The Preparation and Application of multipurpose and multifunctional Organic Liquids

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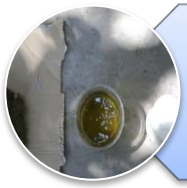
Organic Liquids: Examples

Sanjibani



Shasyagavya

Kunapajala

Panchagavya

Organic liquid : Uses

- Manure to provide nutrients
- Bio-fertilisers for microbial presence
- Growth promoter due to hormones
- Amino acid source
- Bio-pesticides due to beneficial fungii and bacteria
- Starter Solution for compost prep

Organic Liquids

- **Cow dung and cow urine based**
- **Fermented product**
- **Stirring is required during fermentation**
- **Enrichment possible**
- **Application for seed and seedling treatment, manure inoculation, soil reclamation and spray on standing crop**

Standardization Proportion and dose

Sanjibani (20%/ 10%/ 5%)

Cow dung: 1

Cow Urine: 1

Water: 2

Standardization Proportion and dose

Shasyagavya (5%/ 10%)

Water:2

Cow dung: 1

Cow urine: 1

Vegetable Waste: 1

Standardization
Proportion and dose

Kunapajala
(1%)

Cow dung: 1

Cow urine: 1

Water: 2

Animal Waste: 1

Standardization Proportion and dose

Cow dung:5

Cow urine: 3

Panchagavya (3%)

Ghee: 1

Curd: 2

Milk: 2

Experimental plot at Narendrapur

Recommended proportion of different ingredients and dose of application of four low cost multi-purpose and multi-functional liquid organic products viz. *Sanjivani*, *Panchagavya*, Shasya*gavya* and *Kunapajala* are summarized in Table 1

Liquid organic products	Composition	Fermentation Period (days)	Amount of water to be mixed with 1 litre of mother solution	Amount of mother solution for 1 acre crop
Mother Solution/Sanjivani (50%)	Cow dung -1 part, Cow urine -1 part and Water-2 part			
Bija Sanijvani (20%)	Cow dung -1 part Cow urine -1 part Water-5 part	7-9	750 ml water is mixed with 1 lt of mother *Sanjivani*	2-3 lt/kg of seed
Poudh Sanjivani (5%) for spraying on seedlings upto 30 days after germination	Cow dung -1 part Cow urine -1 part Water-20 part	7-9	4.5 lt water is mixed with 1 lt of mother *Sanjivani*	40 lt
Poudh Sanjivani (10%) for spraying in mature seedling	Cow dung -1 part Cow urine -1 part, Water-10 part	7-9	2 lt water is mixed with 1 lt of mother *Sanjivani*	70 lt
Shasyagavya (10%)	Cow dung -1 part Cow urine -1part Crop residues-1 part Water-10 part	10-12	1.6 lt water is mixed with 1 lt of mother *Sasyagavya* (1:1:1:2)	80 lt
Kunapajala (1%)	Cow dung -1 part Cow urine -1 part Animal flesh-1 part Water-100 part	25-30	19.6 lt water is mixed with 1 lt of mother *Kunapajala* (1:1:1:2)	10 lt
Panchagavya (3%)	Cow dung -5 part Cow urine -3 part, Milk-2 part, Curd-2 part, Ghee-1 part	7-9	3 kg of *Panchagavya* is to be mixed with 100 lt of water	6 kg

Table 1: Proportion of different ingredients and dose of four low cost multi-purpose and multi-functional liquid organic products

3. Effect of four multi-purpose and multi-functional liquid organic products on yield of different crops

Year	Crop Season	Crop grown	Variety	Treatment	Yield / plant or Yield / m^2 in treated plot	Yield / plant or Yield / m^2 in control plot
2008-09	Pre-Kharif	Green gram	Samrat	***Sanjivani* 10%,** *Panchagavya* 3%, control	35.8 gm/ plant	15.8gm/plant
	Kharif	Black gram	Sarada	*Sanjivani*-5%,**10%**,15%	10.92 gm/plant	6.32 gm/plant
	Rabi	Mustard	B-9	*Sanjivani* 10%,***Panchagavya* 3%,** control	1.75 gm/plant	0.45 gm/plant
2009-10	Kharif: University trial plot	Paddy	Shatabti	***Sanjivani* 10%,***Panchagavya* 3%, control	750 gm/m^2	668.88 gm/m^2
	Kharif: Farmer's field	Paddy	Khitish	*Sanjivani* 10%,***Panchagavya* 3%,** control	716.67 g/m^2	700 g/m^2
	Rabi: University trial plot	Paddy	GB-1	*Sanjivani* 10%,***Panchagavya* 3%,** control	646.66 gm/m^2	550 gm/m^2
		Mustard	Jhumka	*Sanjivani* 10%,***Panchagavya* 3%,** control	120.66 gm/m^2	60 gm/m^2
	Rabi: Farmer's field	Lady's Finger (25 pickings)	O16 hybrid	***Sanjivani* 10%**,*Panchagavya* 3%, control	229 kg in 0.09 acre	205 kg in 0.09 acre
2010-11	Kharif	Paddy	Shatabti	***Sasyagavya*-20%,**	782.67 gm/m^2	567.00 gm/m^2
			Basmati	***Sasyagavya* 10%,** *Sasyagavya* -5%,10%,20%, *Kunapajala*-1%,3%,5%,10%, Control.	445.33 gm/m^2	352 gm/m^2
		Black gram	Kalindi		110 gm/m^2	90 gm/m^2
	Rabi	Mustard	Jhumka	***Kunapajala* -1%(mustard),**3%,5%,10% ***Sasyagavya*** -5%,**10%(paddy GB1)**, 20%, control	782. 95 gm/m^2	679.33 gm/m^2
		Paddy	GB-1		803.33 gm/m^2	488.67gm/m^2

Table 2: Effect of four liquid organic products on yield of different crops

*Yield of treated plots indicates the yield of best organic treatment which is mentioned as bold characters in treatment column.

Blackgram (Var: Kalindi) treated with 10 % Sanjivani (Kharif, 2009)

Paddy plot (Var: Gontra Bidhan) treated with 1 % Kunapajala (Rabi, 2011)

Mustard plot (Var: Jhumka) treated with 1 % Kunapajala (Rabi, 2010-11)

Paddy plot (Var: Shatabdi)treated with 10 % Shasyagavya (Kharif, 2010)

Chilli Plant (Var: Beldanga) treated with 3 % Panchagavya (Kharif, 2010)

Paddy plot (Var: Basmati) treated with 5 % Shasyagavya (Kharif, 2010)

Bio-chemical analysis of the liquid organic products

Liquid organic products	pH	EC	Organic Carbon (%)	Available Nitrogen (%)	Available Potassium (%)	Available Phosphorus (%)	Total fungus	Total Bacteria
Shasyagavya (1:1:1:5)	5.32-7.78	1.78	0.33-0.73%	0.083-0.086%	0.113-0.118%	0.013%	1.01×10^{7}	7.64×10^{11}
Sanjivani (1: 1: 5)	7.2-7.5	3.5	0.19-0.32%	0.045-0.056%	0.062-0.088%	0.0032-0.0077%	2.53×10^{9}	1.97×10^{11}
Kunapajala (1:1:3:100)	7.69	4.01	0.087-0.116%	0.022-0.025%	0.0022-0.0024%	0.0015-0.0061%	1.71×10^{7}	1.19×10^{11}
Panchagavya	5.6	4.6	>12%	0.035-0.039%	0.058-0.075%	0.0082-0.0168%	4.41×10^{6}	1.83×10^{9}

The sage Parasar in 'Krishi Parasar' in the 400 BC stated that the "life of farmers is solely dependent upon the microbes present in the soil."

Identification of different specific microbes

Parameter	*Panchagavya*	*Sanjivani*	*Sasyagavya*	*Kunapajala*
Days of fermentation	10^{th} Day	10^{th} Day	10^{th} day	24^{th} Day
Azotobacter	17×10^{8}	2×10^{8}	5.12×10^{11}	1.28×10^{11}
Azospirillum	35×10^{8}	2×10^{8}	4.66×10^{9}	3.74×10^{10}
PSB	34×10^{8}	18×10^{8}	4.66×10^{9}	6.22×10^{10}
Pseudomonas	32×10^{8}	5×10^{8}	3.04×10^{10}	5.8×10^{10}
Rhizobium	28×10^{8}	15×10^{8}	1.82×10^{10}	2.08×10^{11}

Soil health of the experimental plots

Particular	pH	EC (mhos/ cm)	Organic C (%)	N (%)	Available P (P_2O_5 kg / ha)	Available K (K_2O kg / ha)	Total fungus	Total Bacteria
2009-Pre- Kharif	7.2	0.30	1.1	0.11	>100	250	-	-
2009- Kharif	7.6	0.30	1.2	0.12	83	450	-	-
2009-10-Rabi	7.9	0.40	1.2	0.12	67	370	-	-
2010-Pre- Kharif	7.4	0.30	0.85	0.085	>100	390	6×10^5	3.33×10^9
2010- Kharif	7.6	0.30	0.71	0.071	60.5	275	2.8×10^6	2.7×10^{10}
2010-11-Rabi	7.7	0.16	1.27	0.12	49.50	203	1.46×10^6	2.36×10^{10}

Mass weight of earthworm

Soil volume: One sq. meter upto 30 cm soil depth	Organic plots (after3years)	Adjacent Inorganic plot
Average weight(gms)	68.56	1.16

5. Increasing shelf life of liquid organic products and scope for rural employment

Days after fermentation	Sasyagavya					
	Control		Solid (Charcoal) carrier (30 ml culture/100 g of carrier)		Liquid (Glycerol) carrier (30 ml culture/100 g of carrier)	
	Fungal count ($X10^5$)	Bacterial count ($X10^9$)	Fungal count ($X10^5$)	Bacterial count ($X10^9$)	Fungal count ($X10^5$)	Bacterial count ($X10^9$)
17	101.55	76.44	75.66	102.55	8	78.66
92	2.66	15.44	8.77	26.77	2.66	0.33

Table 6: Microbial population in different treatments in Sasyagavya at different days of fermentation

Days after fermentation	Kunapajala					
	Control		Solid (charcoal) carrier (30 ml culture/100 g of carrier)		Liquid (Glycerol) carrier (30 ml culture/100 g of carrier)	
	Fungal count ($X10^5$)	Bacterial count ($X10^9$)	Fungal count ($X10^5$)	Bacterial count ($X10^9$)	Fungal count ($X10^5$)	Bacterial count ($X10^9$)
24	171.77	119.00	226.33	70.22	100.40	130.33
94	1.44	1.00	2.66	8.22	3.33	16.77

Table 7: Microbial population in different treatments of Kunapajala at different days of fermentation

Days after fermentation	*Panchagavya*						*Sanjivani*					
	Control		Solid (Charcoal) carrier (30 ml culture/100 g of carrier)		Liquid (Glycerol) carrier (30 ml culture/100 g of carrier)		Control		Solid (Charcoal) carrier (30 ml culture/100 g of carrier)		Liquid (Glycerol) carrier (30 ml culture/100 g of carrier)	
	Fun. ($X10^5$)	Bac ($X10^9$)	Fun. ($X10^5$)	Bac ($X10^9$)	Fun. ($X10^5$)	Bac ($X10^9$)	Fun. ($X10^5$)	Bac ($X10^9$)	Fun. ($X10^5$)	Bac ($X10^9$)	Fun. ($X10^5$)	Bac ($X10^9$)
8	326.33	152.00	231.33	129.66	62.60	220.00	46.66	171.33	101.33	110.00	27.66	109.66
77	3.33	1.66	144.66	136.33	242.00	200.00	0.33	4	328.33	310.00	384.00	336.00

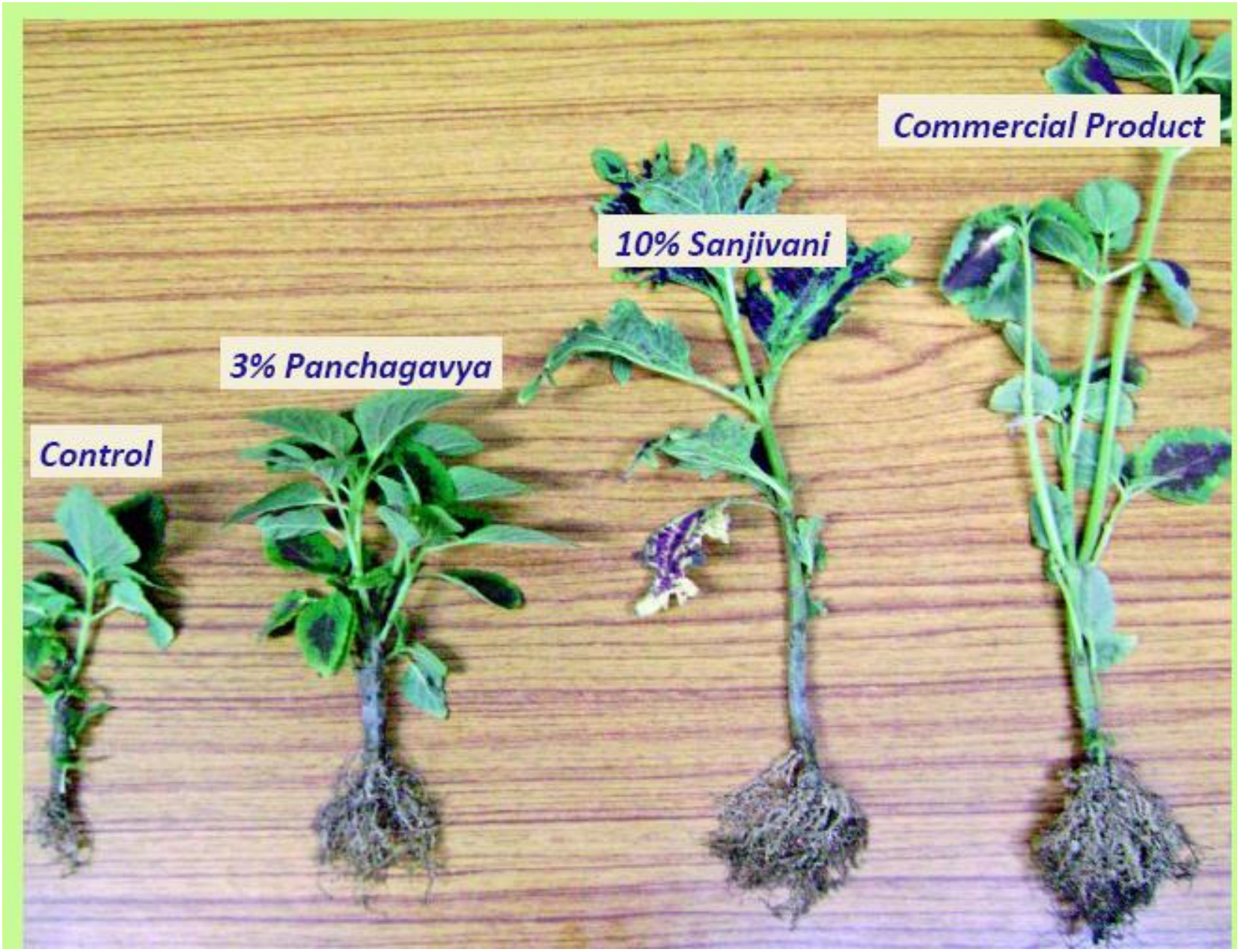
Table 8: Microbial population in different treatments of Panchagvya and Sanjivani at different days of fermentation (Fun: Fungal count; Bac: Bacterial count)

6. Effects on composting

Parameter	Compost using Commercial decomposer 1	Compost using Commercial decomposer 2	Compost using Commercial decomposer 3	Compost using Commercial decomposer 4	Compost using *Panchagavya**	Compost using Sanjivani**
Days for composting	29	34	36	41	38	33
pH	7.96	7.95	7.9	8.2	8.08	8.1
E. C.	8.0	8.2	9.5	5.5	10.5	8.8
Org. C (%)	8.00	7.72	13.15	13	12.5	12
P (%)	3.1	2.8	4.2	6.3	4.2	4.4
K (%)	>0.13	>0.13	>0.13	>0.13	>0.13	>0.13
Total Fungus	4.67×10^5	2.67×10^5	2×10^5	1.33×10^5	2.33×10^5	3.33×10^5
Total Bacteria	9.33×10^5	7.67×10^5	5.67×10^5	3.67×10^5	6.67×10^5	8.33×10^5

7. Effects on root development

Treatment	Root mass(gm)	Root length(cm)	Shoot mass(gm)	Shoot length(cm)
Control	0.42	2.83	2.51	7.73
3% *Panchagavya**	0.88	6.97	6.97	14.03
10% *Sanjivani**	1.86	9.73	9.57	16.77
Commercial product	2.96	12.90	15.06	27.97


Commercial Product
10% Sanjivani
3% Panchagavya
Control

Seasonal Variation in Microbial population of Sanjibani

Microbial population was lower in winter season than the summer season

Enhancement of Shelf life

Carrier based preparation has increased the shelf life up to 130 days after preparation.

Multi-locational trials and demonstrations

Name of the Farmers:

a. Abani Pal,

b. Bhadu Ramanik,

c. Santishi Majhi

Kharif paddy at farmers' plot
at BanHooghly, S-24 Parganas

Address of the farmers:

Vill.Kachharipara, P.O. Banhooghly,

District 24 Paraganas (South), West Bengal, India

Lady's Finger at farmers' plot
at BanHooghly, S-24 Parganas

Field Inspection

Nursery bed preparation

Seed treatment

Seedling treatment

Preparation of *Panchagavya*

Spraying at seed bed

Transplanting

Spraying at main field

Crop at pre-harvest stage

Harvesting

Early Vegetative Stage

Spraying of treatment

Late Vegetative Stage

Flowering-Fruiting

Preparation of leaf extract : Pesticide

Harvesting

Paddy (organic)

Greengram (organic)

Economics of cultivation

Treatment	Cultivation Cost (Rs per acre)	Yield (q per acre)	Return (Rs)	Net return per acre (in Rs)	Additional net return per acre (in Rs)
Chemical	32314	18.72	41184	8870	
Organic**	25250	15.63	34386	9136	266

**Cow dung manure @ 1 q/ acre as basal followed by 4 spraying of 3% *Panchagavya* and *Sanjivani*

Table 11: Economic Analysis of boro paddy (var Gontra Bidhan 1) cultivation: 2009-10

Economics of cultivation

Treatment	Return (q per acre)	Additional return from treatment plot than control (q per acre)	Additional return from treatment plot than control (in Rs per acre)	Additional cost per acre (in Rs)	Additional net return per acre (in Rs)
Control	22.53				
Sanjivani (10%)	30.00	7.47	7470	nil	7470
Panchagavya (3%)	27.73	5.20	5200	600	4600

Table 12: Economics of Kharif Paddy (var Shatabdi) in the University Farm, 2009-10

Economics of cultivation

Cost Calculation of Organic and Chemical Paddy (Basmati) Cultivation (2010) Kharif

Organic paddy:

Yield per acre: 1386.5 kg and Net Return from 1 acre organic paddy = Rs 20, 025/=

Chemical paddy:

Yield per acre: 1100.5 kg and Net Return from 1 acre chemical paddy = Rs 1785/=

Cost Calculation of Organic and Chemical Paddy (Gontra Bidhan-1) (2010-11) Rabi

Organic paddy:

Yield per acre: 39331 kg and Net Return from 1 acre organic paddy = Rs 42600/=

Chemical paddy

Yield per acre: 18330kg and Net Return from 1 acre chemical paddy = Rs 42200/=

a) **The yield of different crops grown in the University Farm at Narendrapur, West Bengal in different seasons** (not included in project report) of different years are shown below:

Year	Crop season	Name of the crop	Yield /plant in gram		
			Panchagavya treated plot	Sanjivani treated plot	Control plot
2008	Kharif	Blackgram	-	10.92	6.32
2008	Rabi	Mustard	1.75	1.66	0.45
2009	Rabi	Chilli	167.80	86.35	41.57
2010	Pre-Kharif	Greengram	68.5	62.75	46.5

Table-14a: Crop Yield record at Narendrapur Farm of the University


Thank you