The Potentials of Refined Rubber Seed Oil for Use as a Dielectric Fluid – A Review

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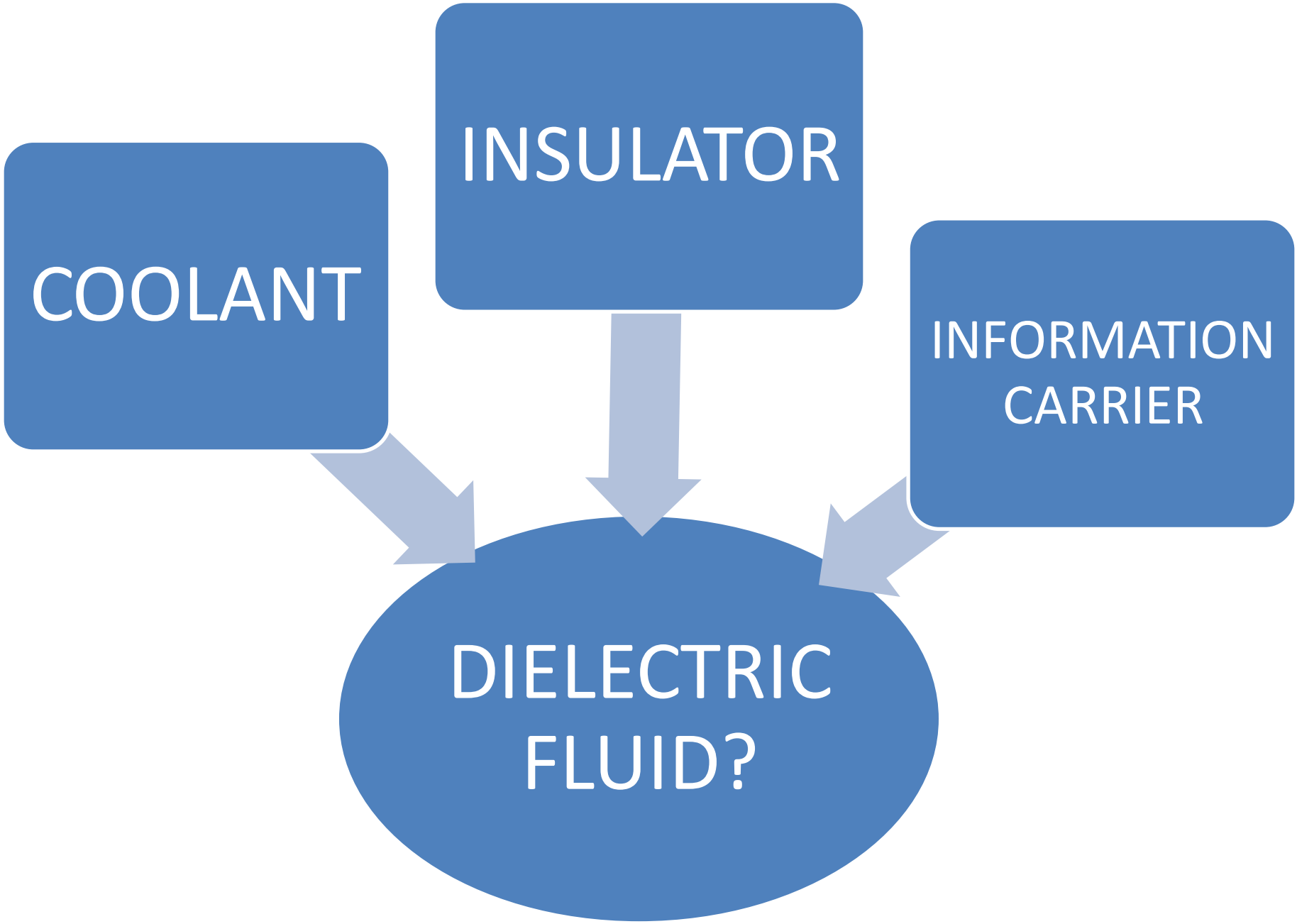
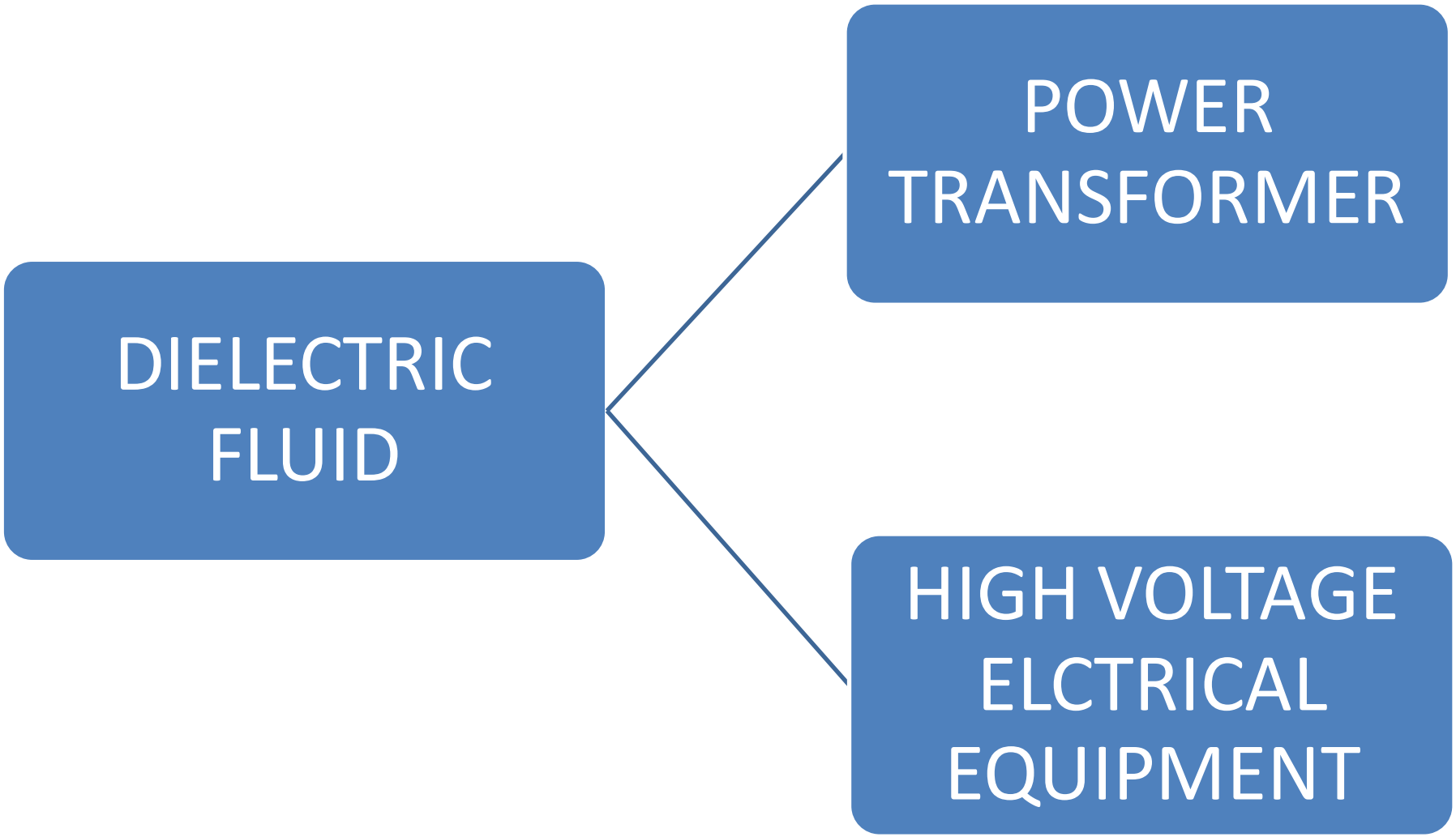

COOLANT
INSULATOR
INFORMATION CARRIER
DIELECTRIC FLUID?

DIELECTRIC FLUID



TYPES OF DIELECTRIC FLUIDS

NON NATURAL ESTERS

- Reduced BDV when attack by moisture content.
- Not biodegradable

NATURAL ESTERS /VEGETABLE OILS

- It has high flash point, fire point and good biodegradability.
- Has long time even when attack by moisture content.

KERNEL
40 – 50 %
OIL

CAKE
50-60 %
CAKE

- ✓PUTTY PRODUCTION
- ✓LIQUID SOAP
- ✓ALKYD RESIN
- ✓BIODIESEL
- ✓BIOLUBRICANT

- ✓POULTRY FEED
- ✓BIOFERTILIZER

WHY RUBBER SEED AS DIELECTRIC FLUID?

Density)	0.91
Cloud Point (°C)	4
Pour Point (°C)	- 9
Fire Point (°C)	345
Smoke Point (°C)	245
Flash Point (°C)	294
Dynamic Viscosity () @ 40 °C	67.72
Kinematic Viscosity () @ 40 °C	74.31
Lower heating Value)	40
Higher Heating Value)	37
Free Fatty Acid %	23.68
Thermal Stability (°C)	225

CONVENTIONAL DIELECTRIC FLUIDS

Properties	Mineral Oils	Silicone Oils	Synthetic Oils	Vegetable Oil
Dielectric Breakdown Voltage (KV)	30/85	35/60	45/7/	82/90
Relative Permissitivity @ 25 ^{0}C	2.1/2.5	2.6/2.9	3.0/3.5	2.7/3.0
Viscosity @ 0 ^{0}C (mm^2S^{-1})	< 76	81/92	26/50	143/77
Viscosity @ 0 ^{0}C (mm^2S^{-1})	3.1/16	35/40	14/29	15/37
Viscosity @ 100 ^{0}C (mm^2S^{-1})	2/2.5	15/17	4/6	4/8
Power Point ^{0}C	-30/-60	-50/-60	-40/-50	-19/-33
Flash Point ^{0}C	100/170	300/320	250/270	315/328
Fire Point ^{0}C	110/185	340/350	300/310	350/360
Density @ 20 ^{0}C ($Kgdm^3$)	0.88/.89	0.96/1.10	0.90/1.00	0.87/0.92
Specific Heat ($Jg^{-1}k^{-1}$)	1.6/2.0	1.5	1.8/2.3	1.5/2.1
Thermal Conductivity ($wm^{-1}K^{-1}$)	.11/.16	0.15	0.15	0.16/0.17
Expansion co-Efficient ($10^{-1}K^{-1}$)	7/9.0	10	6.5/10	5.5/5.9
Dielectric Dissipation Factor @ ^{0}C (Tgd)	< 0.002	< 0.01	< 0.008	< 0.003

DIVERSIFICATION OF RSO USAGE FOR PRODUCTION OF DIELECTRIC FLUID WILL;

- ✓ generates income for natural rubber growing farmers and natural rubber based industries.
- ✓ improve food security as it a better alternative to replace some edible oils used as dielectric fluids.
- ✓ The usage of rubber seed oil as a dielectric fluid will also reduce our dependence on the non renewable petroleum based dielectric fluid in future to meet the high rate of energy demand.

THANK

YOU