaj, H.J., Gaikwad, R.S. and Thorat, S.S. (2014) Nutritional and popping quality of wheat Cultivars *Beverage and Food world* (41) 5. 37-39.
27. Chavan, U. D. and Shaik, J. B. (2015). Standardization and preparation of guava leather. *Int. J. Adv. Res. Biol. Sci.* 2(11): 102-113.
28. Dhumal, S.S., A.R. Karale, T.A. More, C.A. Nimbalkar, U.D. Chavan and S.B. Jadhav. (2015). Preparation of Pomegranate Juice Concentrate by Various Heating Methods and Appraisal of Its Physicochemical Characteristics. *Acta Hort.* 1089, ISHS 2015. 473-484.
29. Chavan, U. D., Patil, S. S., Dayakar Rao, B. and Patil, J. V. (2015). Processing of sorghum from different varieties and hybrids for semolina and their products. *Indones. J. Agric. Sci.* Vol. 16 No. 1: 11-20.
30. Sirimu Celestin, Thorat, S. S., Desale, R. J. and U.D Chavan. (2015). Effect of Milk Supplementation with Fructooligosaccharides and Inulin on Viable Counts of Probiotic Bacteria in Goat and Cow Milk Yoghurts. *IOSR Journal of Environmental Science, Toxicology and Food Technology.* 9(7) I: 06-12.
31. Dhumal, S. S., Karale, A. R., Chavan, U. D., Nimbalkar, C. A. and Jadhav, S. B. (2015). Preparation of pomegranate juice concentrate by various heating methods and appraisal of its physicochemical characteristics. *Beverage and Food World.* 42 (5): 25-30.
32. Chavan U. D., Pansare, S. S., Patil, J. V. and Shinde, M. S. (2015). Preparation and Nutritional Quality of Sorghum *Papads*. *Int. J. Curr. Microbiol. App. Sci.* 4(5): 806-823.
33. Chavan, U. D., Dalvi, U. S., Pawar, G. H. and Shinde, M. S. (2015). Selection of genotype and development of technology for sorghum *pops* production. *Acta Biomedica Scientia.* 2 (2): 100-105.
34. Chavan, U. D., Pawar, U. B. and Pawar, G. H. (2015). Studies on preparation of mixed toffee from guava and strawberry. *J. Food Sci. Technol.* DOI 10.1007/s13197-015-1786-3 (online).
35. Chavan, U. D., Patil, S. S., Dayakar Rao, B. and Patil, J. V. (2015). Processing of sorghum for flakes and their products. *European Journal of Molecular Biology and Biochemistry.* 2 (1): 49-58.
36. Karma Bako Rimamcwe and Chavan, U. D. (2016). Numerical simulation and testing of a passive thermal solar collector on okra (*Hibiscus esculentus*). *International Journal of Current Research.* 8 (9): 39253-39259.

37. Karma Bako Rimamcwe and Chavan, U. D. (2016). Physical properties and nutritional potentials of Indian Roselle (*Hibiscus sabdariffa* L.) seeds. International Journal of Current Research. 8 (9): 38644-38648.
38. Chavan, U. D., Nirmal, S. V., Shinde, M. S., Pawar, G. H. and Gadakh, S. R. (2016). Nutritional quality of advanced sorghum genotypes. International Journal of Recent Scientific Research. 7 (8): 13148-13151.
39. Chavan, U. D., Nirmal, S. V., Gadakh, S. R., Pawar, G. H. and Shinde, M. S. (2016). Effect of location on nutritional quality of sorghum grain and *roti*. International Journal of Current Research, 8 (8): 36865-36869.
40. Shinde M.S, Awari V.R., Patil V.R., Gadakh S.R, Dalvi U.S., Chavan U.D. and Nirmal S.V. (2016). Phule Madhur (RSSGV-46): A sweet grain *rabi* sorghum variety for tender grain processing. International Journal of Science, Environment and Technology, 5 (3): 1362 ? 1369.
41. Ashok Kumar A., Ch Ravinder Reddy, Belum Reddy, S. R. Gadakh, U. D. Chavan and H. V. Kalpande. (2016). Innovative seed consortium strengthening the post-rainy sorghum seed system in India. Bulletin of the Institute of Medicine (Hyderabad). 4(1):1-12.
42. Chavan, U. D., Yewale, K. V. and Dayakar Rao, B. (2016). Preparation of bread and cookies from sorghum flour. International Journal of Recent Scientific Research. 7 (5): 11145-11153.
43. Chavan, U. D., Jagtap, Y. K., Dalvi, U. S. and Patil, J. V. (2016). Preparation and Nutritional Quality of Sorghum *Shankarpali*. Int. J. Pure App. Biosci. 4 (1): 100-108.
44. Chavan U. D., Jagtap Y. K., Shinde M. S and Patil J. V. (2016). Preparation and nutritional quality of sorghum *chakali*. International Journal of Recent Scientific Research. 7 (1): 8404-8411.
45. Chavan, U. D., Shegade, S. L., Karma, B. R. and Dalvi, U. S. (2016). Studies on Preparation of Toffee from Guava. Int. J. Adv. Res. Biol. Sci. 3(1): 99-111.
46. Shinde, M. S., Awari, V. R., Patil, V. R., Chavan, U. D., Dalvi, U. S. and Gadakh, S. R. (2015). CSV 30F: New high yielding single cut forage sorghum variety for kharif season. Forage Res., 41 (3): 194-198
47. Chavan, U. D., Kajjdoni, S. T., Shinde, M. S., Dalvi, U. S., Nirmal, S. V., Patil, V. R., Awari, V. R., Pawar, G. H. and Jadhav, A. S. (2017). Regional Effect on Nutritional Quality of Sorghum Hybrid Genotypes. Int. J. Curr. Microbiol. App. Sci. (2017) 6(11): 75-85.
48. Chavan, U. D., Kajjdoni, S. T., Shinde, M. S., Dalvi, U. S., Nirmal, S. V., Awari, V. R., Patil, V. R., Pawar, G. H. and Jadhav, A. S. (2017). Regional Effect on Nutritional Quality of Sorghum Genotypes. Int. J. Curr. Microbiol. App. Sci. 6(10): 380-389.
49. Karma Bako Rimamcwe, Chavan, U. D., Pawar, G. H. and Gaikwad, R. S. (2017). Nitrogen Solubility and Functional Properties of Roselle Seed Flour. Int. J. Curr. Microbiol. App. Sci. 6(8): 1131-1139.
50. Chavan, U. D., Nirmal, S. V., Gadakh, S. R., Shinde, M. S., Patil, V. R., Awari, V. R. and Dalvi, U. S. (2017). Physiological Evaluation of Genotypes for Drought Tolerance on Receding Soil Moisture. Int. J. Curr. Microbiol. App. Sci. 6(6): 2174-2183.
51. Karma Bako Rimamcwe, Chavan, U. D., Nimbalkar, C. A. and Kahar, S. P. (2017). Rheometry of Roselle (*Hibiscus Sabdariffa* L.) seed oil. Int. J. Pure App. Biosci. 5 (2): 987-993.
52. Karma Bako Rimamcwe and U.D. Chavan (2017). Antioxidant Activity and Nutritional Value of Roselle Seeds Flour. Int. J. Curr. Microbiol. App. Sci. 6(4): 2654-2663.
53. Nirmal, S.V., Shinde, M. S., Awari, V. R., Patil, V. R., Gadakh, S. R., Dalvi, U. S. and Chavan, U. D. (2017). RSSV 313: A Sweet Sorghum Donor for High Biomass. Int. J. Curr. Microbiol. App. Sci. 6(3): 907-912.

54. Chavan, U. D., S.V. Nirmal, M.S. Shinde, G.H. Pawar, S.R. Gadakh and U.S. Dalvi (2017). Nutritional quality of hybrid sorghum genotypes. Int. J. Curr. Microbiol. App. Sci. 6(2): 586-592.

b. Extension Publications (Including bulletin / News paper articles): 57

c. Books: 33

Dr. P. M. Kotecha

a. Research Papers

S. N.	Name of the Authors	Title of the Paper	Name of Journal	Year of publication	Vol. & Page No.
1	Lande, S. B., Nirmal, V. S. and Kotecha, P. M.	Studies on preparation of ready-to-serve beverage from wood apple pulp	Beverage Food World	2010	37 (4) 69
2	Kotlawar, N. G. Kotecha, P. M. and Pawar, V.D.	Studies on preparation of fig leather	Beverage Food World	2011	38 (6) 68
3	Kulthe, A. A., Pawar, V. D., Kotecha, P. M. , Chavan U. D. and Bansoden V. V	Development of high protein and low calorie cookies	J. Food Sci. Technol	2011	48 (3) 460
4	Deore, P. M. Kotecha, P. M. and Pawar V.D.	Studies on processing of bottle gourd into juice and powder	Beverage Food World	2012	39 (4) 46
5	Randive, K. B. Kotecha, P. M. Shivagaje A. J. and Thorat S. S.	Preparation of wine from mixed orange and passion fruit juice	Beverage Food World	2012	39 (4) 58
6	Gawas, V. V. Kotecha, P. M. and Thorat S. S.	Utilization of nutmeg fruit rinds for making candy and its storage	Beverage Food World	2012	39 (9) 31
7	Pawar, V. D., Akkena, M. K., Kotecha, P. M. , Thorat, S. S. and Bansode, V. V.	Effect of presoak treatment on cooking characteristics and nutritional functionality of rice bean	J. Food Legumes	2012	25 (4) 321
8	Rashinkar, N. M., Kotecha, P. M. , and Thorat, S. S.	Studies on preparation of ready-to-serve beverage and powder from ash gourd	Beverage Food World	2013	40 (4) 26

9	Babar, K. P., Thorat, S. S., Kotecha, P. M. , Gaikwad, R. S. and Lande, S. B.	Effects of addition of whey on phytic acid degradation of bread	International Journal of Engineering and Innovative Technology	2014	3 (8) 80
10	Chopade, S. Y., Kotecha, P. M. and Thorat, S. S.	Studies on preparation of powder from pomegranate juice by use of spray dryer	Beverage Food World	2014	41 (4) 36
11	Babar, K. P., Thorat, S., Kotecha, P. M. and Gaikwad, R. S.	Effect of whey and hydrocolloids on quality of bread	Bioinfolet	2014	11 (1B) 253
12	Satkar, K. P. Kotecha, P. M. and Thorat, S. S.	Process standardization for preparation of health drink from bitter gourd	Beverage Food World	2015	42 (2) 50
13	Khade, A.A. Kotecha, P. M. and Thorat, S.S.	Studies on preparation of ready-to-serve beverage from beetroot juice	Beverage Food World	2015	42 (5) 31
14	Pathare, J. B., Kotecha, P. M. and Thorat, S. S.	Studies on osmo-air drying of bitter gourd chips	Beverage Food World	2015	42 (7) 33
15	Nalawade, R. S., Kotecha, P. M. and Thorat, S. S.	Preparation of bread by incorporation of soybean and ragi flour	Beverage Food World	2015	42 (11) 43
16	Rathod, R. N., Kotecha, P. M. and Thorat, S. S.	Standardization of process for preparation of multigrain cookies	Trends in Biosciences	2015	8 (20) 562
17	Deshmukh, S. V., Kotecha, P. M. and Thorat, S. S.	Studies on processing of custard apple for preparation of ice cream	Beverage Food World	2016	43 (8) 24
18	Gaikwad, R.S., Thorat, S. S. and Kotecha, P. M.	Preparation of wine from jamun fruits	Bioinfolet	2016	13 (2B) 332
19	Pokharkar, S. F., Kotecha, P. M. and Thorat, S. S.	Studies on acceleration of process of candy making from anola fruit	Beverage Food World	2016	43 (11) 33
20	Zanwar, S.R., Thorat, S.S. and Kotecha, P. M.	Physicochemical characteristics of linseed gum	Bioinfolet	2016	13 (3) 472
21	Lahamge, D. V., Kotecha, P. M. and Thorat, S. S.	Nutritional and sensory evaluation of anar rub prepared from pomegranate juice	Bioinfolet	2017	14 (1) 27

		during storage			
22	Karewar, A. A. Kotecha, P. M. and Thorat, S. S.	Standardization of process for preparation of tamarind sauce	Beverage Food World	2017	44 (5) 34
23	Totre, D. Z., Kotecha, P. M. and Thorat, S. S.	Preparation of leather from wood apple	Bioinfolet	2017	14 (2) 118
24	Dhemre, J. K., Shete, M. B., Kad, V. P. and Kotecha, P. M.	Performance of packaging on shelf life and quality of fenugreek at different storage conditions in Kharif season	Advances in Research	2017	10 (6) 1
25	Ingle, M., Thorat, S. S., Kotecha, P. M. and Nimbalkar, C. A.	Nutritional assessment of beetroot powder cookies	Asian J. Dairy & Food Res.	2017	36 (3) 222

b. Extension Publications (Including bulletin / News paper articles): 43

c. Books Published: 07

Dr. R. S. Gaikwad

a. Research papers

S. N.	Name of Authors	Title of Paper	Name of Journal	Year of Publication Vol. & Page No.
1	Gaikwad, R. S. and Pawar P. P.	Food processing industries in India, growth status & prospets	Beverage & Food world,	2011 61-63
2	Gaikwad, R. S., Thorat, S. S. and Kotecha, P. M.	Preparation of wine from jamun fruits	Bioinfolet	2016 13(2B): 332
3	Gaikwad, R. S., Thorat, S. S. and Dhemre, J. K.	Protocol for preparation of RTS beverage from custard apple juice	Bioinfolet	2016 13(2A):329

Dr. S. B. Lande

S. N.	Name of Authors	Title of Paper	Name of Journal	Year of Publication Vol. & Page No.
1	S. B. Lande, V. S. Nirmal and P. M. Kotecha	Studies on preparation of ready-to-serve beverage from wood apple pulp	Beverage and Food World	2010 37(4): 69-70
2	S. R. Mhalaskar, S. B. Lande , P. N. Satwadhar, H. W. Deshpande and K. P. Babar	Development of technology for fortification of fig (<i>Ficus carica</i> L.) fruit into its value added product-fig toffee	International Journal of Processing and Post Harvest Technology	2012 3 (2): 176-179
3	Mhalaskar, S. R., Thorat, S. S. and S. B. Lande	Corn meal- A novel substrate for the production of food biocolours through solid state fermentation	Green Farming	2017 8 (1): 1
4	Kulthe, A. A. Thorat, S. S. and S. B. Lande	Effect of different carotene sources on quality of beta carotene enriched pearl millet cookies	Advances in Life Sciences	2016 5 (13): 5477
5	Kulthe, A. A. Thorat, S. S. and S. B. Lande	Characterization of pae millets cultivars for proximate composition, minerals and anti-nutritional contents	Advances in Life Sciences	2016 5 (11): 4672
6	Lande, S. B. Thorat, S. S. and Kulthe, A. A.	Utilization of decorticated finger millet for the production of nutrient rich vermicelli	Int. J. Food , Nutrition and Dietetics	(2017) 93
7	Mhalaskar, S. R., Thorat, S. S. and S. B. Lande	An investigation on fermentative changes during the production of food biocolours through solid state fermantation of corn meal by monascus purpureus	Trends in Biosciences	2017 10 (3): 962
8	Kulthe, A. A. Thorat, S. S. and S. B. Lande	Preparation of beta carotene enriched pearl millet based cookies	Int. J. Curr. Microbiol. App.Sci.	2017 6 (2): 1197
9	Mhalaskar, S. R., Thorat, S. S. And S. B. Lande	Corn meal- A novel substrate for the production of food biocolours through solid state fermentation	Green Farming	2017 8 (1): 1

Extension activities

The training programmes organized: Till date 36 training programmes of Fruits and Vegetable Processing with 499 (male- 318, female -181) participants and 24 training programmes of Bakery Technology with 82 (male- 52, female- 30) participants.

Title: Training on Fruits and Vegetable processing and Bakery Technology

Co-ordinator: Head, Department of Food Science and Technology, MPKV, Rahuri.

Date and Duration: Each training programme is one month duration.

Participants: Farmers, Shelf- help group, Women's (10th pass or Fail participants are included). Minimum 20 participants are selected for the training programme.

Schedule of the training programme: Tentatively the training programme is scheduled in the month of May, Oct and Dec in academic calendar of year during School holiday's period or as per demand of applicants.

Special feature of training programme: During training the participants themselves prepared the products on pilot scale which helps to build the confidence among the participants. The experts from FDA, DIC, Bank, successful entrepreneurs are invited for conducting the classes during the training. Many participants have started their small scale processing units.

Technical Know how: The department keeps good liaison with ex participants of the training for solving their technical problems and encourages for introduction of innovations in food processing and value addition. In addition the number of visitors visits to the department and also through phone contacts the technical persons of the department for solving their technical problems.

Training on Fruits and Vegetable Processing





Contact Details

Head, Department of Food Science & Technology,

**Mahatma Phule Krishi Vidyapeeth,
Rahuri- 413 722 Dist. Ahmednagar (MS)**

Phone No. (02426) 243259

Email: hodfst.mpkv@gov.in fstmpkv@gmail.com
