



## **SOIL TREATMENT**

**UTILIZING BENEFICIAL SOIL MICRO-ORGANISM**

**(Secondary Culture (SC) , SC+ and SC Extra)**

Cultivable land one of the biggest resources at our disposal and we certainly are not doing enough to preserve it.

Soil is made up of both its physical components such as sand, clay, minerals, rocks, dead organic matter, air, and water and biological components such as insects, organisms such as worms, and microorganisms. The physical components are the nature of the terrain, geology and geographic location, but the biological components are defined by the physical components, climate and interaction with local elements.

Recent agricultural practices have affected soils in the most dramatic manner. Soil is more saline and microorganisms are less diverse and less populous due to over fertilization, this can even be seen by the rise in parameters such as Electrical conductivity and pH of such soils. The stable dead organic matter is being deprived in soil sooner than it can be replenished and the various fungicides, bactericides are killing the beneficial microbes in soil.

Hundreds of these different microbes with different functions are losing counterparts and organisms these depend on for sustenance. Now, this is not a plethora of disconnected beings, these are woven in each other's food chains and webs. Any missing link and the system crumbles down.

Whatever we do, we do it in a harmless and effective manner to reinstate this balance.

The obvious answer is to put in more Microbes.. The Lab cultured agriculture specific microbes with efficacy to address issues pertaining the farm dynamics.

The issue with that is that those microbes are lab cultured, not completely acclimatised and adapted to the adversity of farm conditions. And if those are given time to acclimatise, those microbes will certainly offer competition to the local microbes for the same resources and same function, which again is not a sustainable path for conserving soil with all of its components. Therefore, what must be done?

Direct application of Primary proprietary cultures can be challenging, counterproductive and expensive, hence, we present IEC Secondary Culture. A simple on farm brewing process to multiply the microbes in every soil in every farm, to gain a customised brew of local microbes from the farm itself.

Since every soil sample from every piece of land has its own unique microbial profile (diversity and population), we want to help the farmer, soil conservation enthusiast revive or even improve the soil to perform at the best of its characteristics.

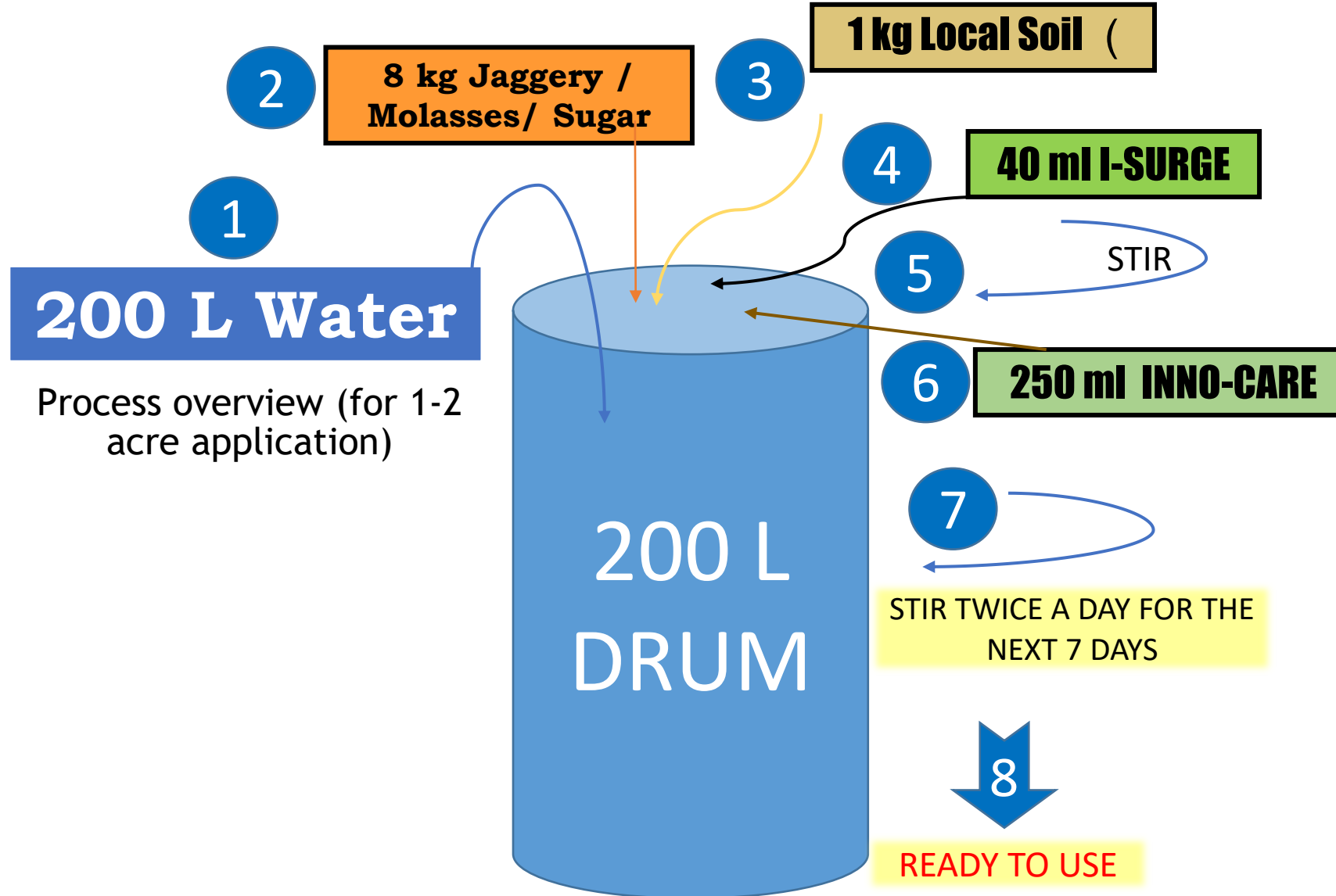
No complex apparatus or ingredients required, just soil from your farm and some locally available materials.

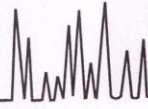
## Requirements:

- 250 ml IEC's **INNO-CARE**
- 40 ml **i-SURGE**
- 8 kg Jaggery / Molasses / sugar
- 200 Litre Water
- 1 kg Local soil &/or Dung
- A 200L or Bigger tank/Drum to make and store SC.

## Protocol:

1. Dissolve 8 kg Jaggery / Molasses in 200 L water.
2. Add 1 kg local soil / Dung.
3. Add 40 ml **i-SURGE** and stir.
4. Add 250 ml **INNO-CARE** and stir.
5. Stir at least twice a day for the next 7 days, and cover the top, so dust won't settle in.
6. For best results, use 70% with irrigation water and 30% as foliar.
7. The procedure can be repeated once in a month or a quarter, depending up on crop and situation.





### TEST REPORT

Report No. : GU/F/150616038  
Sample submitted by : Innovative Eco-Care Pvt. Ltd.  
A-103, Sagun Plaza,  
Vastrapur, Ahmedabad.

Sample Described As : Inno-Care

Mode of Packing : Sample packed in Plastic Bag  
Marking : ---  
Sample Condition : Satisfactory  
Analysis Date : 17/06/2015

Page : 1 of 1  
Lab ID No : F/150616038  
Date of Receipt : 16/06/2015  
Ref.No. & Dt. : NM

Batch No : 1  
Pkd. Date : 03/2015  
Exp.Date : 02/2017  
Sample Qty. : 250 ml

Report Date : 01/07/2015

No. of Days	Result	Parameter	Method of Test
0 Days	< 1 cfu	Total Plate Count cfu/gm	IS : 5402 : 2012
		Total Fungal count cfu/gm	IS : 5403 : 1999
1 <sup>st</sup> Day	2.9 x 10 <sup>3</sup> cfu	Total Plate Count cfu/gm	IS : 5402 : 2012
	7.9 x 10 <sup>2</sup> cfu	Total Fungal count cfu/gm	IS : 5403 : 1999
2 <sup>nd</sup> Day	4.6 x 10 <sup>3</sup> cfu	Total Plate Count cfu/gm	IS : 5402 : 2012
	8.3 x 10 <sup>3</sup> cfu	Total Fungal count cfu/gm	IS : 5403 : 1999
3 <sup>rd</sup> Day	7.8 x 10 <sup>6</sup> cfu	Total Plate Count cfu/gm	IS : 5402 : 2012
	5.6 x 10 <sup>4</sup> cfu	Total Fungal count cfu/gm	IS : 5403 : 1999
4 <sup>th</sup> Day	7.2 x 10 <sup>10</sup> cfu	Total Plate Count cfu/gm	IS : 5402 : 2012
	4.3 x 10 <sup>9</sup> cfu	Total Fungal count cfu/gm	IS : 5403 : 1999
5 <sup>th</sup> Day	6.9 x 10 <sup>9</sup> cfu	Total Plate Count cfu/gm	IS : 5402 : 2012
	3.9 x 10 <sup>9</sup> cfu	Total Fungal count cfu/gm	IS : 5403 : 1999
6 <sup>th</sup> Day	5.3 x 10 <sup>6</sup> cfu	Total Plate Count cfu/gm	IS : 5402 : 2012
	5.4 x 10 <sup>7</sup> cfu	Total Fungal count cfu/gm	IS : 5403 : 1999
7 <sup>th</sup> Day	5.2 x 10 <sup>6</sup> cfu	Total Plate Count cfu/gm	IS : 5402 : 2012
	2.3 x 10 <sup>6</sup> cfu	Total Fungal count cfu/gm	IS : 5403 : 1999
8 <sup>th</sup> Day	2.3 x 10 <sup>4</sup> cfu	Total Plate Count cfu/gm	IS : 5402 : 2012
	1.4 x 10 <sup>3</sup> cfu	Total Fungal count cfu/gm	IS : 5403 : 1999
9 <sup>th</sup> Day	5.1 x 10 <sup>2</sup> cfu	Total Plate Count cfu/gm	IS : 5402 : 2012
	7.4 x 10 <sup>2</sup> cfu	Total Fungal count cfu/gm	IS : 5403 : 1999

Date of Issue : 01/07/2015

For, Gujarat Laboratory  
*(Signature)*  
(Trupti Thakor)  
Autho. Signatory

Note:

- The Result refer only to the tested sample & applicable parameters. Endorsement of products is neither inferred nor implied.
- Total liability of our institution is limited to the invoice amount/testing charges.
- This report is not to be reproduced wholly or in part and cannot be used as an evidence in the court of law and should not be used in any advertising media without our special permission in writing.
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- Subject to Ahmedabad Jurisdiction.
- Perishable samples will be destroyed after testing, others after three weeks from the date of issue of the report, unless otherwise agreed with the customer.
- The sample is accepted by us subject to our general conditions of services which is displayed at reception notice Board & is also available on request.
- Attention is drawn to the limitation of liabilities, indemnification and jurisdictional issues etc defined therein.
- Customer requested for the above test only.

# ANALYTICAL REPORT OF LABORATORY ANALYSIS OF GROWTH RATE OF IEC SC



## Method:

1. Prepare Secondary Culture media. The Secondary Culture media doesn't need to be sterilized before inoculation.
2. Inoculate the Secondary Culture media with IEC's Proprietary culture. All incubations must be done at room temperature.
3. Collect a '0 hour' sample.
4. Similarly collect samples at '24 hours', '48 hours', '72 hours' up to '192 hours' (i. e., 9th day of inoculation).
5. All samples collected must be plated (Yeast Mould Agar / Broth is suggested as the media) for quantitative analysis by CFU count. Appropriate serial dilutions were made.
6. Relative data of growth curve was presented. Proper inferences were drawn as per the observations.



### TEST REPORT

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A-103, Sagun Plaza,  
Vastrapur, Ahmedabad.

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Mode of Packing : Sample packed in Plastic Bag  
Marking : ---  
Sample Condition : Satisfactory  
Analysis Date : 17/06/2015

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Batch No : 1  
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		Total Fungal count cfu/gm	IS : 5403 : 1999

Date of Issue : 01/07/2015

For, Gujarat Laboratory  
*(Signature)*  
(Trupti Thakor)  
Autho. Signatory

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# ANALYTICAL REPORT OF LABORATORY ANALYSIS OF GROWTH RATE OF IEC SC



## Results and Discussion:

The CFU count was calculated per ml of the Secondary Culture through '1<sup>st</sup> Day' to '9<sup>th</sup> Day'. An exponential rise was observed from '1<sup>st</sup> Day' to '4<sup>th</sup> Day' reaching a value of  $7.2 \times 10^{10}$ . The value of CFUs decreased from  $7.2 \times 10^{10}$  on the '5<sup>th</sup> Day' to  $6.9 \times 10^9$  and gradually to  $5.1 \times 10^2$  on '9<sup>th</sup> Day'.

The above results document significant growth dynamics in the Secondary Culture, whose quantitative mass could directly be proportional to its ability for amendments in the application site.

**Conclusion:** The major inference that needs to be derived from the study conducted is that Secondary

Culture of INNO-CARE can contain up to  $7.2 \times 10^{10}$ , which is more than most inoculums available to the consumers. Thus making the usage of INNO-CARE efficient and cost effective which can collectively be called what IEC refers to as "Sustainable Agriculture".

# ANALYTICAL REPORT OF LABORATORY ANALYSIS OF DIFFERENT SOIL MICROBES PROPAGATED IN



Ashwamedh Engineers & Consultants  
Survey No.102, Plot No.26, Wadala Pathardi Road,  
Indira Nagar, Nashik-422009, Maharashtra, India  
(Near Guru Gobind Singh School, Near Pandav Nagar,  
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sales@ashwamedh.net T/F:+91-253-2392225

**Ashwamedh**  
Engineers & Consultants  
Laboratory Services Division

8 [Redacted]

**ANALYSIS REPORT**

Sample / Report No.	M/01/18/27	Report date	17/01/2018
Name and Address of Customer	J J Over 65, Ranad Dadar, M Maharash		
Sample Drawn by	Customer	Sample Description / Type	Microbial Culture
Sampling Location	Khatwad	Date - Receipt of Sample	06/01/2018
Sample Quantity/Packing	1 L x 1 no. plastic bottle	Date - Start of Analysis	06/01/2018
Order Reference	As per our Quo. Ref. No. AEC/NS/December 2017 dated 19.12.2017	Date - Completion of Analysis	16/01/2018

Sr. No.	Parameter	Result	Unit	Method
1.	<i>Azotobacter</i> spp.	$6 \times 10^5$	CFU/ml	IS 9038:2002
2.	<i>Rhizobium</i> spp.	$9 \times 10^5$	CFU/ml	IS 8258:2009
3.	Phosphate solubilising bacteria	$8 \times 10^4$	CFU/ml	IS 14837:2009

**Kavita Raj**  
Kavita Raj  
Technical Manager (Microbiology)  
AUTHORISED SIGNATORY

**Ashwamedh Engineers & Consultants**  
Survey No.102, Plot No.26, Wadala Pathardi Road, Indira Nagar, Nashik-422009, Maharashtra, India

End of Report

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2. This report is not to be reproduced except in full, without written approval of the laboratory.  
3. Perishable samples will be disposed immediately after report dispatch or as per the regulatory norms.  
4. Non-perishable samples will be stored for 15 days to one month after report dispatch or as per the regulatory norms.

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Page no. 1

## Result:

The value of CFUs of

*Azotobacter* spp. was found to be  $6 \times 10^5$  / ml of **SC**

*Rhizobium* spp. Was found to be  $9 \times 10^5$  / ml of **SC** and

*Phosphate Solubilizing Bacteria* was found to be  $8 \times 10^6$

/ ml of **SC**.

**Inference:** The major inference that needs to be derived from this study conducted is that Secondary Culture helps in growing and multiplying soil microbes in great numbers.



IEC SC provides the farmer the benefit of multiplying the Local Microorganisms present in the farmer's soil by 1000 times in volume and up to  $1 \times 10^{13}$  microbes per ml of SC, hence providing an **environmental, agronomical and monetary benefit.**

- SC Increases plant growth and yields.
- SC provides precursors that **reactivate beneficial microbes in the soil** and plant foliage.
- SC promotes rapid root development.
- SC assists in **pH buffering** in soil.
- SC increases soil fertility by increasing nutrient availability to plants.
- SC facilitates rapid breakdown and stability of organic matter (2 - 3 weeks).
- SC boosts plants' **immune system and imparts abiotic stress tolerance.**
- SC improves germination of seeds and growth of seedlings and transplanted crops.
- SC can be administrated at Regular weekly to fortnightly Intervals with irrigation or drenching.

**IEC SC** provides the farmer the benefit of multiplying the Local Microorganisms present in the farmer's soil by 1000 times in volume and up to  $1 \times 10^{13}$  microbes per ml of **SC**, hence providing an **environmental, agronomical and monetary benefit.**

- **SC Increases Carbon Turn-over in Soil**, and therefore the **Organic Carbon Content**
- **SC Improves Water Holding Capacity** of the soil,
- **SC Improves Mobility Of Nutrients** and **Improves Soil Vigor.**
- A prescribed dose of **SC** can be Administered in **Stress Breaking Stage** of horticulture crops
- **SC** Effective in **Increasing Fruit Weight.**
- When **SC** is used in foliar application, it will increase the microbial activity of the phyllosphere and thwart external microflora from attacking host foliage as the local microflora will dominate and discourage growth of external pathogens.
- Foliar application of **SC** can be **Used to Invite Honeybees to Farms**, because of the enticing smell from fermented sugars

## INNO CARE

**INNO CARE** is a Proprietary composition of Liquid Mixed Microbial Culture of *Lactic Acid Bacteria* and *Saccharomyces cerevisiae* fermented in presence of bio-chemicals, metabolites, plant extracts, sugars and sugar derivatives processed through complex microbial fermentation for soil and plant health management.

This microbial inoculum functions as directors of action among soil organisms.

- in guiding the microorganisms in the **SECONDARY CULTURE** to firstly initiate breakdown of all organic biomasses, since, this is mostly done by hydrolysis, a lot of acids are generated in the process, which allows a natural self buffering of favorable pH for biomass breakdown.
- The derivatives gained as a result of the breakdown stimulates more microorganisms to break dormancy and contribute to the shared substrate and metabolic intermediate interactions
- This expedites the microbial profile in terms of population and diversity

## I-SURGE

**I-SURGE** is a Nutritive Formulation specially designed by IEC assist and compliment the enriched system of microbial dynamics established by **INNO CARE** in **SECONDARY CULTURE** to augment a healthy life cycle of plants.

- The key constituents of **I-SURGE** are Mineral salts of **Fe, Bo, Cu, Zn** and **Mn**, with **Humic acid, Phosphorus** and **Sulphur** in aqueous chelating agents of organic origin, therefore, it acts as a **Nutritive Stimulant**.
- **I-SURGE presents the microorganisms in the SECONDARY CULTURE** with scaffolds and conformity of varios chelated nutrients which stimulates the microorganisms to solubilize and ionize the same
- **I-SURGE stimulates the microorganisms** to actively take part in the ionisation and solubilisation of nutrients
- **I-SURGE Activates, Boosts and Guides the Local Beneficial Microorganisms in the Soil** to not only improve plant performance but also positively affect soil performance and sustainability.

### Application with Irrigation Water:

100 - 200 L Per Acre during vegetative / growth / storage stages of plant growth

50-100 L Per Acre during fruit growth stages in horticulture

Not to be used during flowering stages in any crops

### Spraying for Inviting Honeybees:

**IEC SC** can also be sprayed in the early morning at 30 L per acre (with extra water) to invite honeybees to farms.

Repeat this application in 15 days. **IEC SC** can also be used to invite honeybees to our farms, because the specific smell from fermented sugars in SC will be inviting

# COMPARISON OF IEC'S SECONDARY CULTURE WITH MONOCULTURES



S. No.	Feature →	Form	CFU count (On an average)	Does the culture do any of the following?													
	Microbial Culture ↓			Nitrogen Fixation	Enhanced Specific Nutrient Uptake	Enhanced General Nutrient Uptake	Activation of Local Microbes	Increases population of Local Microbes	Competition with Local Microbes	pH Buffering	Bio-control Agent	Improve Soil Organic Carbon	Adapt and acclimatise to various seasonal variations	Can perform in highly saline water / soil	Improve plant response to soil / water salinity	Improve soil water holding capacity	Foliar application Invites honeybees to the farm
1	<i>Azotobacter sp</i>	Solid / Liquid	$-10^6 - 10^8$	YES	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
2	<i>Azospirillum sp</i>	Solid / Liquid	$-10^6 - 10^8$	YES	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
3	<i>Acetobacter</i>	Solid / Liquid	$-10^6 - 10^8$	YES	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
4	<i>Rhizobium</i>	Solid / Liquid	$-10^6 - 10^8$	YES	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
5	<i>Rhodospirillum</i>	Solid / Liquid	$-10^6 - 10^8$	YES	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
6	<i>Nitrogen-fixing cyanobacterii</i>	Solid / Liquid	$-10^6 - 10^8$	YES	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
7	<i>Clostridium beijerinckii</i>	Solid / Liquid	$-10^6 - 10^8$	YES	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO

# COMPARISON OF IEC'S SECONDARY CULTURE WITH MONOCULTURES



S. No.	Feature →	Form	CFU count (On an average)	Does the culture do any of the following?													
	Microbial Culture ↓			Nitrogen Fixation Enhanced	Specific Nutrient Enhanced	General Nutrient Activation	Production of Local Inoculants	Population of Competition with Local	pH Buffering	Bio-control Agent	Improve Soil Organic	Adapt and acclimatise to various seasons	Can perform in highly improved plant response	Improve soil water holding	Foliar application	Invites honeybees to	
8	Zinc Solubilising Bacteria	Solid / Liquid	$10^6 - 10^8$	NO	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
9	Phosphate Solubilising Bacteria	Solid / Liquid	$10^6 - 10^8$	NO	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
10	Phosphate Mobilising Bacteria	Solid / Liquid	$10^6 - 10^8$	NO	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
11	Potassium Solubilising Bacteria	Solid / Liquid	$10^6 - 10^8$	NO	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
12	<i>Trichoderma</i>	Solid / Liquid	$10^6 - 10^8$	NO	NO	NO	NO	NO	YES	NO	YES	NO	NO	NO	NO	NO	NO
13	Arbuscular Mycorrhizae	Solid / Liquid	$10^6 - 10^8$	YES	YES	YES	NO	NO	YES	NO	NO	YES	NO	NO	NO	Maybe	NO
14	Biomass decomposers	Solid / Liquid	$10^6 - 10^8$	Maybe	NO	YES	Maybe	Maybe	YES	NO	NO	YES	NO	NO	NO	Maybe	NO
15	Secondary Culture	Liquid	$10^{10} - 10^{13}$	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES

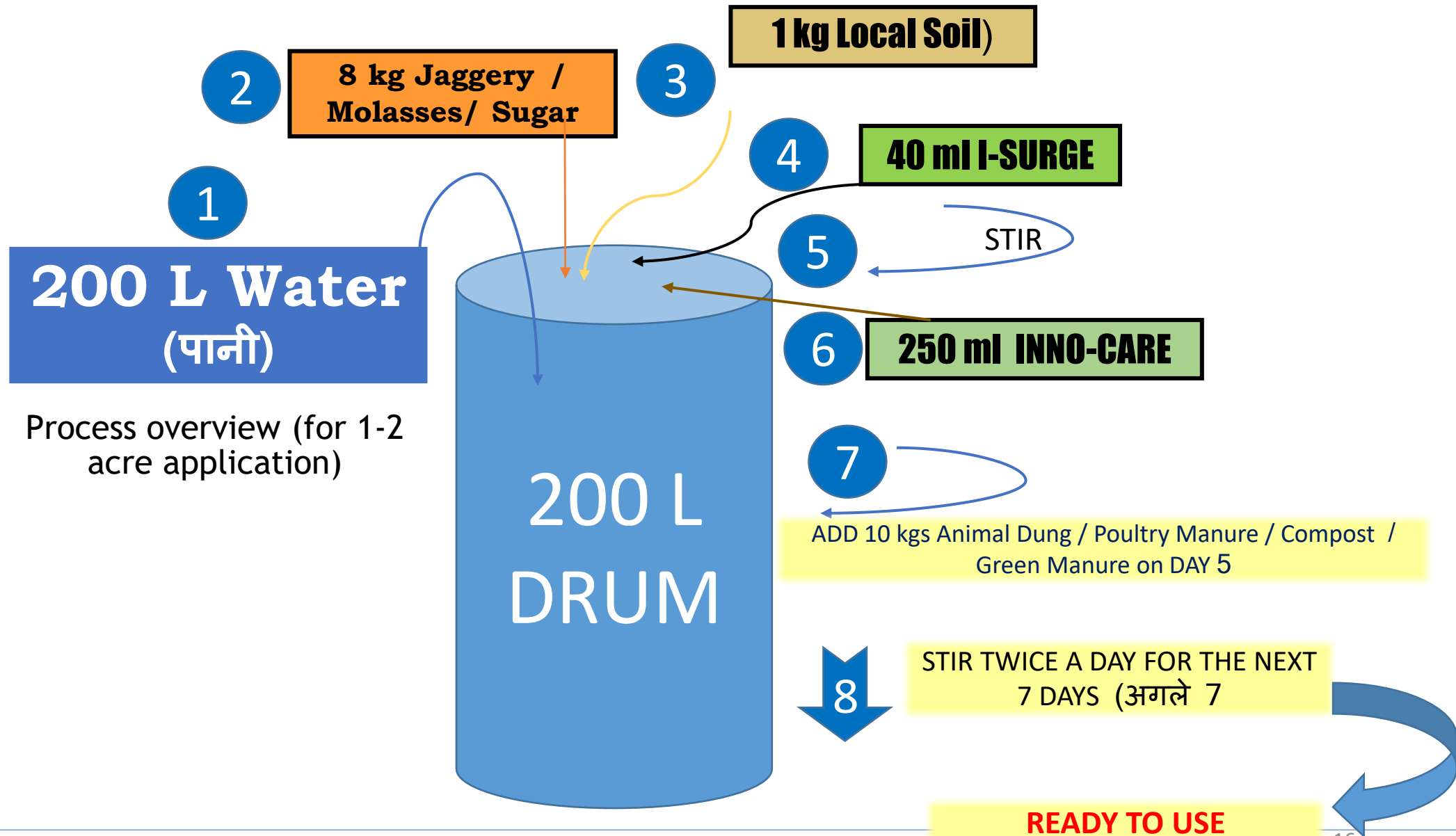
Secondary Culture can be utilized to deliver digested biomass such as cow dung to deliver higher concentration carbon dense nutrient solution to plants. This modification of **Secondary Culture** is called **Secondary Culture Plus**, and can be done by adding a few more steps (**Highlighted in green**) to **Secondary Culture**.

### Requirements:

- 250 ml IEC's **INNO-CARE**
- 40 ml **i-SURGE**
- 8 kg Jaggery / Molasses / sugar
- 200 Litre Water
- 1 kg Local soil &/or Dung
- A 200L or Bigger tank/Drum to make and store SC.
- **10 kg Fresh Cow Dung**

### Protocol:

1. Dissolve 8 kg Jaggery / Molasses in 200 L water.
2. Add 1 kg local soil / Dung.
3. Add 40 ml **i-SURGE** and stir.
4. Add 250 ml **INNO-CARE** and stir.
5. Stir at least twice a day for 5-10 minutes at a time for the next 5 days, and cover the top, so dust won't settle in.
6. **On 5<sup>th</sup> day, add 10 kg Fresh Cow Dung**
7. **Stir at least twice a day for 5-10 minutes at a time for the next 5 days.**
8. The procedure can be repeated once in a month or a quarter, depending up on crop and situation.



Process overview (for 1-2 acre application)



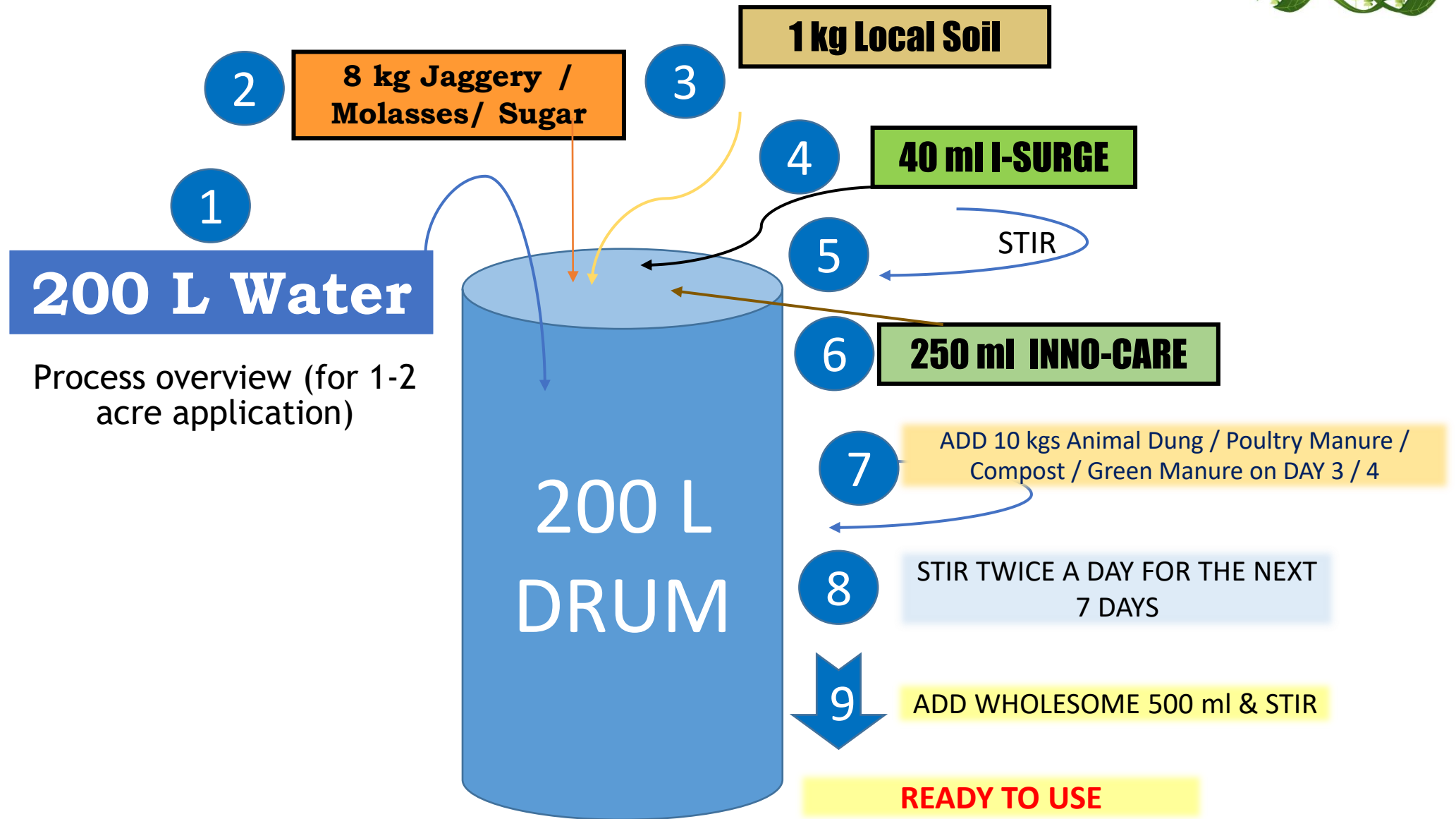
**Secondary Culture Plus (SC+)** is effective but it can mobilise a lot of nitrogenous nutrients, which may not be advisable at some plant stages. This SC+ can be rectified into **Secondary Culture Extra (SCX)** by using IEC's Wholesome to bind excessive Nitrogen, neutralise microbial activity and deliver microbial biochemicals and metabolites to the plants. This modification can be done by adding a few more steps (**Highlighted in red**) to **Secondary Culture**.

### Requirements:

- 250 ml IEC's **INNO-CARE**
- 40 ml **I-SURGE**
- **500 ml IEC's WHOLESOME**
- 8 kg Jaggery / Molasses / sugar
- 200 Litre Water
- 1 kg Local soil &/or Dung
- A 200L or Bigger tank/Drum to make and store SC.
- **10 kg Fresh Cow Dung**

### Protocol:

1. Dissolve 8 kg Jaggery / Molasses in 200 L water.
2. Add 1 kg local soil / Dung.
3. Add 40 ml **i-SURGE** and stir.
4. Add 250 ml **INNO-CARE** and stir.
5. Stir at least twice a day for 5-10 minutes at a time for the next 5 days, and cover the top, so dust won't settle in.
6. **On 5<sup>th</sup> day, add 10 kg Fresh Cow Dung**
7. **Stir at least twice a day for 5-10 minutes at a time for the next 5 days.**
8. **At the end of total 10 days of beginning this process, add 500 ml IEC's WHOLESOME to SC.**
9. **SC is ready to be used.**



Thank

You