Journal of Pharmacognosy and Phytochemistry
Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
www.phytojournal.com
JPP 2020; 9(5): 2802-2806
Received: 15-07-2020
Accepted: 25-08-2020

Neeta Kumari
Department of Foods and Nutrition, I.C. College of Home Science, CCS Haryana Agricultural University, Hisar, Haryana, India

Sangeeta C Sindhu
Department of Foods and Nutrition, I.C. College of Home Science, CCS Haryana Agricultural University, Hisar, Haryana, India

Varsha Kumari
KVK Vaishali, DRPCAU, Pusa, Bihar, India

Varsha Rani
Department of Foods and Nutrition, I.C. College of Home Science, CCS Haryana Agricultural University, Hisar, Haryana, India

Corresponding Author:
Neeta Kumari
Department of Foods and Nutrition, I.C. College of Home Science, CCS Haryana Agricultural University, Hisar, Haryana, India

Nutritional evaluation of developed value added biscuits incorporating germinated pumpkin seed flour

Neeta Kumari, Sangeeta C Sindhu, Varsha Kumari and Varsha Rani

Abstract
Value added whole wheat flour biscuits were developed by incorporating 10, 20 and 30 per cent of whole wheat flour with germinated pumpkin seed flour. The developed biscuits were nutritionally evaluated. Three types of biscuits were developed i.e. Type I, Type II and Type III, respectively, by replacing 10, 20 and 30 per cent of whole wheat flour with germinated pumpkin seed flour. It was observed that value addition with pumpkin seed flour improved the nutritional value of biscuits in terms of ash, fat, protein, fibre as well as total minerals. Crude fat content increased from 12.38 to 28.00g/100 g, crude protein content increased from 12.28 to 21.58g/100g while crude fibre increased from 1.80 g/100g in control to 3.86 g/100g in Type III biscuits. Dietary fiber content includes soluble, insoluble and total dietary fiber. Soluble dietary fiber contented increased from 2.16 to 2.36 g/100g, insoluble dietary fiber content increased from 8.51 to 9.75 g/100g and total dietary fiber increased from 10.73 to 12.10 g/100g. Value addition also resulted in improvement in mineral profile of the products. Calcium, magnesium, zinc and iron, respectively ranged up to 92.48, 133.53, 7.58, 11.60, 675.46 and 326.58mg/100g. Such developed products can be very useful in combating the micronutrients deficiency problem in population of all age groups.

Keywords: Pumpkin seeds, biscuits, sensory evaluation, nutritional evaluation and mineral analysis

Introduction
Food security in its essence means 'Availability' 'Accessibility' and 'Utilization' of food for an active and healthy life of human population. It is about 'Nutrition' or its reverse 'Malnutrition'.

The problem of micronutrient malnutrition in India is essentially due to protein, vitamins and minerals deficiencies [1, 2]. There is a need for strategic use of inexpensive high protein, fiber and micronutrient rich novel and underutilized food sources that will increase the protein and mineral content of diet or processes that will improve availability of nutrients in staple food in order to enhance their nutritive value. Recently, the focus of interest and significant effort has been in the development of food products from by-products or wastes and under-utilized agricultural products with the objective to improve the nutritional value of cereal flours particularly in terms of protein, minerals, vitamins and dietary fiber [3, 4].

Rightly termed as nutritional powerhouse, as these seeds are excellent nutrient source filled with minerals mainly zinc, phosphorous, magnesium, potassium and selenium responsible for fighting diseases and can act as weapon for fighting diseases such as arthritis, inflammation, prostate cancer etc [5]. Pumpkin seeds are rich natural source of protein (25 to 37%) and oil (37 to 45%). In addition, they are also good sources of minerals, dietary fibre, health-benefiting vitamins and mono-unsaturated fatty acids, which are good for heart health. They are also rich source of zinc, lignans, and phytosterols such as delta 7-sterols and delta 5-sterols essential amino acid like as tryptophan and glutamate and are beneficial for maintenance of immune system, cell growth and multiplication, eye and skin health, insulin regulation and male sexual functions such as sperm generation and testosterone metabolism [6-9].

Pumpkin seed flour can be used to fortify soups, biscuits, cookies, pancakes and breads. Moreover, it is also used to fortify wheat flour to produce bakery products like pastries with unique and nutty taste [10].

Value addition of existing foods with such ingredients is a simple and feasible way of enhancing nutritional values of foods and in turn the health. The addition of germinated pumpkin seed flour into the whole wheat flour can further increase the protein quality, dietary fiber and some mineral content in biscuits. Keeping it in view, the present study was conducted and here findings reported in this paper.

Materials and methods

Product development

Present study was carried out in Department of Foods and Nutrition, I.C. College of Home science, Chaudhary Charan Singh Haryana Agricultural University, Hisar. Pumpkins were procured from the local market and seeds were separated from the pulp.

For the preparation of biscuits the required ingredients namely, whole wheat flour, ghee, milk, refined sugar, ammonia and baking powder were purchased in a single lot from the local market of Hisar. The pumpkin seeds were washed thoroughly in tap water and soaked in water for the period of 24 hours and germinated for 48 hours, oven dried and made into flour using electric grinder. Three types of whole wheat flour biscuits were developed i.e. Type I, Type II and Type III, respectively, by replacing 10, 20 and 30 per cent of whole wheat flour with germinated pumpkin seed flour (Table 1). Sensory evaluation of developed value added whole wheat flour biscuit was carried out with respect to color, appearance, flavour, taste, texture and overall acceptability by a panel of ten semi-trained judges from the Department of Foods and Nutrition, I.C College of Home Science, CCS Haryana Agricultural University, Hisar using 9-point hedonic scale.

Plate 1: Biscuits incorporating germinated pumpkin seed flour

Table 1: Value added whole wheat flour biscuits incorporating germinated pumpkin seed flour

Ingredients	Control	Type I	Type II	Type III
Wheat flour (g)	150	135	120	105
Germinated pumpkin seed flour (g)	-	15	30	45
Ghee (g)	50	50	50	50
Sugar (g)	90	90	90	90
Ammonium bicarbonate (tsp)	1	1	1	1
Sodium bicarbonate	a pinch	a pinch	a pinch	a pinch
Cooked Weight (g)	290	290	290	291

Nutritional evaluation

Moisture, ash, crude fat, crude protein and crude fiber were estimated by employing the standard methods of analysis[11]. The total carbohydrate was calculated by the difference method. Total carbohydrate (%) = 100 – [crude protein (%) + crude fat (%) + crude fiber (%) + total ash (%)]. Total, soluble and insoluble dietary fiber constituents were determined by the enzymatic method [12]. Total calcium, iron, zinc, potassium and magnesium in acid digested samples were determined using Atomic Absorption Spectrophotometer Model No: Pinaacle 700AA [13]. Phosphorus was determined colorimetrically [14]. Phytic acid and polyphenol were also analysed [15, 16].

Results and Discussion

Sensory evaluation

The mean organoleptic scores for biscuits without incorporating pumpkin seed flour were 8.80, 8.70, 8.60, 8.60, 8.60 and 8.66 for colour, appearance, aroma, texture, taste and overall acceptability, respectively. All the scores were in the category of 'liked very much' (Table 2).

Type-I and Type-II whole wheat flour biscuits incorporating 10 and 20 per cent germinated pumpkin seed flour had 8.60, 8.60, 8.40, 8.50, 8.50, 8.52 and 8.10, 8.00, 8.10, 8.00, 8.30, 8.10 mean scores for colour, appearance, aroma, texture, taste and overall acceptability, respectively. All the scores were in the category of 'like very much'.

Incorporation of germinated seed flour at 10 per cent brought no significant ($P \leq 0.05$) change in any of the sensory scores as compared to the control. At 20 per cent incorporation level a significant ($P \leq 0.05$) decrease was observed in terms of colour and appearance. As the level of incorporation increased to 30 per cent level, a significant ($P \leq 0.05$) decrease was observed in all sensory characteristics. However the products were within acceptable limits and categorised as 'like moderately'. Similar work on development and sensory acceptability has been reported by various co-workers [17]. They reported that the biscuits and cookies containing 30 per cent pumpkin seed flour were acceptable.

Table 2: Organoleptic acceptability of developed value added whole wheat flour biscuits

Level of incorporation	Color	Appearance	Aroma	Texture	Taste	Overall acceptability
Control WWF:GPSF::100:0	8.80±0.13	8.70±0.15	8.60±0.22	8.60±0.22	8.60±0.22	8.66±0.18
Type-I WWF:GPSF::90:10	8.60±0.16	8.60±0.16	8.40±0.22	8.50±0.22	8.50±0.22	8.52±0.17
Type-II WWF:GPSF::80:20	8.10±0.18	8.00±0.21	8.10±0.23	8.00±0.21	8.30±0.30	8.10±0.20
Type-III WWF:GPSF::70:30	7.80±0.20	7.60±0.22	7.60±0.27	7.30±0.21	7.40±0.27	7.54±0.20
CD ($P \leq 0.05$)	0.49	0.54	0.68	0.62	0.73	0.55

Values are mean ± SE of ten observations, WWF: Whole wheat flour, GPSF: Germinated pumpkin seed flour.

Physical characteristics

Developed whole wheat flour biscuits were analysed for diameter, thickness and spread ratio (Table 3). Diameter and thickness of whole wheat flour biscuits decreased while spread ratio increased with increased incorporation of pumpkin seed flour. The diameter of control, Type-I, Type-II and Type-III whole wheat flour biscuits was 6.90, 6.73, 6.44 and 6.19 cm, respectively with significant ($P \leq 0.05$)

differences among them. The thickness of control, Type-I, Type-II and Type-III whole wheat flour biscuits was 0.97, 0.91, 0.84 and 0.78 cm, respectively with significant ($P \leq 0.05$) differences among them. Spread ratio for respective whole wheat flour biscuits was 7.11, 7.39, 7.66 and 7.93 with significant ($P \leq 0.05$) differences among them. Similar finding have been reported by previous workers also[18]. They measured quality parameters of biscuits produced by partial replacement of wheat flour by barley and rye flours at 0, 10, 20, 30 and 40 per cent. For most of the composite flours, the level of substitution was statistically significant for the weight and the spread ratio of the biscuits.

Table 3: Diameter, thickness and spread ratio of developed value added whole wheat flour biscuits

Types of whole wheat flour biscuits	Diameter (cm)	Thickness (cm)	Spread ratio (D/t)
Control WWF:GPSF:100:0	6.90±0.6	0.97±0.02	7.11±0.06
Type-I WWF:GPSF:90:10	6.73±0.8	0.91±0.03	7.39±0.04
Type-II WWF:GPSF:80:20	6.44±0.11	0.84±0.02	7.66±0.03
Type-III WWF:GPSF:70:30	6.19±0.12	0.78±0.02	7.93±0.02
CD ($P \leq 0.05$)	0.12	0.05	0.26

Values are mean ± SE of six independent observations. WWF: Whole wheat flour, GPSF: Germinated pumpkin seed flour.

Nutritional evaluation

Proximate composition

Whole wheat flour biscuits with no added pumpkin seed flour had 2.20 per cent moisture, 2.64 per cent ash, 12.38 per cent crude fat, 12.28 per cent crude protein, 1.80 per cent crude fiber and 70.90 per cent total carbohydrates. Incorporation of germinated pumpkin seed flour by replacing 10, 20 and 30 per cent of whole wheat flour, respectively, significantly ($P \leq 0.05$) increased the moisture, ash, crude fat, crude protein as well as crude fiber with a simultaneous significant ($P \leq 0.05$) decrease in total carbohydrates.

The respective composition for moisture, ash, crude fat, crude protein, crude fiber as well as total carbohydrates was 2.46, 7.85, 22.65, 18.62, 3.16 and 47.73 per cent for Type-II whole wheat flour biscuits while that for Type-III whole wheat flour biscuits it was 2.94, 9.13, 28.00, 21.58, 3.86 and 37.43 per cent (Table 4). Similar finding have been reported by previous workers also. Mamoun and Nada (2019) [19] reported that as the supplementation ratio of pumpkin seed flour increased from 0 to 15% (w/w), the protein content, ash content, crude fiber and total carbohydrates were increased. The biscuits with the ratio of 15% (w/w) pumpkin seed flour recorded the highest values of protein (8.8%), ash (1.12%), fiber (4.25%) and total carbohydrates (97.84%).

Pratyush *et al.* [20] found that the nutritional value of control cookies to be 1.52 per cent ash, 2.44 per cent moisture, 8.10 per cent crude protein, 22.75 per cent crude fat, 0.86 per cent fiber and cookies supplemented at 50 per cent level of pumpkin seed powder had 1.85 per cent ash, 3.49 per cent moisture, 9.45 per cent crude protein, crude fat 23.10 per cent and 23.32 per cent crude fiber, respectively.

Table 4: Proximate composition of developed value added whole wheat flour biscuits (%, dry weight basis)

Types of whole wheat flour biscuits	Moisture*	Ash	Crude fat	Crude protein	Crude fiber	Total carbohydrates
Control WWF:GPSF:100:0	2.20±0.12	2.64±0.06	12.38±0.00	12.28±0.05	1.80±0.06	70.90±0.16
Type-I WWF:GPSF:90:10	2.46±0.15	5.15±0.08	16.05±0.03	15.54±0.18	2.45±0.03	60.81±0.27
Type-II WWF:GPSF:80:20	2.76±0.20	7.85±0.10	22.65±0.23	18.62±0.14	3.16±0.03	47.73±0.49
Type-III WWF:GPSF:70:30	2.94±0.23	9.13±0.02	28.00±0.28	21.58±0.17	3.86±0.03	37.43±0.39
CD ($P \leq 0.05$)	0.34	0.23	0.60	0.46	0.13	1.15

Values are mean ± SE of six independent determinations. WWF: Whole wheat flour, GPSF: Germinated pumpkin seed flour.
*On the fresh weight basis.

Total dietary fiber

Whole wheat flour biscuits with no added pumpkin seed flour had 2.16 per cent soluble, 8.57 per cent insoluble and 10.73 per cent total dietary fiber content. Incorporation of germinated pumpkin seed flour by replacing 10, 20 and 30 per cent of whole wheat flour, respectively, significantly ($P \leq 0.05$) increased the soluble as well as insoluble dietary fiber content. The respective composition of soluble, insoluble and total dietary fiber content of Type-II and Type-III whole wheat flour biscuits was 2.30, 9.34, 11.64 per cent and 2.36, 9.75, 12.10 per cent (Table 5).

Table 5: Dietary fiber content of developed value added whole wheat flour biscuits (g/100g, dry weight basis)

Type of whole wheat flour biscuits	Soluble dietary fiber	Insoluble dietary fiber	Total dietary fiber
Control WWF:GPSF:100:0	2.16±0.03	8.57±0.05	10.73±0.11
Type-I WWF:GPSF: 90:10	2.27±0.01	8.92±0.04	11.19±0.29
Type-II WWF:GPSF:80:20	2.30±0.01	9.34±0.02	11.64±0.46
Type-III WWF:GPSF:70:30	2.36±0.01	9.75±0.02	12.10±0.36
CD ($P \leq 0.05$)	0.07	0.11	1.08

Values are mean ± SE of six independent determinations. WWF: Whole wheat flour, GPSF: Germinated pumpkin seed flour.

Total mineral content

Value addition with germinated pumpkin seed flour brought significant ($P \leq 0.05$) improvement in the mineral profile of whole wheat flour biscuits. The calcium content improved from 45.59 (control) to 92.48 mg/100g (Type-III) with an increase of 102.85 per cent. Type-I, Type-II and Type-III whole wheat flour biscuits with 10, 20 and 30 per cent incorporation level depicted total calcium 60.45, 76.60 and 92.48 mg/100g, respectively (Table 6).

The control whole wheat flour biscuits with no value addition had mineral content 130.57 mg/100g magnesium, 2.53 mg/100g zinc, 4.46 mg/100g iron, 308.52 mg/100g potassium and 305.54 mg/100g phosphorus. All the minerals were found to improve with value addition. Respective mineral

composition for magnesium, zinc, iron, potassium as well as phosphorus was 131.48, 3.51, 6.62, 430.45 and 312.59 mg/100g for Type-I whole wheat flour biscuits. It was 132.47, 5.56, 9.53, 553.50 and 319.52 mg/100g for Type-II and 133.53, 7.58, 11.60, 675.46 and 326.58 mg/100g for Type-III whole wheat flour biscuits. Qayyum et al. (2017) [21] also reported an improved iron and zinc profile of value added biscuits. They reported that iron content of biscuits supplemented with 33 per cent pumpkin seed flour found that biscuits contained 3.11mg/100g.

Table 6: Total mineral content of developed value added whole wheat flour biscuits (mg/100g, dry weight basis)

Type of whole wheat flour biscuits	Calcium	Magnesium	Zinc	Iron	Potassium	Phosphorus
Control WWF:GPSF:100:0	45.59±0.20	130.57±0.24	2.53±0.22	4.46±0.19	308.52±0.21	305.54±0.17
Type-I WWF:GPSF:90:10	60.45±0.22	131.48±0.19	3.51±0.23	6.62±0.23	430.45±0.19	312.59±0.21
Type-II WWF:GPSF:80:20	76.60±0.22	132.47±0.21	5.56±0.23	9.53±0.25	553.50±0.25	319.52±0.21
Type-III WWF:GPSF:70:30	92.48±0.14	133.53±0.18	7.58±0.14	11.60±0.17	675.46±0.26	326.58±0.14
CD ($P \leq 0.05$)	0.65	0.68	0.67	0.69	0.75	0.60

Values are mean ± SE of six independent determinations. WWF: Whole wheat flour, GPSF: Germinated pumpkin seed flour.

Per cent HCl-extractability of mineral

A significant ($P \leq 0.05$) improvement was observed in per cent HCl-extractability of mineral content also (Table 4.14). Whole wheat flour biscuits with no value addition had 46.38, 28.22, 9.65, 10.52, 53.38 and 54.56mg/100g per cent HCl-extractability calcium, magnesium, zinc, iron, potassium and phosphorus, respectively. The per cent HCl-extractability of calcium was 49.16 per cent (Type-I), 56.54 per cent (Type-II) and 69.04 per cent (Type-III). Per cent HCl-extractability of magnesium increased from 28.22 per cent (control) to 30.61, 33.39 and 36.36 per cent in Type-I, Type-II and Type-III whole wheat flour biscuits, respectively.

Per cent HCl extractability of zinc increased from 9.65 per cent (control) to 15.69 per cent (Type-III) whole wheat flour biscuits, respectively. The per cent HCl-extractability of iron increased from 10.52 per cent (control) to 12.64, 15.57 and 17.51 per cent, respectively, at three levels of incorporation.

Per cent HCl-extractability of potassium was 53.38 per cent (control), 55.50 per cent (Type-I), 58.67 per cent (Type-II) and 61.45 per cent (Type-III). The per cent HCl-extractability of phosphorus increased from 54.56 per cent (control) to 61.39 per cent (Type-III).

Table 7: Per cent HCl-extractability mineral content of developed value added biscuits (mg/100g, dry weight basis)

Type of whole wheat flour biscuits	Calcium	Magnesium	Zinc	Iron	Potassium	Phosphorus
Control WWF:GPSF:100:0	46.38±0.12	28.22±0.15	9.65±0.22	10.52±0.10	53.38±0.11	54.56±0.31
Type-I WWF:GPSF:90:10	49.16±0.11	30.61±0.10	11.43±0.29	12.64±0.18	55.50±0.13	56.47±0.22
Type-II WWF:GPSF: 80:20	56.54±0.21	33.39±0.13	13.54±0.16	15.57±0.13	58.67±0.17	58.41±033
Type-III WWF:GPSF::70:30	69.04±0.20	36.36±0.22	15.69±0.14	17.51±0.20	61.45±0.09	61.39±0.33
CD ($P \leq 0.05$)	0.54	0.36	0.44	0.51	0.46	0.38

Values are mean ± SE of six independent determinations. WWF: Whole wheat flour, GPSF: Germinated pumpkin seed flour. Figures in parenthesis indicate per cent extractability

Phytic acid and polyphenol content

A significant ($P \leq 0.05$) improvement was observed in phytic acid content of whole wheat flour biscuits. The phytic acid content increased from 255.09 mg/100g (control) to 260.71, 266.33 and 271.95mg/100g in Type-I, Type-II and Type-III whole wheat flour biscuits, respectively.

Control biscuits with no value addition had 225.55 mg GAE/100g polyphenol content. Incorporation of germinated pumpkin seed flour by replacing 10, 20 and 30 per cent of whole wheat flour, respectively, significantly ($P \leq 0.05$) decreased the polyphenol content. The polyphenol content for Type-I whole wheat flour biscuit was 222.27 mg GAE/100g; it was 217.41 mg GAE/100g for Type-II biscuits and for Type-III biscuits it was 213.45 mg GAE/100g (Table 8).

Table 8: Phytic acid (mg/100g) and polyphenol content (mg GAE/100g) of developed value added whole wheat flour biscuits

Type of whole wheat flour biscuits	Phytic Acid	Polyphenol
Control WWF:GPSF:100:0	255.09±0.56	225.55±0.70
Type-I WWF:GPSF: 90:10	260.71±0.56	222.27±0.52
Type-II WWF:GPSF: 80:20	266.33±0.56	217.41±0.31
Type-III WWF:GPSF:70:30	271.95±0.57	213.45±0.55
($P \leq 0.05$)	1.84	1.75

Values are mean ± SE of six independent determinations. WWF: Whole wheat flour, GPSF: Germinated pumpkin seed flour.

Conclusion

Germinated pumpkin seed flour could successfully be incorporated up to 30 per cent level in whole wheat flour biscuits. Incorporation of germinated pumpkin seed flour significantly ($P \leq 0.05$) improved the nutrient and mineral profile of whole wheat flour biscuits. Such developed products can be very useful in combating the micronutrients deficiency problem in population of all age groups. The shelf life studies of developed product are underway and shall be reported in further communication.

References

1. Food and Agriculture Organization. The double burden of malnutrition: case studies from six developing countries. FAO Food and Nutrition Paper. 2006; 84:1-334.
2. Gaiha R, Jha R, Kulkarni VS. Diets, malnutrition and disease: The Indian experience. Oxford University Press, 2014.
3. Revathy MN, Sabitha N. Development, quality evaluation and popularization of pumpkin seed flour

incorporated bakery products. International Journal of Food and Nutritional Sciences. 2013; 2(2):40-45.
4. Roy S, Datta S. A comparative review of the versatile pumpkin seeds (*Cucurbita maxima*) as a valuable natural medicine. International Journal of Current Research. 2015; **7**(8):19355-19361.
5. Maheshwari P, Prasad N, Batra E. Papitas -the underutilized by product and the future cash crop- a review. American International Journal of Research in Formal, Applied and Natural Sciences. 2015; 12(1):31-34.
6. Call F, Huan S, Quanhong LA Review on pharmacological activities and utilization technologies of pumpkin. Plant Foods for Human Nutrition. 2006; 61:73-80.
7. Nakic SN, Rade D, Skevin D, Strucelj D, Mokrovcak Z, Bartolic M. Chemical characteristics of oils from naked and husk seeds of *Cucurbita pepo* L. European Journal of Lipid Science and Technology. 2006; 108:936-943.
8. Ardabili AG, Farhoosh R, Haddad Khodaparast MH. Chemical composition and physicochemical properties of pumpkin seeds (*Cucurbita pepo* Subsp. pepo Var. Styriaka) grown in Iran. Journal of Agricultural Science and Technology. 2011; 13:1053-1063.
9. Hashemi JM. Pumpkin seed oil and vitamin E improve reproductive function of male rats inflicted by testicular injury. World Applied Sciences Journal. 2013; 23(10):1351-1359.
10. Patel S. Pumpkin (*Cucurbita* sp) seeds as neutraceutic: A review on status quo and scopes. Mediterranean Journal of Nutrition and Metabolism. 2013; 6:183-89.
11. AOAC. Official Methods of Analysis. Association of Official Analytical Chemist. Washington, D.C, 2012.
12. Furda I. Simultaneous analysis of soluble and insoluble dietary fiber. *In* W.P.T. James, and O. Theander (*Eds.*). The Analysis of Dietary Fibre in Food. Marcel Dekker, New York. 1981, 163-172.
13. Lindsey WL, Norwell MA. A new DPTA-TEA Soil test for zinc and iron. Agronomy Abstract. 1969; 61:84-89.
14. Chen PS, Tosibara TY, Warner H. Micro- determination of phosphorus. Analytical Chemistry. 1956; 28:1756-1759.
15. Davies NT, Reid H. An evaluation of phytate, zinc, copper and magnesium content and availability of soya based textured vegetables, protein meat substitutes or meat extrudes. British Journal of Nutrition. 1979; 41:579-589.
16. Singh U, Jambunathanan R. Studies on desi and kabuli chickpea cultivars, levels of protease inhibitors, polyphenolic compounds and *in vitro* protein digestibility. Journal of Food Science. 1981; 46:1364-1367.
17. Kanwal S, Raza S, Naseem K, Amjad M, Naseem B, Gillani M. Development, physico- chemical and sensory properties of biscuits supplemented with pumpkin seeds to combat malnutrition in Pakistan. Pakisthan Journal of Agricultural Research. 2016; 28:400-405.
18. Drakos A, Andrioti-Petropoulou L, Evageliou V, Mandala I. Physical and textural properties of biscuits containing jet milled rye and barley flour. Journal of Food Science and Technology. 2019; 56(1):367-375.
19. Mamoun OA, Nada AF. Formulation and Quality Evaluation of Biscuits Supplemented with Defatted Pumpkin Seed Flour. J. Acad. Indus. Res. 2019; 8(4):68-72.
20. Pratyush K, Masih D, Sonkar C. Development and quality evaluation of pumpkin powder fortified cookies. International Journal of science, engineering and technology. 2015; 3(4).
21. Qayyum A, Munir M, Raza S, Gillani M, Kanwal S, Rashid N et al. Rheological and qualitative assessment of wheat-pea composite flour and its utilization in biscuits. Pakistan Journal of Agricultural Research. 2017; 30(3):258-265.