

DEVELOPMENT OF VALUE ADDED PRODUCTS OUT OF INDIGENOUS GREEN LEAFY VEGETABLES



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CONCLUSION

From the above findings of present investigation below mentioned conclusions are drawn.

- Assessed the nutritional status of selected women.
- Food consumption was inadequate as compared to ICMR recommendation in all groups.
- Maximum percent adequacy was noted for cereals, sugar and jaggary and minimum was fruits.
- Nutrient intake of women was for below when compared with RDA.
- Anemic women were found more in rural than urban area women.
- Nutrient content high in dehydrated green leafy vegetables than as is basis.
- Micronutrient content was more in cauliflower leaves than selected other green leafy vegetables.
- The incorporation of fresh cauliflower leaves up to the level of 15 percent in traditional food products.
- The incorporation of dehydrated cauliflower leaves up to the levels of 10 percent traditional food products.
- Incorporation of fresh and dehydrated cauliflower leaves in traditional food products is beneficial to improvement it's nutritive value.
- Cauliflower can be successfully utilized for developed value added food products.
- Supplementation of the developed products Chakali for a period of 90 days helped significantly in improvement of hemoglobin and hematological parameters.

Further, the developed iron rich traditional products are good source of iron and calcium and helped in percent improvement in hemoglobin and hematological parameters. Therefore, it can be recommended that the consumption of developed iron rich traditional food products id

helpful in reduction of iron deficiency anemia not only that the absence or unavailability of synthetic drugs for treatment of iron deficiency anemia these products will serve the purpose to a large extent.

SUMMARY

The present study was conducted on development of value added food products out of uncommon, indigenous green leafy vegetables. The present study was comprised of three phases i) Assessment of nutritional status of selected women. ii) Development of value added iron rich products. iii) Intervention study. In phase first survey was carried out for total 300 women in rural and urban area of Nanded district. Different parameters were used for Assessment of Nutritional status i.e anthropometry, diet survey, biochemical assessment for hemoglobin content etc. In phase Second development of value added iron rich products covered selection of green leafy vegetables, nutrient analysis of green leafy vegetables in fresh and dried forms. Products were developed utilizing selected green leafy vegetables and nutrient analysis of developed value added products were also studied. Lastly in phase third intervention study was carried out for period of 90 days by conducting feeding trial of developed products on 75 selected women who were suffering with anemia. Prior to intervention the HB content was determined. Based on the HB content household women were arranged in descending order. Selected women belonging to experimental group received developed product, whereas experimental control group neither received tablet nor product and normal control group received tablet. Before and After intervention study the blood sample was collected with the help of trained personnel. The collected blood was immediately analyzed for HB, RBC, MCV, MCH and MCHC content. The results of the study is narrated here in following paragraphs.

Total 300 sample were divided into two groups, 150 women in each group i.e. rural and urban. 163 (54.33percent) women were in-between age group of 40 to 60 years, however 137 (45.66 percent) were from age group of 20 to 40 years 157 (52.33 percent) of the selected women belonging to the joint family whereas 143 (47.66 percent) were vegetarian while 107 (35.06 percent) were non-vegetarian. Total 60 percent of women were college educated and 40 percent were school educated high percentage 34.66 percent of women were belonging to monthly family income of Rs. 10,000-15,000/- and remaining 32.66 percent each were belonging to monthly family income of Rs. 5000-10,000/- and Rs. >15,000/- respectively. Anthropometric measurements were recorded of selected women for the study i.e. height, weight, arm circumference, waist circumference and body mass index was calculated. The height of the women in rural and urban area was almost same i.e. 150 ± 174 and 150.64 ± 1.96 cm respectively. In case of

weight comparatively urban women were having better weight ($47.61 \pm 4.48 \text{ kg}$) than rural women ($45.50 \pm 3.73 \text{ kg}$). The result showed that the high income group and non-vegetarian women recorded high values of arm circumference and waist circumference. Body mass index of rural and urban women was ranged between 19.02 to 21.70. Influence of area, age, food habit and family income revealed that no specific effect was noted of these factors on anthropometric measurements of selected women in both the areas. Statistically non-significant difference was noted. Hemoglobin content was estimated for all selected women and result revealed that as compared to urban women rural women were found to be anemic. The hemoglobin content of rural women ranged from 7.52 to 12.11 gm% and urban women 10.21 to 14.25 gm% respectively. Prevalence of undernutrition in selected rural and urban women as per age, food habit and family income revealed that the 79.36 and 74.71 percent women 20-40 and 40 and above from rural area and 82.43 and 85.52 percent women of 20-40 and 40 and above from urban area was found to be normal. Whereas percentage of undernutrition was decreased in urban area from 14.84 to 10.52 percent for both age group. In rural area 73.73 and 82.35 percent vegetarian and non-vegetarian women were found to be normal. Whereas 26.26 percent vegetarian and 17.64 percent non-vegetarian women from rural area were found in the category of undernutrition. Further urban area 79.78 and 91.07 percent vegetarian and non-vegetarian women were found to be normal. It was showed that 15.94 and 17.14 percent were under weight and 4.25 and 1.7 percent found to be overweight. The majority of studied women were categorized as normal irrespective of area and income, which ranged between 59.74 to 100 percent. None of the rural women were found to be overweight. 6.38 to 40.25 percent women were categorized as underweight.

The mean food intake of selected women of rural and urban area observed that the cereals consumption of both categories were 290.64 and 277.58 gm per day respectively. Pulses consumption was also same in both area i.e. 39.9 and 36.66 gm per day. The consumption of green leafy vegetable, root and tubers, other vegetable, fruits and milk, fats and oils and sugar and jaggery was low for both rural and urban areas. When compared with RDA it was found that all the recorded per day food intake was below than recommended dietary allowances given by ICMR. Nutrient intake was calculated on the basis of recorded values of food intake. Intake of nutrients i.e. energy, fat, Vitamin-C and calcium was recorded more by urban women. Whereas β -carotene intake was more in rural women. Intake of protein and iron was found to be almost same in rural and urban women. except fat other nutrient intake was found to be low when compared with RDA.

Non-vegetarian women exhibited more nutrient adequacy than the vegetarian women. Age was not influencing factors for food and nutrient intake.

Further results revealed that fresh leafy vegetables were having high content of moisture. All leafy vegetables showed moderate ash content. Green leafy vegetables are good source of minerals. The low fat content of all green leafy vegetables is in agreement with general observation that leafy vegetables are low in lipids. All green leafy vegetables have moderate fiber content. All the investigated green leafy vegetables are poor source of protein and carbohydrate, vitamin-c content of fresh green leafy vegetables ranged from 30.35 to 200.14 mg calcium and iron content high in cauliflower leaves 620.62 mg and 37.78mg respectively. Further dehydrated green leafy vegetables were found to be low in moisture, fat, protein but high in iron and calcium. The results suggested that the vegetables if consumed in sufficient amount would contribute greatly towards meeting the nutritional requirement for normal growth and also could provide adequate protection against diseases arising from malnutrition.

Generally, cauliflower leaves were not used regularly but it in the present research study utilizing in any form. Cauliflower leaves can be used as valuable source of micronutrient like iron and calcium. Hence, for value added food products cauliflower greens were used in fresh and dehydrated forms. Value added traditional food products developed by incorporation of fresh and dehydrated cauliflower leaves in 0, 10, 15, 20, 25 and 30 percent level. To know the acceptability of developed products sensory evaluation was carried out. The result of sensory evaluation showed that cauliflower leaves was highly accepted at 15 percent level. In case of Paratha, Bhajiya, Poori, bakarwadi and Kachori and dehydrated cauliflower leaves was highly accepted at 10 percent incorporation level in Shev, Chakali, Kharapara, Papad and Bundi.

Nutrient analysis of developed products with and without incorporation of cauliflower leaves in fresh form i.e. Paratha, Bhajiya, Poori, bakarwadi and Kachori shows that moisture, protein, fat, fiber, total minerals, iron, calcium, ascorbic acid and β -carotene was more incorporated in products than without incorporation of cauliflower leaves. Addition of cauliflower leaves powder in developed products showed increment value for all nutrients. Improvement was recorded in fat, fiber, iron, calcium, β -carotene and ascorbic acid of Shev, Chakali, Kharapara, Papad and Bundi.

To assess the impact of consumption of developed products in increment in hemoglobin content level feeding trial was carried out before that the women selected for study were those who recorded low hemoglobin content. Hence, 75 women were selected for intervention three groups were formed having 25 women in each group. The first group experimental group comprised of 25 women whose hemoglobin was recorded least. Remaining women were categorized as 25 each in experimental control and normal control. The first experimental group women were given developed value added products Chakali for 90 days, whereas experimental control group neither medicine nor product. However normal control group provided available conventional medicine for 90 days. The hematological parameter was assessed before and after intervention of all group. The result showed that experimental control groups was not change any hematological parameters in all investigation. Whereas normal control group increment in hemoglobin 4.88 percent, RBC 0.67 percent, MCV 1.97 percent, MCH 5.81 percent and MCVC 6.32 percent after intervention. Whereas experimental group shows increment in hemoglobin by 2.95 percent, RBC 0.44 percent, MCV 4.00 percent. However, MCH and MCVC increased more i.e. 26.67 percent and 14.89 percent respectively.