P-ISSN: 2618-0723
E-ISSN: 2618-0731

NAAS Rating: 5.04
www.extensionjournal.com

International Journal of Agriculture Extension and Social Development

Volume 7; Issue 2; Feb 2024; Page No. 518-523

Received: 08-12-2023
Accepted: 12-01-2024

Indexed Journal
Peer Reviewed Journal

Impact of entrepreneurship development programme amongst rural women through fortified millet cookies

[1]Anitha R, [2]Gottemukkula Bhavani, [3]V Rajendra Kumar and [4]Dr. Dadasaheb Khogarae Traimbek

[1]Subject Matter Specialist -Home Science, YFA-KVK, Madanapuram, Wanaparthy, Telangana State, India

[2]Subject Matter Specialist -Agricultural Extension, YFA-KVK, Madanapuram, Wanaparthy, Telangana State, India

[3]Subject Matter Specialist -Plant Protection, YFA-KVK, Madanapuram, Wanaparthy, Telangana State, India

[4]Senior Scientist and Head, YFA-KVK, Madanapuram, Wanaparthy, Telangana State, India

DOI: https://doi.org/10.33545/26180723.2024.v7.i2g.380

Corresponding Author: Gottemukkula Bhavani

Abstract

Entrepreneurship Development Programme (EDP) which aims to provide awareness programmes, Goshtis, skill training and exposure visits on Millets production, Value Addition and marketing to women SHGs to stimulate them in entrepreneurship development. The present study was conducted at YFA-KVK, Madanapuram of Wanaparthy district, wherein a sample size of 240 farm women (members of SHGs) selected for the study. Impact analysis was carried out to find out the beneficiaries' knowledge and skill gained on Millets production, Value Addition and marketing skills. The responses so gathered stated that majority (63.3%) of the beneficiaries having gained medium level besides 60.4 percent of beneficiaries replied that YFA KVK skill training programmes helpful in developing their skills in millet production, value addition and marketing. The interesting part of the study is that, with the handholding of YFA-KVK, women group developed a unique Fortified millet (Millet based Moringa Cookies) cookies and were analyzed for nutritional qualities, and sensory attributes. It was observed that the product was highly accepted and appreciated by the consumers that eventually resulted in enterprise development by the women SHGs with a net profit of Rs. 3,51,600/- per annum.

Keywords: Krishi Vigyan Kendra, entrepreneurship development programme, skill trainings, millet production, value addition and fortified (moringa) millet cookies

Introduction

India is one of the leading producers of millets in the world with an estimated share of around 41 percent in the global production. As per FAO (Food and Agriculture Organization), world production of millets in 2020 was 30.464 million metric tonnes (MMT) and India's share was 12.49 MMT, which is 41 percent of the total millet production. Millets that India cultivates are (Jowar), Pearl millet (Bajra) and Finger millets (Ragi) besides there are six minor crops they are Barnyard (Sanwa), Proso (Chena), Foxtail (Kakum), Kodo (Kodon), Little (Kutki) and Pseudo millets are Amaranth (Rajgira) and Buckwheat (Kuttu). These are three to five times more nutritious than wheat and rice in terms of proteins, minerals, and vitamins (PIB Delhi, 2022) [4]. They need very little water for production just around 25 percent of the rainfall regime demanded by crops like rice, sugarcane, and banana. Besides millets are the crop which can tackle the challenges of climate change, environmental degradation, and malnutrition. But on the other hand, there is a continuous downfall in the cultivated area under millets which may be attributed due to the area shifting for other crops, changed lifestyle, and ensured returns from major commercial crops (Agro and Food processing, 2022) [1].

India being one of most effected countries with increased number of lifestyle diseases like cardiovascular and diabetics with highest number of diabetics (50.8 million) according to the World Health Organization (WHO) wherein this figure is set to increase to 73.5 million by 2025. Besides 25 million suffer from cardiovascular diseases which amount to 60% of the global figure (The Borgen Project, 2016) [5]. This situation is getting complicated with increased emergence of fast-food culture in all sections of society. However, with the hit of COVID 19 pandemic, people become conscious on eating healthy, and there by there is growing awareness about millet potential health benefits which resulted in the resurgence of millets in India. For instance, in India, the government is setting in place an Initiative for Nutritional Security through Intensive Millet Promotion (INSIMP). Recognizing their immense nutraceutical potential and climate resilient nature, the government of India has launched a national nutraceutical mission. The national nutraceutical mission is an arching national strategy, which has prioritized eight millets including minor millets and two pseudocereals and termed them as Nutri-Cereals. The government of India declared the year 2018 as the national year of millets to boost up the indigenous production of millets. The UN Food and

Agriculture Organization (FAO), Rome has declared the year 2023 as the international year of millets, upon the request from the Indian government (PIB Delhi, 2022) [4]. In this regards the government of India has taken initiatives focusing on promotion of millet cultivation and value addition. These initiatives are carried out in different government organization and institutes like Krishi Vigyan Kendras through different capacity building programme in various concerned areas.

KVKs are innovative farm science centres/ institutes, established mainly to impart need-based capacity building programmes for farming community to bring the sustainability of agriculture besides it (KVK) also improves the economic status of farmers. Keeping this in view, Youth for Action-KVK, under Entrepreneurship Development Programme (EDP) initiated different extension activities (Awareness programme, Kisan Goshtis, Trainings and Exposure visits) from 2019-20 to 2021-22 in promoting Millet production, value addition and marketing. YFA-KVK is committed to give priority to women in this regard for bringing them in the mainstream of agriculture development. The dream of achieving India's socio-economic development will not be fulfilled without empowering the farm women living in rural areas. Hence, there is every need to embark on the empowerment of women which brings identification and recognition. Women economic empowerment refers to women ability to make life-determining decision than have been previously denied by the society and family (Mahbub, 2021) [2]. Millet-based farming is the answer to cope with the changing time as Millet farming preserves biodiversity and empowers women farmers as cultivators to agri-preneurs and self-employed women.

In this regard, YFA-KVK, under EDP, KVK nurtured the rural women on various aspects of business activity required for setting up Micro and Small-scale Enterprises (MSEs). As a result, with the handholding support of KVK, women group developed a unique ready to eat snack called Fortified Millet Cookies (Millet based Moringa Cookies). In general, cookies in the market are made from refined wheat flour, which lacks protein as well as dietary fibre whereas cookies made from Millets in combination of Moringa (leaf powder), are enriched with high-protein, vitamin, mineral and antioxidants. This is a commercially viable method of incorporating nutritional value into cookies, which can help to alleviate malnutrition and nutrient deficiencies knowing its importance, the product was highly accepted and appreciated by the consumers that eventually resulted in enterprise development by the women SHGs in Wanaparthy district of Telangana state.

The objectives are

1. To access the perceived usefulness of different extension activities conducted under EDP to promotes millet production values addition and marketing.
2. To study the knowledge and skill developed in millet production, value addition and marketing amongst rural women SHGs.
3. To examine the proximity analysis and sensory evaluation conducted for Millet Moringa Cookies developed.
4. To study the economics of Fortified (Moringa) Millet cookie Unit established by women SHGs.

Materials and Methods, Results and Discussion

YFA-KVK, Madanapuram, Wanaparthy district identified women SHG members during the year 2019-20 to 2021-22 under EDP on Millet Production value addition and marketing. KVK conducted different extension activities like Awareness programmes, Goshtis, Exposure visits and skill training programmes through EDP mode to rural Self-Help Group women to start a suitable enterprise.

As part of the study, a multi-stage research design has been adopted for the sample selection. A total of 06 mandals were selected purposively from the Wanaparthy district for the study from which 12 villages (2 villages from each mandal) were purposively selected because the greatest number of the EDP activities were conducted in the below mentioned villages. From these 12 villages, 240 rural SHG women were identified (20 members from each village) who are among the trainees trained in KVK. Last 3years data was collected to study the impact of the activities conducted under EDP.

Table 1: Sample respondents selected for the study

S. No.	Name of the district	Name of the Mandals	Name of the Village	No. of. Farm Women
1	Wanaparthy	Pebbiar	Venkatapuram	20
			Ayyavari Palli	20
2		Kothakota	Kothakota	20
			Nervein	20
3		Madanapuram	Kothapalli	20
			Nelvidi	20
4		Wanaparthy	Nagamma thanda	20
			Kashimnagar	20
5		Revally	Chennaram	20
			Kesampeta	20
6		Pangal	Chikke palli	20
			Dondaipalli	20
			Total(no.)	240

Measurement of knowledge and skill level developed

Beneficiaries knowledge level gained on millet production, value addition and marketing were calculated by Knowledge score which was computed for each beneficiary to determine the degree of his or her comprehend understand on the topic under study. Teacher made scale with a total of twenty questions were selected in the interview schedule for measuring beneficiaries' knowledge. Beneficiaries were asked to answer those questions. The table least knowledge score was 1 and the table highest knowledge score was 60. Based on knowledge score, the beneficiaries were classified into three categories which are low knowledge (up to 35), medium knowledge (36 to 45) and high knowledge (46-55). Skill level developed was also measured in the similar, with ten number of statements selected and the least skill developed was 10 and highest-level skill developed was 30. Beneficiaries' skill was tested and based on the score obtained, the beneficiaries were classified into three categories which are low skilled (up to 17), medium (18-23) and high skilled (24-29).

A structured pre-tested interview schedule was prepared considering the objective of the research and used to collect

the relevant information from the beneficiaries. The data was collected in the year of 2021-22 and was analysed using appropriate statistical procedures. A complete method of developing the Fortified millet cookies was mentioned below

Preparation of Fortified Millet cookies

Preparation of Millet (Finger Millet) and Moringa Flour: Fresh, clean moringa leaves were used for high quality dehydrated powder. The leaf samples dried to the moisture level reduced up-to 10% and powdered and stored for further processing. On the other hand, Finger Millets were cleaned and milled and was allowed to passed through 36 BSS (British standard sieve) or 420 microns to get fine particles sized flour.

Preparation of Treatments: For the preparation of treatments, a general practice of using Refined Wheat flour was replaced by Moringa and finger millet flour at different proportions. Blends of concentrations of 20 percent, 25 percent, 30 percent, 35 percent and 40 percent and cookies flour was prepared.

Preparation of Cookies: In cookies preparation, where in dry ingredients were weighed and mixed by taking sugar, fat, sodium bicarbonate, skimmed milk powder, and vanilla powder added to flour. Dough was thoroughly kneaded and spread into sheet of 5mm thickness and cut into rectangular shapes with a mould sized 34mm width. At 135 °C cookies were backed for 15minutes and was cooled down to room temperature before packing in airtight container and was preserved for evaluation of quality parameters.

Proximate analysis of cookies

Determination of moisture, ash, fat, and protein contents was done. Moisture analysis of cookies was done using a Digital Moisture Analyser. Ash content of cookies was extracted by Muffle Furnace. Ash was extracted by taking cookie sample into crucible and put into muffle furnace for 5-6 hours at 550 °C. Crucible weight was taken and ash content was calculated. Protein was calculated using Kjeldahl method, divided into three steps: Digestion, neutralization, and titration. Fat was extracted by pouring petroleum ether on the cookie sample added into a dried thimble in the Soxhlet apparatus. Solvent was evaporated off and fat was collected. Percentage values of Proximate analysis were examined at quality Control lab, Professor Jayashankar Telangana State Agriculture University (PJTSAU), Rajendranagar, Hyderabad.

Sensory evaluation of cookies

The sensory evaluations were conducted in a purpose-built, ten-booth sensory evaluation laboratory. The six developed products with regular refined wheat flour (control) and Fortified Millet (Moringa) (experimental) were subjected to sensory evaluation by 15 semi-trained panel members (consisted of staff) by using a sensory evaluation score card at YFA-KVK, Madanapuram. Each day two products samples were served which were coded by using random three-digit numbers. Panellists were provided with water and instructed to rinse and swallow water between samples. They were given written instructions and asked to evaluate the products for acceptability based on its appearance, colour, taste and overall acceptability by using five-point hedonic scale (1=Disliked very much to 5=Like very much) (Meilegaard *et al*., 1999) [3].

Results and Discussion

The perceived usefulness of different extension activities conducted under EDP to promotes millet production values addition and marketing

The perceived usefulness of extension activities conducted under EDP on Millet production, value-addition and Marketing for rural women SHGs were analysed by mention them under 4 different heads, for the duration of last three years i.e., from 2019-20 to 2021-22, KVK organized ten number of Awareness programmes with the participation of 310 members, six number of Kisan Goshtis with 300 participants, 11 number of Skill Trainings on Millet processing and marketing with 330 beneficiaries and three number of exposure visits to millet fields and processing units with the participation of 67 beneficiaries.

Data presented in Table 2 represents the distribution of participates according to their perceived usefulness on different extension activities conducted under EDP on Millet production, value addition and marketing. Higher percent (37.00%) of participates perceived medium usefulness of awareness programmes conducted on millet production, value addition and marketing. Followed by 60.6 percentage of participants perceived medium usefulness of kisan goshtis conducted under EDP on Millet production, value addition and marketing. Similarly, regarding training programmes on Millets processing (value-addition) and marketing, about 51.8 percentage of participants perceived the medium usefulness of the trainings. At the same time, higher percentage (52.2%) of the participants perceived high usefulness of exposure visits on production and processing of millets.

Role of YFA-KVK in the development of knowledge and skill among the women trainees

In accordance to our present study, we define knowledge as the comprehend understanding of the beneficiaries about the millet production, value-addition and marketing and its impacts and procedural knowledge based on their experience gained. Moreover, in our study we highlighted the definition of knowledge of Bloom *et al*. 1956 [6] which defined knowledge as those behaviours and test situations that emphasized the remembering either by recognition or recall of ideas, materials or phenomenon.

Similarly, with reference to our study, the skill development is application of cognitive knowledge and ability to produce confectionary products of millets.

From the Table 3, it is majority of the beneficiaries (63.3%) has medium level of knowledge followed by low level (23.75) and high level (12.9%) of knowledge on Millet production, value addition and Marketing.

Similarly, From the Table 3, it is majority of the beneficiaries (60.4%) has medium level of skill developed in production of value-added products (all kinds of millet cookies) from millets followed by medium level (31.6%) and low level (8.3%) of skill developed value addition of millets.

Table 2: Distribution of rural SHG Women on the perceived usefulness of extension activities conducted at YFA-KVK under EDP

S. No.	Activities	Activities
1	Awareness Programmes (10 no. of activities and n=310)	
	Low (up to 17)	103(33.22%)
	Medium (18-23)	115(37.09%)
	High (23-28)	92(29.6%)
2	Kisan Goshti (06 no. of activities and n=300)	
	Low (up to 16)	42(14%)
	Medium (17-21)	182(60.6%)
	High (22-26)	76(25.3%)
3	Training on Millets processing and marketing (11 no. of activities and n=330)	
	Low (up to 16)	131(39.69%)
	Medium (17-22)	177(51.8%)
	High (23-28)	22(6.6%)
4	Exposure Visits to millet production and processing (03 no. of activities and n=67)	
	Low (up to 15)	10(14.9%)
	Medium (16-21)	22(32.8%)
	High (22-27)	35(52.2%)

Table 3: Distribution of beneficiaries based on their knowledge and skill level developed in millet value-addition

S. No	Knowledge level developed	Frequency	Percentage (%)
1	Low level (up to 35)	57	23.75
2	Medium level (36-45)	152	63.3
3	High level (46-55)	31	12.9
S. No	**Skill level developed**	**Frequency**	**Percentage (%)**
1	Low level (up to 17)	20	8.3
2	Medium level (18-23)	145	60.4
3	High level (24-29)	76	31.6

To examine the proximate analysis and sensory evaluation for fortified (Moringa) Millet Cookies developed.

Five different treatments were prepared with Moringa and millet (Finger millet) flour at different proportions to observe the proximate and sensory properties of cookies against the control cookies which were using only the refined wheat flour.

From Table 5, Keeping the Refined Wheat flour was considered as Control (T_0) we prepared five formulations (from T_1 to T_5) with Moringa and finger millet flour at different levels of concentration i.e., 20 percent, 25 percent, 30 percent, 35 percent and 40 percent for the preparation of cookies.

Table 4: Describes the Five formulations prepared with Moringa-Millet (finger millet) flours

Treatments	Blends (%)	Refined wheat flour (g)	Moringa Flour (g)	Finger Millet Flour (g)
$T_{0\ (Control)}$	0	50	0.00	0.00
T_1	25	22.5	5.25	22.5
T_2	30	20.2	6.74	20.3
T_3	35	18.37	7.87	18.37
T_4	40	16.7	8.99	16.7
T_5	45	15.15	10.1	15.15

Proximate Composition of Fortified (Moringa) Millet Cookies

From the Table 6, the proximate composition of fortified (Moringa) Millet cookies of 100 grams resulted in highest protein content (6.82%), followed by 56.61 percentage of CHO and Energy at 909.07 Kcal/100 g, Ash at 1.24% and the moisture level of 3.99% respectively. Whereas the control resulted in 5.92 percentage of Protein followed by 56.28 percent of CHO and Energy (659. 96K.Cal/100grms.), Ash (1.14%) and moisture is at 3.92 percent.

The proximate contents were higher in formulated millet moringa cookies as compared to control.

Table 5: Proximate Content of Fortified (Moringa) Millet Cookies (100 grms.)

Treatments	Moisture (%)	Protein (%)	Ash (%)	Fat (%)	Energy (K.Cal)	CHO (%)
T_0	3.92	5.92	1.14	32.16	659.96	56.28
T_1	3.92	6.20	1.05	31.01	668.8	57.76
T_2	4.04	6.32	1.08	30.57	662.04	61.11
T_3	4.09	6.39	1.19	32.65	657.28	55.68
T_4	4.16	6.50	1.09	32.02	660.15	56.23
T_5	3.99	6.82	1.24	31.34	909.07	56.61

Sensory evaluations of Fortified (Moringa) millet cookies
From the Table 7 and Fig.1, we observed that the majority (4.05±0.274) of the panel members scored for the third treatment (T_2) for the sensory evaluation against the sensory parameters like the appearance, colour, texture, taste with the score of 3.78±0.17, 3.78±0.14, 3.70±0.142 and 3.91±165 respectively in comparison with control having scored the overall acceptability of 3.50±0.16 against the appearance, colour, texture, taste with the score of 3.40±0.25, 3.4±0.20, 3.5±0.14 and 3.49±0.17

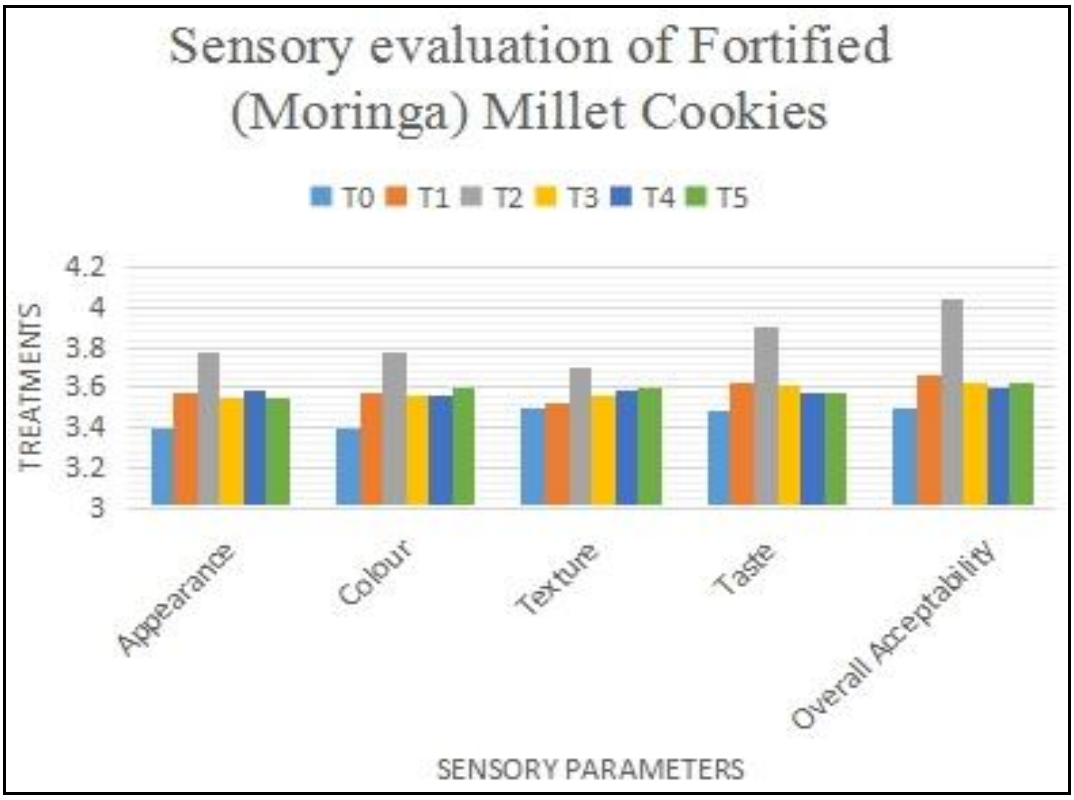

Fig 1: Mean sensory scores for Fortified (Moringa) Millet cookies.

Table 6: Treatment wise description of sensory evaluation scores obtained for Fortified (Moringa) millet cookies

Treatments	Appearance	Colour	Texture	Taste	Overall Acceptability
T_0	3.40±0.25	3.4±0.20	3.5±0.14	3.49±0.17	3.50±0.16
T_1	3.58±0.15	3.57±0.134	3.52±0.135	3.63±0.177	3.66±0.20
T_2	3.78±0.17	3.78±0.14	3.70±0.142	3.91±165	4.05±0.274
T_3	3.55±0.11	3.56±0.097	3.56±0.089	3.61±0.117	3.62±0.121
T_4	3.59±0.15	3.56±0.142	3.59±0.144	3.58±0.169	3.60±0.171
T_5	3.55±0.146	3.60±0.148	3.60±0.136	3.58±0.169	3.62±0.199

To study the economics of Fortified Millet cookies (Millet Moringa Cookies) developed by women SHGs
Under EDP, YFA-KVK organized different kinds of extension activities to motivate women SHGs towards establishment of rural enterprises so that they (women) could start their own economic activity at micro or small level. As mentioned before one of the women groups developed the Fortified (Moringa) Millet cookies with the handholding support of KVK and also analysed its proximate and sensory acceptance. The below mentioned Table 8 reported the economics of Fortified Millet cookie (Millet Moringa Cookies) unit established by the rural women SHGs.

Table 7: Economics of Fortified (Moringa) Millet cookie Unit established by women SHGs.

S.no	Particulars	Amount(Rs.)
1	Variable Cost (Raw material + Fuel + labour+ 10% interest)	5,25,000/-
2	Fixed Cost (Depreciation of equipment + Interest)	9,000/-
3	Rental (1200 /month)	14,400/-
4	Total quantity produced (Per annum)	3600 kg
5	Cost of making cookies (Per annum)	5,48,400
6	Gross Income	9,00,000/-
5	Net Income	3,51,600/-
6	B:C	1.64

As shown in Table 8 The net income generated from the enterprise was 3,51,000 per annum by producing 3600 kgs of cookies with Rs. 5,48,400/- of production cost which includes variable, fixed and rental cost. Fortified (Moringa) millet cookies were sold at Rs. 250 per kg.

YFA-KVK, apart from providing handholding support in training and product development, it also assisted the group to obtain FSSAI (Food Safety and Standards Authority of India) licensing for the unit, besides it also provided financial support indirectly by linking them under PMFME (PM Formalisation of Micro Food Processing Enterprises Scheme) scheme for establishment and expansion of unit. This small-scale millet unit was found scalable with consistency in quality, timely delivery, and market demand.

Conclusion

Ever since the establishment of first KVK in the country under ICAR (Indian Council of Agricultural Research) its network as a science–based institution, has grown leaps and bounds in every district across the country. YFA-KVK one such science-based institute provides various farm support, it not only support agriculture but also enhance the improvement of allied sectors in the district. KVK, under EDP, empowered rural women SHGs through different extension activities on Millet production, value addition and marketing wherein through skill training programmes KVK resulted in 63.3 percentage of increase in knowledge level and 60.4 percentage development in skill level on millet production, value addition and marketing. Besides YFA-KVK also provided handholding support to women SHGs to develop unique Fortified (moringa) millet cookies and worked on its proximity analysis and sensory evaluation, wherein the results indicated that Fortified (moringa) millet cookies (T_2) were most acceptable in terms of overall acceptability. Therefore, these Cookies with high protein content, better taste and sensory characteristics gives a new range of products which can help to alleviate malnutrition. This product was highly accepted and appreciated by the consumers that eventually resulted in enterprise development by the women SHGs with a net profit of Rs. 3,51,600/- (per annum) from Wanaparthy district of Telangana state.

References

1. Agro & food processing. Strengthening millet farming policies need of the hour; c2022. https://agronfoodprocessing.com/strengthening-millet-farming-policies-need-of-the-hour/
2. Mahbub. Women Empowerment; theory, practice, process and importance. Gender and Politics in Bangladesh; c2021. p. 1-9.
3. Meilegaard MC, Civille GV, Carr BT. Sensory Evaluation Techniques. Ed. CRC, Boca Raton, Florida; c1999. p. 1-23.
4. PIB. Ministry of Commerce & Industry. Millet Conclave to help boost exports of nutri-cereals; c2022.
5. The Borgen Project. Lifestyle Diseases in India; c2016. https://borgenproject.org/lifestyle-diseases-in-india/
6. Bloom BS, Engelhart MD, Furst EJ, Hill WH, Krathwohl DR. Handbook I: cognitive domain. New York: David McKay; c1956.