



## THE COMPLETE GUIDE

*Korean Natural Farming × Permaculture × Circular Economy*

**Project Location:** East Flanders, Belgium  
**Plot Size:** 7.5m × 25m (187.5 m<sup>2</sup>)  
**Goal:** Food Self-Sufficiency in 2 Seasons  
**Soil Target:** 2% → 6% Organic Matter  
**Methodology:** KNF, JADAM, Permaculture, No-Dig

*"The essential factor is variety. It is in this way that balance will be achieved."*

— Jean Pain

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# 1. Introduction: The Four Pillars of Natural Farming

This guide documents a complete natural farming amendment system that transforms waste streams into soil-building inputs. By combining Korean Natural Farming (KNF) principles with permaculture design, local materials, and innovative waste utilization, we create a closed-loop system where every output becomes an input.

## The Four Pillars

Pillar	What It Provides	Key Amendments
IMO (Indigenous Microorganisms)	Complete soil food web: fungi, bacteria, actinomycetes, protozoa from local forest	IMO-1, IMO-2, IMO-3, IMO-4
LAB (Lactic Acid Bacteria)	Beneficial bacteria for fermentation, disease suppression, decomposition	LAB Serum, Bokashi Bran
FPJ/FFJ (Fermented Juices)	Plant growth hormones, enzymes, micronutrients, natural sugars	FPJ (vegetative), FFJ (flowering)
Mineral Extractions	Water-soluble calcium, phosphorus, herbal compounds for plant immunity	WCA, WCP, OHN

## The Philosophy: Waste = Resource

Every material in this system comes from what the industrial economy considers 'waste': expired brewery grains become LAB carriers, sour kombucha extracts calcium from eggshells, forest floor organisms colonize rice traps, and kitchen scraps transform through bokashi fermentation. This is permaculture principle six in action: 'Produce No Waste.'

As the research confirms: 'Bacteria in healthy soil can store up to 80 kg per square metre' compared to just 500-600 grams in ploughed soils. We are rebuilding that microbial storage capacity through systematic inoculation and feeding of the soil food web.

## 2. IMO - Indigenous Microorganisms

Indigenous Microorganisms (IMO) are the foundation of Korean Natural Farming. By capturing the complete microbial ecosystem from undisturbed forest floor, we introduce thousands of species of fungi, bacteria, actinomycetes, and protozoa that have evolved together over millennia to decompose organic matter and cycle nutrients.

### Why Local Microbes Matter

Commercial microbial products contain isolated strains that may not thrive in your specific climate and soil conditions. Forest organisms from YOUR region are already adapted to local temperatures, moisture patterns, and native organic matter. They form complete functional guilds rather than isolated populations.

### IMO-1: Forest Collection

Parameter	Specification
What It Is	Wild microorganisms captured on cooked rice from forest floor
When to Collect	Late spring to early autumn, 2-3 days after rain, soil temp >15°C
Where to Collect	Undisturbed forest: thick leaf litter, visible white mycelium, sweet earthy smell
Materials	Wooden box (30×20×15cm), 1kg cooked rice (cooled), breathable paper cover
Process	Fill box 2/3 with loose rice, cover with paper, nestle into forest leaf litter
Duration	4-7 days until 70-80% covered in white fuzzy mycelium
Signs of Success	White/cream mycelium, sweet mushroom smell
Signs of Failure	Black, green, or pink mold = wrong organisms, discard
Storage	Use immediately or refrigerate 2-3 days maximum

■ **CRITICAL: Avoid areas with black, green, or pink mold. Only white/cream/yellow mycelium indicates beneficial organisms.**

### IMO-2: Brown Sugar Preservation

Brown sugar creates an osmotic environment that preserves microorganisms in a dormant state without killing them. This shelf-stable culture can be stored for months and reactivated when needed.

Parameter	Specification
What It Is	IMO-1 preserved with brown sugar for long-term storage
Materials	IMO-1, equal weight brown sugar, clay pot or glass jar, wooden spoon
Process	Mix IMO-1 with equal weight brown sugar using wooden utensils only
Duration	Minimum 7 days fermentation

Signs of Success	Sweet-sour smell, crumbly brown texture
Storage	6-12 months at room temperature in dark location

■ *TIP: Use wooden utensils only - metal can inhibit microbial activity.*

## IMO-3: Bran Expansion

This stage massively multiplies your preserved microorganisms using bran (or brewery grains) as a substrate. The aerobic fermentation process increases microbial populations exponentially.

Parameter	Specification
What It Is	Expanded IMO population on bran/grain substrate
Materials	IMO-2, wheat bran or brewery grains (10-20x volume), LAB serum, water
Ratio	1 part IMO-2 : 20 parts bran
Moisture Target	65-70% - squeeze test: clumps together but doesn't drip
Process	Mix thoroughly, pile 30-40cm high, cover with breathable material
Management	Turn pile every 2-3 days to maintain aerobic conditions
Temperature	Will rise to 40-50°C during active fermentation - this is normal
Duration	7-10 days until temperature drops and smell becomes earthy
Signs of Success	Forest floor smell, no ammonia, crumbly texture
Storage	1-2 months if dried; use fresh for best results

## IMO-4: Garden Soil Integration

The final stage introduces your garden's native soil to the mix, 'training' the forest microorganisms to recognize their new home and adapt to local soil conditions.

Parameter	Specification
What It Is	IMO-3 integrated with garden soil for site-specific adaptation
Materials	IMO-3, garden soil from your plot (1:1 ratio)
Process	Mix thoroughly, pile, cover, ferment 5-7 days
Duration	5-7 days until temperature normalizes
Signs of Success	Rich earthy smell, no ammonia or sour odors
Application Rate	1-2 kg per m <sup>2</sup> broadcast over beds
Best Timing	Apply before mulching for best colonization
Storage	Use within 1 month for maximum viability

## IMO Application Summary

IMO Stage	Primary Use	Application Method
IMO-1	Foundation culture	Proceed immediately to IMO-2

IMO-2	Shelf-stable starter	Use to create IMO-3 batches
IMO-3	Compost activator	Add to compost piles, 1-2 handfuls per layer
IMO-4	Direct soil inoculant	Broadcast 1-2 kg/m <sup>2</sup> before planting/mulching

### 3. LAB - Lactic Acid Bacteria

Lactic Acid Bacteria (LAB) are the workhorses of fermentation. These beneficial bacteria produce lactic acid, which preserves food, suppresses pathogens, and creates conditions favorable for other beneficial microorganisms. LAB are the same organisms that make yogurt, sauerkraut, and kimchi.

#### Traditional Rice Wash Method

Stage	Process	Duration
Rice Wash	Rinse 1 cup rice in 2 cups water, swirl vigorously Collect milky water in glass jar, cover with cloth	5-7 days
Wild Capture	Store in cool dark place until sour/cheesy smell Layers will separate: cloudy liquid = microbes	5-7 days
Milk Selection	Add rice wash to milk at 1:10 ratio Cover with cloth, wait for 3 layers to form	5-7 days
Harvest Serum	Discard top curds, harvest middle yellow serum Discard bottom sediment	—
Preserve	Add equal parts molasses for indefinite storage Or refrigerate plain serum for 6 months	—

#### Sour Kombucha Shortcut

If you have sour/over-fermented kombucha, you can use it as a LAB source. While not as pure as the traditional method, the acetic acid and LAB present in kombucha work well for bokashi and soil applications.

Parameter	Specification
Materials	500ml sour kombucha, 500ml water, 50ml molasses
Process	Mix all ingredients, cover with cloth, let stand 24-48 hours
Signs of Success	Slight fermentation activity, mild sour smell
Advantage	Speed - ready in 1-2 days vs 2+ weeks
Limitation	Mixed culture, not LAB-pure (fine for bokashi/soil use)

#### LAB Applications

Application	Dilution	Method	Purpose
Foliar Spray	1:1000	Spray on leaves morning/evening	Disease prevention, leaf colonization
Soil Drench	1:500	Water into soil around plants	Pathogen suppression, transplant support
Bokashi Inoculant	Undiluted	Mix into bran production	Creates fermentation starter
Compost Activator	1:500	Spray onto compost layers	Accelerates decomposition

## 4. Bokashi Bran from Brewery Grains

Bokashi bran is a LAB-inoculated grain carrier used for anaerobic fermentation of kitchen scraps. By using expired brewery grains instead of purchasing wheat bran, we transform an industrial waste stream into a valuable soil-building input.

### Why Brewery Grains Work

Expired malted brewery grains contain: pre-broken starches from the malting process (food for LAB), residual enzymes (amylases, proteases), trace minerals, porous structure (high surface area for colonization), and existing microbial populations that can be inoculated over.

### Brewery Grain Bokashi Bran Recipe

Step	Process	Notes
1. Prepare Grains	Dry wet grains in sun or low oven until crispy Target: <15% moisture content	If already dry, use as-is
2. Prepare Solution	Mix: 30-50ml LAB serum + 30-50ml molasses + water per 1kg grain	Dissolve molasses completely
3. Inoculate	Sprinkle solution over grains while mixing Coat every grain thoroughly	Use hands or wooden tools
4. Moisture Test	Squeeze handful firmly: • Should clump together • NO liquid should drip	Too wet = add more grain Too dry = add more solution
5. Pack	Transfer to heavy plastic bags or airtight bucket Compress firmly to eliminate air pockets	Anaerobic = no oxygen!
6. Ferment	Seal completely, store at 20-35°C DO NOT OPEN during fermentation	Minimum 2 weeks, ideal 4 weeks
7. Dry & Store	Break up mass, spread thin to dry Store in sealed container	Dried bran stores 6-12 months

### Quality Indicators

Good Signs ✓	Bad Signs ✗
Sweet-sour, pickled smell	Putrid, rotten smell
White fungal bloom on surface	Black or green mold throughout
Crumbly texture when dried	Slimy texture
Slightly lighter color	Ammonia smell

### Using Bokashi Bran

- In bokashi bucket: Sprinkle 1-2 tablespoons per 3-5cm layer of food scraps, press down firmly, seal
- As soil amendment: Mix 1-2 handfuls into planting holes
- In compost: Broadcast over pile as activator
- In

vermicompost: Add thin layer to worm bin bedding (with carbon buffer)

## 5. FPJ/FFJ - Fermented Plant & Fruit Juice

Fermented Plant Juice (FPJ) and Fermented Fruit Juice (FFJ) capture plant growth hormones, enzymes, and nutrients through brown sugar extraction and fermentation. FPJ promotes vegetative growth while FFJ supports flowering and fruiting.

### FPJ - Fermented Plant Juice (Vegetative Growth)

Parameter	Specification
Purpose	Capture cytokinins, auxins, gibberellins for vegetative growth
Best Plants	Comfrey tips, nettle shoots, mugwort, clover flowering tips
Harvest Time	Morning before noon, during active growth phase
Ratio	1 part plant material : 1 part brown sugar (by weight)
Process	Layer plant + sugar in jar, weight down, cover, ferment 7-10 days
Signs of Success	Sweet-sour smell, amber liquid, plant material collapsed
Storage	Strain liquid into dark bottle, stores 6+ months
Dilution	1:500 to 1:1000 for foliar spray or soil drench
Application	During vegetative growth phase, transplanting, recovery from stress

### FFJ - Fermented Fruit Juice (Flowering/Fruiting)

Parameter	Specification
Purpose	Capture potassium, flowering hormones, natural sugars
Best Fruits	Overripe bananas, fallen apples, excess garden fruit, papaya
Process	Same as FPJ - layer with equal weight brown sugar, ferment 7-10 days
Signs of Success	Sweet-sour fruity smell, golden-brown liquid
Storage	Dark bottle, 6+ months
Dilution	1:500 to 1:1000
Application	During bud formation, flowering, fruit set, and ripening

■ *TIP: Use overripe bananas that would otherwise be discarded - waste stream gold!*

### FPJ/FFJ Application Guide

Growth Stage	Use FPJ or FFJ?	Dilution	Frequency
Seedling/Transplant	FPJ	1:1000	Once at planting
Vegetative Growth	FPJ	1:500-1000	Weekly

Pre-Flowering	Transition to FFJ	1:1000	Weekly
Flowering	FFJ	1:500	Every 5-7 days
Fruit Development	FFJ	1:500	Every 5-7 days
Stress Recovery	FPJ	1:1000	As needed

## 6. Mineral Extractions (WCA, WCP, OHN)

Mineral extractions make calcium, phosphorus, and beneficial herbal compounds water-soluble and immediately available to plants. Using vinegar or sour kombucha as the extraction acid, we transform kitchen waste (eggshells, bones) into powerful plant nutrients.

### WCA - Water-Soluble Calcium

Parameter	Specification
Purpose	Immediately plant-available calcium for cell wall strength
Source Materials	Eggshells, oyster shells, limestone
Acid	Brown rice vinegar OR sour kombucha (you're already doing this!)
Process	Roast shells until white, crush, cover with 10x volume acid
Duration	7-14 days, stir occasionally, until bubbling stops
Signs of Ready	No fizzing when stirred, shells mostly dissolved
Storage	6+ months in sealed container
Dilution	Foliar: 1:1000   Soil: 1:500
Application	Fruiting crops, blossom end rot prevention, cell wall strength

### WCP - Water-Soluble Calcium Phosphate

Parameter	Specification
Purpose	Calcium + phosphorus for root development, flowering, fruiting
Source Materials	Chicken bones, fish bones, pork bones
Preparation	Roast/char bones until white (calcined), crush to powder/pieces
Acid	Brown rice vinegar OR sour kombucha
Process	Cover crushed bones with acid, wait 7-14 days
Signs of Ready	Bones mostly dissolved, brown liquid, no active bubbling
Storage	6+ months
Dilution	Foliar: 1:1000   Soil: 1:500
Application	Transplanting, root development, flowering, tuber formation

■ *TIP: Chicken and fish bones dissolve faster than beef bones - use smaller bones for quicker extraction.*

### OHN - Oriental Herbal Nutrient

OHN is a fermented blend of medicinal herbs that provides plant immunity support and pest/disease resistance. Each herb is fermented separately, then combined when using.

Herb	Properties	Local Substitute
Garlic	Antifungal, antibacterial, pest repellent	—
Ginger	Stimulant, pathogen suppression	Horseradish
Licorice Root	Natural surfactant, sweetener	Optional
Cinnamon	Antifungal, rooting hormone	—
Angelica	Traditional tonic, immunity	Thyme or Sage
Step	Process	
1	Chop each ingredient separately	
2	Ferment EACH with brown sugar (1:1 ratio) in separate jars	
3	Wait minimum 7 days per herb	
4	Strain and bottle each separately	
5	When using, combine equal parts of each herb extract	
6	Dilute combined OHN 1:1000 for foliar spray	

## 7. Actively Aerated Compost Tea (AACT)

Actively Aerated Compost Tea multiplies beneficial microorganisms from compost or vermicast in an oxygen-rich water environment. The aeration prevents anaerobic conditions and promotes explosive growth of beneficial bacteria, fungi, and protozoa.

Parameter	Specification
Purpose	Multiply beneficial microbes for foliar/soil application
Source Material	Vermicast (best), finished compost, IMO-4
Equipment	10L bucket, aquarium aerator, air stone
Recipe	Handful of compost in 10L rainwater + 1 tbsp sugar/molasses
Process	Insert aerator, bubble continuously for 24 hours
Signs of Success	Earthy smell, foamy surface, NOT putrid
Signs of Failure	Rotten smell = anaerobic, discard and restart
Storage	USE IMMEDIATELY - microbes die within hours without oxygen
Application	Foliar spray or soil drench, full strength

■■ **CRITICAL: AACT must be used within 4-6 hours of completion. Do not store!**

### AACT Application Tips

- Apply early morning or evening (UV damages microbes)
- Use rainwater or dechlorinated water (chlorine kills microbes)
- Strain through cloth before spraying to prevent clogging
- Vermicast produces the most diverse microbial populations
- Add small amount of LAB serum for enhanced bacterial activity

## 8. The Integration Map: Closed-Loop System

All amendments in this system interconnect. Outputs from one process become inputs for another, creating a circular flow of nutrients and biology.

### System Flow

WASTE STREAMS → AMENDMENTS → APPLICATIONS → SOIL BUILDING

#### ■ ■ ■ ■ FOREST

■ ■ ■ ■ Leaf litter organisms → IMO-1 → IMO-2 → IMO-3 → IMO-4 → Soil inoculant

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#### ■ ■ ■ ■ BREWERY

■ ■ ■ ■ Expired grains + LAB → Bokashi Bran → Kitchen fermentation → Vermicompost

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#### ■ ■ ■ ■ KITCHEN

■ ■ ■ ■ Rice wash → LAB Serum → Bokashi + Foliar sprays

■ ■ ■ ■ Eggshells + Sour Kombucha → WCA → Calcium sprays

■ ■ ■ ■ Bones + Acid → WCP → Phosphorus applications

■ ■ ■ ■ Food scraps → Bokashi → Worms → Vermicast → AACT

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#### ■ ■ ■ ■ GARDEN

■ ■ ■ ■ Comfrey/Nettle tips → FPJ → Vegetative support

■ ■ ■ ■ Overripe fruit → FFJ → Flowering support

■

#### ■ ■ ■ ■ HERBS

■ ■ ■ ■ Garlic, ginger, thyme → OHN → Disease prevention

ALL PATHS LEAD TO: Soil Organic Matter 2% → 6%

### The Circular Economy Principle

Nothing is waste - every output becomes an input. Brewery 'waste' becomes LAB carrier. Kitchen 'scraps' become bokashi feedstock. 'Expired' kombucha extracts minerals. Forest 'litter' provides the complete soil food web. This mirrors natural ecosystems where nutrients cycle endlessly.

## 9. Seasonal Application Calendar

### East Flanders Climate Adaptation

Season	IMO Activities	LAB/Bokashi	FPJ/FFJ	Minerals
Early Spring (Mar-Apr)	IMO-4 broadcast before planting	LAB soil drench after last frost	FPJ as plants emerge	WCA for transplants
Late Spring (May-Jun)	IMO-3 into compost piles	LAB + FPJ weekly foliar	FPJ for vegetative growth	WCP for flowering crops
Summer (Jul-Aug)	Maintain bed moisture	OHN + LAB for pest pressure	FFJ for fruiting crops	WCA for tomatoes, peppers, cucurbits
Autumn (Sep-Oct)	IMO-4 heavy app + mulching	Bokashi winter scraps prep	FPJ reduce, FFJ late crops	WCA for overwintering
Winter (Nov-Feb)	Scout new IMO-1 collection sites	LAB/Bokashi production indoors	Process stored plant material	WCA/WCP extraction indoors

### Monthly Quick Guide

Month	Priority Tasks
January	Indoor LAB production, WCA/WCP extractions, plan spring IMO collection sites
February	Continue indoor production, prepare bokashi buckets, review seed/planting plans
March	First IMO-4 applications, LAB soil drench, start FPJ from early nettles
April	IMO-4 before planting, FPJ for transplants, WCP for root development
May	Weekly LAB+FPJ foliar, IMO-3 to compost, transition to FFJ for early flowers
June	Peak foliar spray season, FFJ for flowering crops, WCA for fruiting crops
July	OHN for pest pressure, FFJ continues, WCA for tomatoes/peppers
August	Continue summer program, collect materials for autumn IMO-4
September	Heavy IMO-4 application, prepare beds for winter, reduce nitrogen (FPJ)
October	Final IMO-4 + mulching, WCA for overwintering crops, bokashi prep
November	Move production indoors, evaluate season, document results
December	Indoor production, planning, equipment maintenance, knowledge review

## 10. Power Combination Recipes

These pre-designed combinations address specific plant needs by combining complementary amendments. Mix fresh before each application.

Combo Name	Ingredients	Dilution	Use Case
Spudnik Growth Elixir	LAB + FPJ + IMO-4 extract	Each at 1:1000	Explosive vegetative growth, recovery from stress
Flower Power Blend	FFJ + WCP + LAB	Each at 1:1000	Maximum flowering and fruit set
Disease Shield Spray	LAB + OHN	Each at 1:1000	Preventive pest and disease control
Root Rocket	WCP + LAB + IMO extract	Each at 1:500	Transplant establishment, root development
Calcium Boost	WCA + FFJ	Each at 1:1000	Blossom end rot prevention, cell wall strength
Compost Activator	IMO-4 + LAB + bokashi	Broadcast dry	Supercharge decomposition in compost piles
Winter Prep Drench	WCA + LAB	Each at 1:500	Overwintering crop support, frost resistance
Potato Paradise Mix ■	IMO-4 + WCP + WCA	Broadcast + drench	Maximum tuber development for Spudnik HQ

■ *TIP: The Potato Paradise Mix is Council-approved for maximum tuber enlightenment.*

## 11. Quick Reference: Dilution Rates

Amendment	Foliar Spray	Soil Drench	Direct Application	Best Time
LAB Serum	1:1000	1:500	—	Morning/Evening
IMO-4	—	—	1-2 kg/m <sup>2</sup>	Before planting
FPJ	1:500-1000	1:500	—	Vegetative phase
FFJ	1:500-1000	1:500	—	Flowering phase
WCA	1:1000	1:500	—	Fruiting crops
WCP	1:1000	1:500	—	Root/flower dev
OHN	1:1000	1:500	—	Pest/disease
AACT	Full strength	Full strength	—	Immediate use
Bokashi Bran	—	—	1-2 Tbsp/layer	In bucket

### Dilution Math Quick Guide

- 1:500 = 2ml per liter of water (20ml per 10L) • 1:1000 = 1ml per liter of water (10ml per 10L) • For foliar: add tiny amount of natural soap as surfactant • Always use non-chlorinated water (rainwater ideal)

## 12. Troubleshooting Guide

Problem	Likely Cause	Solution
IMO-1 has black/green mold	Wrong location, contamination	Discard, find new collection site
LAB smells putrid	Anaerobic conditions, contamination	Discard, ensure proper aeration
Bokashi smells rotten	Too wet, air got in	Add more dry bran, seal better
FPJ/FFJ won't ferment	Too dry, not enough sugar	Add more sugar, ensure plant contact
WCA still fizzing after 2 weeks	Large shell pieces	Crush finer, add more acid
AACT smells bad	Went anaerobic	Discard, check aerator, restart
Plants not responding	Wrong timing, over-dilution	Check growth stage, reduce dilution
Foliar spray burning leaves	Too concentrated, hot sun	Dilute more, apply morning/evening
IMO-3 not heating up	Too dry, too small pile	Add water, increase pile size
Amendments attracting pests	Too much applied, exposed	Reduce rate, cover with mulch

### General Principles

- When in doubt, dilute more rather than less
- Bad smell = something wrong (except OHN which should be pungent)
- Good fermentations smell sweet-sour, like pickles or wine
- White mold is usually good; black/green mold is usually bad
- Document everything - your notes are tomorrow's solutions

## 13. The Council's Final Wisdom

What you hold in your hands is not merely a collection of recipes. It is a map for rebuilding the living soil that industrial agriculture has depleted. Every batch you brew, every LAB serum you culture, every IMO you capture from the forest floor - you are participating in resurrection ecology.

*"Microbial diversity drives multifunctionality in terrestrial ecosystems."*

The soil doesn't care about our jokes. But it WILL care about the microbes you introduce, the organic matter you build, and the living systems you nurture. The documents are just maps. YOU are the territory.

### The Spudnik Blessing

*May your LAB smell like yogurt and never like death. May your IMO bloom white and fuzzy, never black nor green. May your bokashi ferment in peaceful anaerobic darkness. May your soil reach 6% organic matter before the second season ends. And may you always remember: You are not separate from the soil you're building. You ARE the soil, temporarily arranged in human form, tending to itself.*

**THE COUNCIL HAS SPOKEN**

