

WATER-LESS AGRICULTURE

A CHEAP SOLUTION FOR DROUGHT:]



AIM:

- **WE SOUGHT TO CREATE A PRODUCT THAT CAN IMPROVE SOIL QUALITY, PRESERVE WATER AND RESIST DROUGHT THEREFORE PRODUCING A BETTER ENVIRONMENT FOR CROP'S GROWTH.**
- **IT MUST BE HARMLESS AND NON-POLLUTING WITH SUPER WATER ABSORBING ABILITY AND WATER PRESERVING ABILITY WHILE THE ABSORBED WATER CANNOT BE EASILY REMOVED WHEN APPLIED TO SOIL SUBJECT TO MICROBIOLOGICAL DEGRADATION AS A RESULT OF AEROBIC AND ANAEROBIC BACTERIA.**
- **THE SAP MAKES USE OF NATURALLY FOUND POLYSACCHARIDE IN ORANGE PEELS. THE PRODUCT IS FULLY BIODEGRADABLE, LOW-COST AND HAS BETTER WATER RETAINING PROPERTIES THAN COMMERCIAL SAPS.**

DETAILS OF THE PROJECT COMPONENTS

- **MATERIALS USED: ORANGE PEELS**

ARTIFICIAL SAP

3 PLANTS(HIBISCUS)

WATER (NORMAL GROUND WATER FROM WELL)

SOIL MOISTURE SENSOR

- **PLANT DETAILS: HIBISCUS (NATIVE BREED)**

SOURCE OF ORANGE PEELS

- **WE WENT TO A NEARBY JUICE SHOP IN RAMAPURAM AND ASKED FOR THE ORANGE PEEL THAT THEY USE FOR MAKING JUICE .**
- **HE ASKED FOR ONE DAY TIME , AND THE NEXT DAY HE GAVE ONE COVER OF ORANGE PEEL.**

FINAL OBSERVATION AND RESULTS

TESTS DONE:

- **ABSORPTION TEST**
- **TEST WITH PLANTS**
- **SOIL MOISTURE TEST**

ABSORPTION TEST

- **THE ARTIFICIAL SAP AND THE SAP THAT WE PREPARED WERE PUT TO TEST BY DIRECTLY ADDING WATER TO BOTH THE SAPS , THUS WE WERE ABLE TO DETERMINE THE WATER RETAINING CAPACITY OF THE SAP.**
- **TO 5 GRAMS OF EACH SAP , 2 GLASSES OF WATER WAS ADDED.**

INITIAL IMAGE OF THE SAP



This is the photo of the sap put for absorption on 23rd January 2019



TEST WITH PLANTS

- **THREE PLANTS WERE BOUGHT AND EACH PLANT WERE WATERED ONLY ONCE ON 20/1/2019 .**
- **PLANT (1) : NORMAL SOIL**
- **PLANT (2) : SOIL WITH ARTIFICIAL SAP**
- **PLANT (3) : SOIL WITH OUR SAP**

QUANTITY OF THE SAP THAT WAS ADDED:

3 SPOONS WAS MIXED WITH 1 POT OF SOIL

DAY 1 ~ (20-1-2019)



Plant 1

Plant 2

Plant 3

DAY 2~(21-1-2019)



Plant 1

Plant 2

Plant 3

DAY 3~(22-1-2019)



Plant 1

Plant 2

Plant 3

DAY 4~(23-1-2019)



Plant 1

Plant 2

Plant 3

DAY 5~(24-1-2019)



Plant 1

Plant 2

Plant 3

DAY 6~(25-1-2019)



Plant 1

Plant 2

Plant 3

SOIL MOISTURE TEST

- **THE TEST WAS CONDUCTED USING FOLLOWING EQUIPMENT**
- **SOIL MOISTURE SENSOR**
- **ARDUINO MEGA**
- **ARDUINO IDE (SERIAL MONITOR)**



PROCESS OF THE TEST

- **THE MOISTURE LEVEL OF THE SOIL WAS CHECKED FOR THREE PLANTS ON 22ND OF JANUARY 2019 AND ON 24TH OF JANUARY 2019.**
- **WE WERE ABLE TO SEE THE GRADUAL DECLINE IN THE MOISTURE LEVEL OF THE SOIL. HOWEVER THE DECLINE WAS DRASTIC IN PLANT 1 WHERE AS IN PLANT 2 AND 3 IT WAS VERY MINUTE.**

TEST READING

22nd January 2019

PLANT 1

PLANT 3

```
COM4 (Arduino/Genuino Uno)
Wet soilSoil Moisture = 520
Wet soilSoil Moisture = 505
Wet soilSoil Moisture = 529
Wet soilSoil Moisture = 546
Wet soilSoil Moisture = 539
Wet soilSoil Moisture = 540
Wet soilSoil Moisture = 541
Wet soilSoil Moisture = 539
Wet soilSoil Moisture = 535
Wet soilSoil Moisture = 540
Wet soilSoil Moisture = 547
Wet soilSoil Moisture = 548
Wet soilSoil Moisture = 553
Wet soilSoil Moisture = 545
Wet soilSoil Moisture = 542
Wet soilSoil Moisture = 548
Wet soilSoil Moisture = 552
Wet soilSoil Moisture = 539
Wet soilSoil Moisture = 553
Wet soilSoil Moisture = 555
Wet soilSoil Moisture = 561
Wet soilSoil Moisture = 550
Wet soilSoil Moisture = 541
Wet soilSoil Moisture = 551
Wet soilSoil Moisture = 548
Wet soilSoil Moisture = 547
Wet soilSoil Moisture = 551
Wet soilSoil Moisture = 558
Wet soilSoil Moisture = 553
Wet soilSoil Moisture = 543
Wet soilSoil Moisture = 539
Wet soilSoil Moisture = 540
Wet soilSoil Moisture = 532
Wet soilSoil Moisture = 528
Wet soilSoil Moisture = 532
Wet soilSoil Moisture = 532
Wet soilSoil Moisture = 533
Wet soil
```

```
COM4 (Arduino/Genuino Uno)
Wet soilSoil Moisture = 456
Wet soilSoil Moisture = 448
Wet soilSoil Moisture = 444
Wet soilSoil Moisture = 452
Wet soilSoil Moisture = 474
Wet soilSoil Moisture = 433
Wet soilSoil Moisture = 436
Wet soilSoil Moisture = 446
Wet soilSoil Moisture = 457
Wet soilSoil Moisture = 446
Wet soilSoil Moisture = 432
Wet soilSoil Moisture = 429
Wet soilSoil Moisture = 400
Wet soilSoil Moisture = 451
Wet soilSoil Moisture = 436
Wet soilSoil Moisture = 453
Wet soilSoil Moisture = 436
Wet soilSoil Moisture = 459
Wet soilSoil Moisture = 438
Wet soilSoil Moisture = 452
Wet soilSoil Moisture = 455
Wet soilSoil Moisture = 438
Wet soilSoil Moisture = 440
Wet soilSoil Moisture = 389
Wet soilSoil Moisture = 423
Wet soilSoil Moisture = 420
Wet soilSoil Moisture = 444
Wet soilSoil Moisture = 413
Wet soilSoil Moisture = 448
Wet soilSoil Moisture = 450
Wet soilSoil Moisture = 428
Wet soilSoil Moisture = 427
Wet soilSoil Moisture = 441
Wet soilSoil Moisture = 437
Wet soilSoil Moisture = 453
Wet soilSoil Moisture = 458
Wet soilSoil Moisture = 469
Wet soil
```

TEST READING

24th January 2019

PLANT 1

PLANT 3

```
COM3 (Arduino/Genuino Mega or Mega 2560)
//Ra
//we
//pr
Dry soilSoil Moisture = 367
void
{
  Dry soilSoil Moisture = 363
  Dry soilSoil Moisture = 370
  Dry soilSoil Moisture = 361
  Dry soilSoil Moisture = 360
  Dry soilSoil Moisture = 370
  Dry soilSoil Moisture = 364
  Dry soilSoil Moisture = 355
  Dry soilSoil Moisture = 358
  Dry soilSoil Moisture = 359
  Dry soilSoil Moisture = 364
  Dry soilSoil Moisture = 357
  Dry soilSoil Moisture = 348
  Dry soilSoil Moisture = 344
  Dry soilSoil Moisture = 344
  Dry soil
}
Autoscroll Show timestamp
Newline 9600 baud Clear output
```

```
COM4 (Arduino/Genuino Uno)
Wet soilSoil Moisture = 456
Wet soilSoil Moisture = 462
Wet soilSoil Moisture = 454
Wet soilSoil Moisture = 464
Wet soilSoil Moisture = 462
Wet soilSoil Moisture = 456
Wet soilSoil Moisture = 477
Wet soilSoil Moisture = 477
Wet soilSoil Moisture = 473
Wet soilSoil Moisture = 475
Wet soilSoil Moisture = 475
Wet soilSoil Moisture = 474
Wet soilSoil Moisture = 468
Wet soilSoil Moisture = 472
Wet soilSoil Moisture = 477
Wet soilSoil Moisture = 469
Wet soilSoil Moisture = 462
Wet soilSoil Moisture = 469
Wet soilSoil Moisture = 460
Wet soilSoil Moisture = 459
Wet soilSoil Moisture = 462
Wet soilSoil Moisture = 462
Wet soilSoil Moisture = 461
Wet soilSoil Moisture = 477
Wet soilSoil Moisture = 476
Wet soilSoil Moisture = 477
Wet soilSoil Moisture = 475
Wet soilSoil Moisture = 476
Wet soilSoil Moisture = 493
Wet soilSoil Moisture = 487
Wet soilSoil Moisture = 480
Wet soilSoil Moisture = 463
Wet soilSoil Moisture = 468
Wet soilSoil Moisture = 473
Wet soilSoil Moisture = 472
Wet soilSoil Moisture = 468
Wet soilSoil Moisture = 459
Wet soil
Autoscroll Show timestamp
Newline 9600 baud Clear output
```

FINAL SUMMARY AND RESULTS

THEREFORE AFTER THE TESTS THAT WE ATTEMPTED AND FROM THE RESULTS WE WERE ABLE TO LIST THE FOLLOWING RESULTS:

- **THE SAP THAT WE CREATED WAS ABLE TO ABSORB WATER OF ABOUT 10 TIMES OF ITS WEIGHT AND RETAIN IT FOR NEARLY 8 DAYS.**
- **THE SAP WHEN USED WITH THE PLANTS RESULTED IN ITS SUSTAINED GROWTH FOR 5 DAYS .**
- **THIS WILL THUS SAVE THE WATER REQUIRED FOR 5 DAYS THUS HELPING IN THE APPROPRIATE USAGE OF WATER DURING DROUGHT.**
- **HENCE THE PROJECT IS SUCCESSFULLY COMPLETED.**

THANK YOU!
