



## Community Science

### 1. Name of the technology: Low glycemic index (GI) roti mix

**Source of technology:** College of Community Science, CAU, Tura

**Year of notification /development:** 2019

**Description of the technology:** The glycemic index (GI) is a number ranging from 0 to 100 assigned to a food, which represents the relative rise in blood glucose level two hours after consuming food. Food which has low GI will be considered as healthier. Hence a roti mix using locally available farm products has been developed. Physicochemical analysis shows that the mix is rich in dietary fibre. Low 'GI Roti mix' was prepared with whole wheat flour and dehydrated squash powder, in 90:10 proportion. Organoleptic tests were taken for the entire developed product.



**Fig.** Prepared roti from low GI mix

### 2. Name of the technology: Low glycemic index (GI) upma mix

**Source of technology:** College of Community Science, CAU, Tura

**Year of notification /development/notification:** 2019

**Description of the technology:** There are estimated 72.96 million cases of diabetes in adult population of India. The prevalence in urban areas ranges between 10.9% and 14.2% and prevalence in rural India was 3.0-7.8% among population aged 20 years and above with a much higher prevalence among individuals aged over 50 years. Food which has low GI is considered as healthier for both diabetic patients and even for normal individuals. Physicochemical analysis shows that the mix which has been developed and is presented here is rich in dietary fibre. This low 'GI Upm mix' is prepared with semolina, foxtail millet and squash powder mix. The composition of the Upma mix is: Semolina: 65 g, Foxtail Millet: 20 g, Squash powder: 15 g. organoleptic test (sensory evaluation) indicated that the mix has high acceptance levels.

### 38. Name of the technology: Arka Mushroom Machinery (Mushroom Spawn Production Machinery)

**Source of the technology:** ICAR-IIHR

**Description of technology:** Mushroom production units need spawn regularly for production of mushroom. The machineries for mushroom spawn production have been developed. Grain cleaner is for cleaning the grains by oscillating sieves. A grain boiler is operated by 9-12 kW electric power. The integrated grain mixer cum grain filler is for mixing boiled grains with chalk powder and filling spawn to pp bags. Spawn inoculator used inoculating mother, Generation-1, Generation-2 and commercial spawn has also been developed. These machineries have been developed for 170 kg per day of spawn production. The use of machineries will reduce the labour requirement by 50%, power requirement by 60 % and labour efficiency is increased. The contamination of spawn is also reduced.

Use to clean the grain from dust, sticks etc.



### 39. Name of the technology: Arka Mushroom Growing Unit

**Source of the technology:** ICAR-IIHR

**Description of technology:** The present technology relates to the production of oyster mushroom by using low cost Solar Power Integrated Outdoor Mushroom Growing Unit which can be at both rural and urban levels. Presently most of the growers are using permanent or semi-permanent structures for growing these mushrooms. The newly designed outside mobile chamber is low cost in comparison to the permanent building and even during non-favourable conditions like months of April and May, the mobile chamber gives a better environment for mushroom growing due to its evaporative cooling principal as compared to permanent structures. As the availability of the space and capacity of the investment is less, maintenance is easy and less costly for adoption. Such structures will help in developing entrepreneurship not only in mushroom cultivation but also to fabricate and sell the units to the needy growers. It enhances mushroom cultivation to make mushroom as a part of diet. Daily consumption which can help in mitigation of malnutrition and also additional income can be generated for entrepreneurship development especially among women. The overall dimension of the growing chamber is 1.35 x 0.93 x 1.69 m which is made up of 1" CPVC pipes and fittings. It is covered with nylon 40 mesh to protect the entry of insects and to facilitate the aeration. It is further covered with locally available gunny bag all around and it is wetted to maintain humidity inside the chamber. A 30 W DC misting diaphragm pump with 10 nozzles of 0.1 mm size to produce more than 100 bar pressure to get very fine misting inside the chamber. It can be operated either by electric power or using solar power system with 300 W panel, inverter, 12V storage battery and a timer. The entire growing chamber is fitted inside a mild steel frame of 1.08 x 1.48 x 1.8 (side height) x 2.2 (centre height) with mobile wheels for easy mobility and transport. The solar panels are mounted on the roof top of the frame and inverter and battery are mounted and supported in the frame. A 30 litre water tank is fitted at the bottom side of the frame along with the misting pump. It was evaluated by growing two varieties of oyster varieties viz., 20 bags (1 kg) of Elm oyster and White oyster mushroom were evaluated both at cropping room and outside chamber every month from 2016 to 2018.

The average yield recorded during 2016 to 2018 shows that there is an average increase of 108 % in Elm oyster yield in mobile chamber in comparison to the cropping room yield. Similarly, an increase of 51% mushroom yield was recorded in white mushroom yield. The average monthly mushroom yield from this structure is 25-28 kg.



Different preparations of *Upma* out of the Low GI mix

### 3. **Name of the technology:** Modified Vawksa rep; a smoked pork product

**Source of technology:** CVSc&AH (CAU, Imphal), Aizawl, Mizoram

**Year of notification/development/notification:** 2020

**Description of the technology:** Modified Vawksa rep, the smoked pork product is prepared with slight modification of the traditional Vawksa rep. Pork meat are cut into small pieces of almost uniform size (3x3 in.) Pork chunks, which are to be cut into uniform size (3 x 3 in.) with a knife, are cured for 24 h. The meat chunks are subsequently placed in the smoke unit (Kerres Showsmoker CS 350 EL) and then smoked for 45 minutes. Hardwood saw dust is used for smoking the meat. After smoking and before packaging, the product should be sprayed with Nisin (Hi-Media Laboratories Pvt. Ltd.) with the help of a sprayer at the rate of 5 mg kg<sup>-1</sup> of product. Vacuum packaging was found to be better compared to aerobic packaging under refrigerated storage for 15 days and all the physicochemical, microbiological and sensory properties of the products were found to be superior in case of vacuum packaged samples. Curing and applying Nisin, a new product, the modified form of Vawksa rep shows superior physicochemical, microbiological and sensory properties. The modified Vawksa rep is highly acceptable even on 15th day of storage due to superior sensory rates throughout the storage period whereas the sensory scores of Traditional Vawksa rep gradually decreases and becomes almost unacceptable at 15th day of storage.



Traditional vs Modified Vawksa rep



Preparation of modified

#### 4. **Name of the technology:** Low cost Smoked Chicken sausages incorporated with bamboo shoot

**Source of technology:** CVSc&AH (CAU, Imphal), Aizawl, Mizoram

**Year of notification/development/notification:** 2020

**Description of the technology:** Bamboo shoots can be successfully incorporated for nutritional improvement as well as from economical point of view and also to give a preservative effect. Bamboo shoots may be soaked overnight and cooked and chopped before adding to the sausage mix. In a formulation, 8% of meat can easily be replaced with bamboo shoots without effecting the sensory attributes as well as other nutritional quality. By adding bamboo shoot an ethnic taste may be given to the products while incorporating the beneficial dietary fibre in the product.



#### 5. **Name of the technology/variety:** Post harvest technology of Muga cocoon

**Source of technology/variety:** Central silk board

**Year of release:** 2020

**Description of the technology:** Poor reeling efficiency leads to wastage of cocoon yarn. Hence different slippery substances affect reeling efficiency. During cooking of cocoon alkali solution were used along with slippery substance. The



alkali best suited for Muga cocoon is made from plaintain ash of *Musa Bulbisina*. Different slippery substance is *monisaal* seed (Vernacular name (Hindi) - Ritha scientific name -*Sapindus mukorossi*), *outenga* (Common name- Elephant apple, Scientific name- *Dillenia indica*), bark of *cochin Goroka* and sometimes non- ionic liquid detergent were also used. The best slippery substance found is *monisaal* seed and *outenga* followed by bark of *cochin goreka*.

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#### Treatments- Slippery substances



**Liquid detergent**



***Outenga***



***Monisaal Seed***



***Bark of Cochin Goroka***



## 6. Name of the technology: Ergonomically designed (new) tea plucking basket

**Source of technology:** College of Community Science, AAU

**Year of release:** 2019

**Description of the technology:** Ergonomically designed tea plucking basket is developed by using anthropometric measurements of the worker to reduce physiological cost of plucking activity. The ergonomically designed tea plucking basket help to reduce back pain, neck pain and shoulder pain and provide comfort to wearer than conventional method of tea plucking basket made from bamboo. However, synthetic bags used by plucker are not ergonomically suitable and create health hazards in long run due to inadequate body poster.



Bamboo basket (FP)



Ergonomically designed tea plucking basket

## 7. Name of the technology: Effectiveness of bamboo ladle for parboiling of rice.

**Source of technology:** College of Community Science, AAU

**Year of release:** 2019

**Description of the technology:** Parboiling involves partial boiling of paddy before milling in order to increase its nutritive value, to change the texture of cooked rice and reduce breakage during milling. Parboiling is done in three steps as soaking, steaming and drying. During steaming of paddy most of the women use bamboo perforated basket which are very hot to carry and cause burn and hence an ergonomically designed bamboo ladle was developed to ease the work. The specifications of bamboo ladle: Weight-150g, Diameter-30cm, Circumference-94.2 cm, Length of the handle- 20 cm, Total length of the ladle:91



Use of bamboo basket (traditional *Kharahi*) while parboiling rice (FP)



Use of bamboo ladle for parboiling of rice

cm. Bamboo ladle used in parboiling rice is ergonomically designed and provide ease to carry the parboiled paddy rice while boiling. It reduces back ache and prevents burning of hands from steam and gives good grip. It performed the work more comfortably than the conventional method.

## 8. **Name of the technology:** Effectiveness and utilization of Lemon Harvester

**Source of technology:** College of community science, AAU Jorhat

**Year of release:** 2019

**Description of the technology:** Use of lemon harvester equipment for plucking of Assam Lemon fruit. The arduous operation of harvesting of lemon is usually performed manually with use of traditional hand tools in upright posture which creates back pain for majority of labors. Moreover, in traditional method of harvesting, fruits get damage and thus decrease its shelf life. Further, the thorns in Assam lemon tree hurt the farm women. Hence, the lemon harvester designed by AAU, Jorhat observed to be farmers friendly lemon harvesting tool.



Lemon harvester used in harvesting lemon



Lemon harvester used in harvesting lemon



Lemon harvester



## 9. **Name of the technology:** Popularization of paddy picker for drudgery reduction

**Source of technology:** College of Community science, AAU Jorhat.

**Year of release:** 2021

**Description of the technology:** Paddy picker is a drudgery reduction equipment's and a women friendly hand tool. The technology is useful for handling paddy grains in a faster manner without much physical stress. The tool is specially designed for laborious and time-consuming traditional paddy picking operations after thrashing and during sun drying while loading and unloading paddy from storage and gunny bags. Its takes only 2.10 minutes to load and unload paddy in compared to traditional method of paddy picking i.e. 6 minutes.



## 10. **Name of the technology:** Jackfruit chips – a value added products

**Source of technology:** College of Community Science, CAU (I), Tura, Meghalaya

**Year of notification:** 2020

**Description of the technology:** The preparation of jackfruit chips is very simple and can easily be processed. The prepared chips can be stored at ambient condition keeping in Aluminium laminate pouches for two months without loss of organoleptic quality. Ingredients required are fully matured but unripe deseeded bulbs, cooking oil, chilli powder, salt, potassium meta bi-sulphite. Equipment's required are jackfruit chips cutting machine, deep fryer, sealing machine, etc.



**11. Name of the technology:** Jackfruit squash a value-added product

**Source of technology:** College of Community Science, CAU (I), Tura, Meghalaya

**Year of notification:** 2020

**Description of the technology:** This jackfruit squash is prepared with ripe deseeded jackfruit bulbs, sugar and citric acid. It provides for a refreshing summer drink packed with vitamins and minerals. Inputs required are fully ripe jackfruit bulbs, citric acid, sugar, KMS, squash making machine, pulping machine, boiler, homogenizer, food grade bottles.

**12. Name of the technology:** Aloe vera based Ready-To-Serve (RTS) drink blended with ginger, amla and sweet lime

**Source of technology:** College of Community Science, CAU (I), Tura, Meghalaya

**Year of notification:** 2020

**Description of the technology:** The product is an RTS Drink developed from locally available inputs like Aloe vera, ginger, amla and sweet lime. The juice is extracted from Aloe vera, ginger, amla and sweet lime and then mixed with sugar syrup. The cooled product is stored in sterilized bottles. It is a value added product from locally available raw materials. Inputs required are filtration unit, Sensitive balance, Juice extractor, Homogenizer, Appropriate Utensils, Pure water.



### 13. Name of the technology: Antimicrobial finish and herbal dyeing from arecanut extract

**Source of technology:** College of Community Science, CAU (I), Tura, Meghalaya

**Year of notification:** 2020

**Description of the technology:** Arecanut has high medicinal value having high TPC (Total phenolic content) and significant antimicrobial activity. Arecanut contains active substances such as alkaloids, tannins etc., produced during their secondary metabolism, which impart medicinal properties. Arecanut extract can be used in colouring as well as for imparting antimicrobial finish in a single bath for diversified functional use. Arecanut extract is used for natural herbal dyeing as well as imparting antimicrobial finishes to garment in single bath. The pre-treated cotton fabrics were immersed in the antimicrobial stock solution containing arecanut powder (10% w v-1), cross linking agents (6% citric acid owf) for one hour and shade dried. Standard wash durability test was conducted with antimicrobial assessment test on each successive wash for checking durability or shelf life of textile finishes. Inputs required are areca nut extracts, sodium hydroxide, citric acid for cross linking, chemical or natural mordents for different shades, dyeing vessel and heating apparatus.



### 14. Name of the technology: Pumpkin seed butter

**Source of technology:** College of Community Science, CAU (I), Tura, Meghalaya

**Year of notification:** 2020

**Description of the technology:** Pumpkin seeds butter can be successfully used as a substitute of the peanut butter. Unlike peanuts, pumpkin seed does not have allergens, which make pumpkin seed butter suitable for wide and extensive consumption.

Seed butter can be made from raw seed and roasted seeds. The sensory profile analysis indicates high acceptability profile for roasted seed butter. Preparation of pumpkin seed butter involves dehydration and pulverizing of herbs like naga chives, mint, cinnamon, dehulling pumpkin seed, Dehydration and roasting of pumpkin seeds, pulverizing pumpkin seed and herbs and making butter.



### 15. Name of the technology: Pumpkin ice cream

**Source of technology:** College of Community Science, CAU (I), Tura, Meghalaya

**Year of notification:** 2022

**Description of the technology:** Pumpkin pulp can be used for the formulation of the pumpkin ice-cream. This will enhance nutritional value of ice-cream as pumpkin is considered as one of the food with high content of  $\beta$ -carotene. The colour of the pumpkin will also enhance the colour to the product which eliminates the use of artificial colouring substances. The pumpkin pulp can be used to up to 60-70% in the cream base to make pumpkin ice-cream. The pumpkin ice-cream is formulated using whipped cream and milk base. The steps involve in preparation of pumpkin pulp, preparation of milk base using milk, sugar, gelatin (if desired) and corn flour. The milk base was half frozen and beat to peak stiff followed by addition of whipped cream and pumpkin pulp and freezing it to  $-20^{\circ}\text{C}$ . Inputs required are pumpkin, whipped cream, milk, sugar, cornflour, gelatin (optional).



### 16. Name of the technology: Pumpkin squash

**Source of technology:** College of Community Science, CAU (I), Tura, Meghalaya

**Year of notification:** 2022

**Description of the technology:** Pumpkin squash can be prepared using pumpkin as main ingredients and make a blend of fruits like pineapple and citrus. The squash was prepared with addition of any artificial colour. The natural colour of pumpkin can serve as colour of squash with discolouration for at least a year. Mature pumpkin pulp can be blended with the ginger extract/ pineapple juice, sugar syrup and  $40^{\circ}\text{Brix}$ . The pumpkin has shelf life of at least 13 months with proper packaging. Inputs required are pumpkin, ginger extract, sugar, citric acid, sodium benzoate.





## 17. Name of the technology: Gluten free Millet Cookies

**Source of technology:** College of Community Science, CAU (I), Tura, Meghalaya

**Year of notification:** 2024

**Description of the technology:** Value addition of local millets will promote its use and to popularize health foods to the health conscious especially the consumers who suffer from gluten sensitivity. The ingredients such as millets, oats, jaggery, fat were sourced from the local market. The ingredients were processed individually into powders and different formulations were prepared. Whole wheat flour cookies served as the control and the formulation with highest sensory acceptability was selected for further nutrient analysis. The formulation containing 70% millets and 30% oats was selected as the most acceptable product. Inputs required are foxtail millet, oats, jaggery, fat.



Fig. Finger Millet Cookies (Gluten Free)

## 18. Name of the technology: Sickle for paddy harvesting

**Source of technology:** College of Community Science, CAU (I), Tura, Meghalaya

**Year of notification:** 2024

**Description of the technology:** Considering the observations made during the intervention by use of sickles designed by PAU, the handle design of the sickle was further refined/improved to make it ergonomically suitable for the women of the north eastern region. The musculoskeletal comfort and heart rate during work were recorded to study the Energy expenditure, Total Cardiac Cost of Work and Physiological Cost of work during use of the refined/improved sickle design. The findings of study reveal that the refined sickle is more effective in terms of Energy Expenditure, Total Cardiac Cost of work, Physiological cost of work and weight of the sickle.

