

## **7.2 Best Practices**

7.2.1 Describe at least two institutional best practices (as per NAAC format)

### **i) Best Practice – I**

#### **1. Title of the Practice:**

WEEKEND DIABETES CLINIC & DEVELOPMENT OF HERBAL FORMULATIONS AND THEIR SCIENTIFIC VALIDATION

#### **2. Objectives of the Practice**

The objective of the practice is to design herbal/Ayurvedic formulations for lifestyle diseases with focus on Type II diabetes mellitus and Liver disorders and to validate established Ayurvedic polyherbal formulations for their therapeutic functions in human subjects besides quality assessment of formulations.

#### **3. The Context**

Diabetes mellitus is a chronic metabolic disorder that affects human body physically, psychologically and socially. It is defined as a group of disorders characterized by hyperglycemia, altered metabolism of lipids, carbohydrates and proteins. The diabetes mellitus is one of the most prevalent diseases in this region. Jiwaji University is serving a great cause by running a weekend ‘Diabetes Clinic’ on every Sunday under the supervision of a Ayurvedic Physician. The Clinic is run by the Centre for Translational Research established in Jiwaji University in Nov. 2002. It also serves as a model for academia-industry interaction with a long term association of more than a decade. The Biochemistry division and Centre for Translation Research of Jiwaji University and M/S Dindayal Group of Industries are working in close association. Till this date about 1, 50, 000 subjects have been screened for diabetes and those interested in Ayurvedic treatment have been provided with drugs at the centre. Currently, about 500 type II diabetics are registered and attend the clinic regularly.

#### **4. The Practice**

The ‘Centre for Translational Research’ runs a weekend ‘Diabetes Clinic’ on every Sunday under the supervision of a Ayurvedic Physician. The type II diabetic subjects interested in taking Ayurvedic drugs are provided with anti-diabetic Ayurvedic formulations for periods ranging from 3 months to 1 yr. The subjects on therapy are monitored at regular monthly intervals to assess the efficacy of Ayurvedic drugs administered for specific periods. All laboratory investigations and drugs are provided free of charge to the subjects.

Major formulations used in Ayurveda are based on herbs used as decoctions, infusion, tinctures and powders. Drug formulation in Ayurveda (As mention in Ayurvedic treatise like Charaka Samhita, Sushruta Samhita) is based on two principles: (a). Use as single drug, and (b). Use of more than two drugs. When two or more herbs are used in formulation they are known as polyherbal formulation. A before and after study of a group of human subjects with type 2 diabetes mellitus was carried out Patients were given “Polyherbal formulation” consisting of a mixture of 10 herbs *Gymnema sylvestre* (Gurmar), *Syzygium cumini* (Jamun seed), *Phyllanthus emblica* (Amla), *Curcuma longa* (Haldi), *Pterocarpus marsupium* (Vijaysaar), *Terminalia chebula* (Harad), *Cassia fistula* (Amaltas), *Picrorhiza kurroa* (Kutki), *Swertia chirata* (Chirayita), *Terminalia bellerica* (Behada).

The formulations are refined from time to time on the basis of results and clinical feedback from end users. The drugs are provided by the courtesy of Dr. Gopal Krishna Memorial Dindayal Research Foundation, Gwalior. The activity is supported by National funding agencies such as AYUSH, UGC, DST etc. in the form of research projects.

The phytochemical/Ayurvedic formulations developed and evaluated in association with sister departments either in animal models/ type II diabetic subjects are presented separately in a booklet.

## **5. Evidence of Success**

About 1, 60, 000 type II diabetic subjects were provided with free laboratory investigations and ayurvedic drug formulations. Daily administration of various polyherbal formulations and their nanoparticle hot water extract regularly for 6 months resulted in significant reductions of blood glucose and glycosylated hemoglobin levels. There was also a significant increase in high density lipoprotein cholesterol levels with concomitant decreases in total cholesterol, triglycerides, low density lipoprotein cholesterol and very low density lipoprotein. A significant improvement in glycosuria and proteinuria was also observed. Also, the subjects exhibited a significant improvement in enzymatic and non-enzymatic biochemical markers of oxidative stress. The kidney and liver functions remained normal and in fact improved in many subjects.

## **6. Problems Encountered and Resources Required**

No problems of any nature have been encountered.

## **7. Notes (Optional)**

Similar practice can be adopted by other Institutions.

## **(ii) Best Practice – II**

### **1. Title of the Practice:**

Excellence in Sports

### **2. Objectives of the Practice**

The objective of the Practice is to impart training to the students of the University and children and youth of Gwalior so that they may excel in sports. In addition, the department of Physical Education also organizes zonal and National sports events, championship meets, summer training programs for children and local residents, yoga classes for both, young and elderly persons.

### **3. The Context**

The University has established itself as a leading centre in sports in the region and is presently catering to the sports need of Children, Youth and old People of Greater Gwalior by organizing regular Yogic classes and scientific coaching camps in different games and sports. The Sports Complex has got two floodlight basketball courts with portable uprights, three floodlight tennis courts, four volleyball courts (caged) one hockey ground, one grassy football ground, standard cricket ground with turf wicket, one Kho-Kho, two Kabaddi, one Handball, one Indoor hall for Table Tennis, Judo, Aerobic, Badminton, Wrestling and Weight Lifting and a 400 m. grassy track. The sports complex of University is named as Mahadji Scindia Sports Complex.

### **4. The Practice**

Describe the practice and its uniqueness in the context of India higher education. What were the constraints / limitations, if any, faced (in about 400 words)?

### **5. Evidence of Success**

The students of Jiwaji university have won several laurels. Our hockey (women) team won the first place amongst Indian Universities (2007-08), the Badminton (women) team won the first place amongst Indian Universities (2007-08). The Badminton (women) and Volleyball (men) teams stood second and fourth in the region respectively.

### **6. Problems Encountered and Resources Required**

Please identify the problems encountered and resources required to implement the practice (in about 150 words).

As such no major problems are experienced even from resource point of view.

### **7. Notes (Optional)**

### **(iii) Best Practice III**

#### **1. Title of the practice:**

Energy conservation and Energy Audit

#### **2. Objective of the practice:**

Objective of the Energy conservation and Energy audit practice is to encourage use of alternative source of energy. The Jiwaji University has established. Solar technology to meet its energy demands as much as possible in a green manner. This initiative has helped the University in reducing dependency on conventional sources of energy for meeting their energy requirements and increasing its dependency on renewable energy resources.

Solar energy plays crucial rule in this initiative. Solar cell panels, Solar heaters, Solar lightning and solar energy-based equipment are used. Photoelectric effect is the underlying principle of working of Solar based electricity equipment.

#### **3. The Context:**

Major contextual features for making energy conservation initiative successful is the space selection for capturing solar energy. It is to be ensured that space for solar equipment is such that it receives ample amount of Sunlight without any hindrance from nearby buildings and trees. Second important feature of the initiative is to select the lab equipment that are energy efficient and can be integrated to the solar cell panels. e.g. Weather station at School of Studies in Environmental Science, it uses solar cell panels to monitor weather parameters.

For the Energy auditing, School of Studies in Environmental Science is coordinating with the various Departments of Jiwaji University and its campus to audit them time to time.

Ensuring maintenance of solar equipment is indispensable to the project as they are the crucial for energy conservation. School of Studies in Environmental Science rely on Solar equipment considerably as its uses Solar Weather forecasting station, solar panels and solar lightning in garden.

#### **4. The Practice:**

Students of School of Studies in Environmental Science are carrying out periodic Energy auditing in the University's Departments. Department coordinates with the administration and encourage them to use energy efficient appliances. This helps Departments to reduce their electricity footprints significantly. Use of Light emitted diodes bulbs and Bureau of energy efficiency high star rating equipment are being installed in the University and Department. This

initiative also helps in creating a generation of citizens that are sensitive to the environment and have acquired requisite skills to carry on with their environment friendly activities while inspiring others to do the same. The Department is conducting the University energy audit periodically. Data generated thereby via energy audit enables the university to take necessary steps in requisite directions to reduce their electricity footprint from conventional resources. e.g. University gardens are being lightened by solar cell panels after sunset.

School of Studies in Environmental Science has Green building that largely uses the sunlight to lit itself thereby reducing need of electrical lightning. Building stays airy in summer and nearby tree cover ensures cool air supply.

Uniqueness of this project lies in the fact that it has a potential for mitigating the impacts of global warming and climate change while encouraging sustainable and energy efficient practices.

#### **5. Evidence of Success:**

School of Studies in Environmental Science has been successful in inculcating environmental friendly approach in the University Departments and campus. It has created the culture of using solar panels for lightning the gardens in the university. It has taken the initiative to set Zero emission and green weather forecasting station that functions using solar light. Regular and sincere auditing of the University Departments and campus has enabled them to take environmental friendly initiatives. Also, School of Studies in Environmental Science is sending an encouraging message of green architecture pre-planning before commencing on any infrastructure project with its own Green building.

#### **6. Problems encountered and Resources required:**

Energy conservation requires resources and skills such as solar cell panels to meet energy demands, solar energy-based equipment in the requisite Departments, integration of innovative green architecture planning according to local supply of resources. Significant Manpower is required to carry out Energy audit of all the Departments, hostels and University campus.

#### **7. Notes (Optional)**

Non-conventional energy sources can be tapped by any Institution.

#### **iv) Best Practice – IV**

##### **1. Title of the practice:**

Sustainable Solid Waste Management

##### **2. Objective of the practice:**

Objective of the Sustainable waste management practice is to convert organic waste coming from University hostel's kitchen, city temples and gardens of Jiwaji University into compost by using Vermicomposting technique thereby achieving dual outcomes of sustainable waste management and its use as organic compost.

Many religious beliefs prevent temple flowers from being trashed, as they are considered sacred. This is one of the reasons why people prefer to discard them in rivers, lakes and other water bodies, which then mix with the water and land resources and pollute them. Intended outcomes of vermicomposting practice would not only abate the river and land pollution but also produced compost of superior value with very high nutritional value. The vermicompost is not only used on campus gardens but is also made to public at very subsidized rate.

##### **3. The Context:**

Lot of waste is generated from discarded flowers from temple sources and is generally subjected to incineration. Temple waste includes discarded flowers, household wastes, incense sticks, etc. It also includes non-degradable items such as utensils, plastics, polythene etc. Though the waste is segregated at the source itself, it still consists of plastics remnants from garlands etc. Garden waste involves leaves, branches etc. while kitchen waste includes leftover foods and vegetables. Major contextual features for making sustainable waste management successful is to ensure waste is segregated at the source itself.

Maintaining physio-chemical parameters such as temperature, pH, electrical conductivity, moisture content and volatile solid samples is quite essential for obtaining nutrient rich compost and requires consistent monitoring.

##### **4. The Practice:**

Many compost pits (More than 15) are formed for the purpose of vermicomposting at site of School of Studies in Environmental Science. Department has also coordinated with the University hostels in creating onsite vermicomposting pits. The pits are filled with organic waste every day. Each pit has capacity of 300-400 kg. The temple waste is thoroughly mixed

with cow dung. This is to ensure proper mixing and faster decomposition. It also improves the quality of compost. The composting is done on a phased manner.

#### Physio-Chemical Analysis

The department has facilities for chemical analysis of the prepared compost. The following chemical parameters are analyzed:

- b) Total Nitrogen.
- c) Total Phosphorus.
- d) Electrical Conductivity.
- e) Moisture content.
- f) pH
- g) Organic Carbon
- h) Humus

Once the compost is ready after its due course, the compost is then sealed in bags and containers. The compost takes only 40 days to prepare.

Uniqueness of this project lies in the fact that it has a potential for skill development and employment generation besides solid waste utilization in the form of nutrient rich compost. The raw material is easily available and training can be easily imparted. It can be modelled in variety of places ranging from villages to metros. The setup cost is minimal and the return on investment is good.

Vermicomposting requires no energy or electricity input unlike production of synthetic fertilizers which is an energy intensive process. Most of the energy is derived from fossil fuel based sources in order to produce synthetic fertilizers.

Vermicomposting contains plant hormones like auxin and gibberellins and enzymes which believed to stimulate plant growth and discouraged plant pathogens. Thus, Vermicomposting result into good plant yield. Adding Vermicomposting enriches soil by adding essential plant nutrients like nitrogen, phosphorus and potassium, improve crop yields, and reduce chances of plant diseases.

## **5. Evidence of Success:**

We are converting 50-60% of waste into compost using Vermicomposting in more than 15 pits, where each pit has capacity of 300-400 kg. The compost is of good quality. The compost is used in University gardens for enriching the soil. This has eliminated the need for chemical fertilizers for the same. Surplus compost is also marketed as green compost by the Jiwaji University. It provides the revenue to the University and organic compost to the end users.

We also provide skill training to other institutes and individuals like farmers, gardeners and students who wish to learn this skill of composting. This enhances their job potential and provides a sustainable source of income to them. We also encourage Schools teachers and students to visit our department and learn about practices of Sustainable Solid Waste Management. Active involvement of students, research scholars and teachers of School of Studies in Environmental Science in the training modules enhance their waste management skills and inculcate green habits in them.

Our initiative has extended over a period of time and is greatly accepted and loved in society. Temples administration themselves segregate wastes at their premises to their best and sponsor transporting of the temple waste to departmental Vermicomposting field.

## **6. Problems encountered and Resources required:**

No major problems are encountered as such in converting temple waste to Organic compost. However, Vermicomposting requires consistent supply of organic waste, segregated of all non-biodegradable things that otherwise can be present and affects the productivity of earthworms and quality of compost thereby.

## **7. Notes (Optional)**

Similar practice can be adopted by other Institutions as well.