Aspergillus Niger and *Aspergillus fumigates* by P.D.A. technique [Sharma *et al.* 2009]. The data were analyzed according to the following formula:

$$\% Inhibition = C - \frac{T}{C} \times 100$$

Where C = number of fungal colonies (control plates after 72 h)
T = number of fungal colonies (test plates after 72 h) All the tests were performed in triplicate the standard deviation has been measured by the conventional measure of repeatability and the average was taken as final reading (Table -5) The results of ANOVA for the antifungal activities for all sops complexes are shown in Table 6. The predicted R^2 are in reasonable agreement and closer to1.0. This confirms that the experimental data are well satisfactory.

Results and Discussion

The Biocide and its activity against the species by copper sesame and mustard agrochemicals and their complexes with urea and benzothiazole ligands have been evaluated by testing against various fungi i.e. *Aspergillus niger*, *Aspergillus Fumigatus* at different concentrations by P.D.A. technique. The results of the biocidal screening data are recorded in Fig. 5-8

A perusal of results reveals that benzothiazole and urea complexes of copper and mustard agrochemicals show higher activity than pure agrochemicals. (Fig. 9)

Suggesting that complexes are more powerful antifungal agents. From the results it is apparent that the pure copper agrochemicals and their complexes with urea and benzothiazole have significant fungi toxicity at 10^4 ppm but their toxicity decreases markedly on dilution (at 10^3 ppm). Their comparative order could be as follow:

$10^4 > 10^3 > 10^2$ ppm.

It is evident that their efficiency increases with increases in concentration. Thus concentration plays a vital role in increasing the degree of inhibition. Also, on increasing the amount of solution in Petri plates from 1ml to 4 ml the % inhibition increases, suggesting that the % inhibition is affected by the increase in the concentration of the active fungicidal moiety in the analyzed system.

By earlier workers observations it was observed that enhanced activity of complexes might be due to synergistic mechanism i.e. the pure agrochemicals are less active but on complexation they show more activity in combination with ligands containing N and S atoms (Sharma *et al.*. 2012, Tank *et al.*. 2017)

The evaluation of antifungal studies further revealed that fungi toxicity of pure agrochemicals and their complexes also depends on the nature of the metal ions. From the results it shows that CM agrochemical is least fungi toxic (% inhibition lowest) in comparison to CSe agrochemicals the Biocide and it's activities against the species by copper sesame and mustard agrochemical is found in the order:

CSe> CM

And for complexes of agrochemicals the order of toxicity is as follow:

CseB>CSeU
CMB > CMU

The observation suggests that the agrochemicals possessing maximum biocidal activity have lowest molecular weight. Some recent studies about ant microbiological activities of early synthesized complex possessing thiazole or imidazole moieties also support our studies.

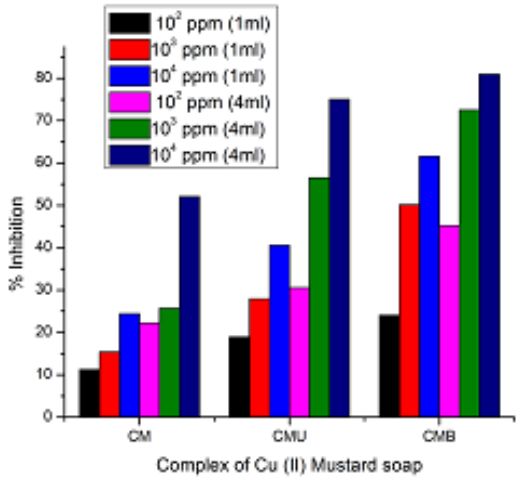

Fig.5 **Antifungal activity of copper mustard agrochemical (CM), their urea (CMU) & benzothiazole (CMB) complexes for fungi *Aspergillus Niger***

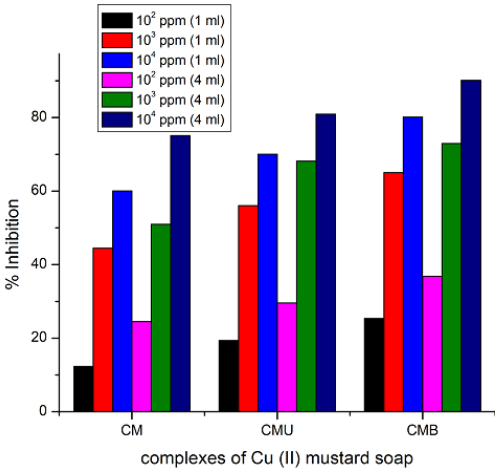

Fig.6 **Antifungal activity of copper mustard agrochemical (CM), their urea (CMU) & benzothiazole (CMB) complexes for fungi *Aspergillus Fumigatus***

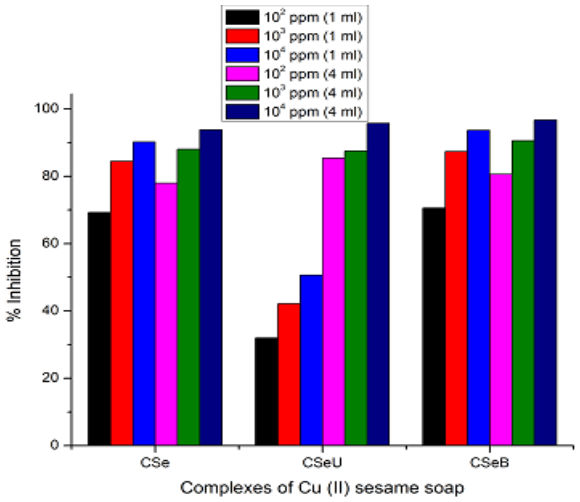

Fig.7 **Antifungal activity of copper sesame agrochemical (CSe), their urea (CSeU) &benzothiazole (CSeB) complexes for fungi *Aspergillus Niger***

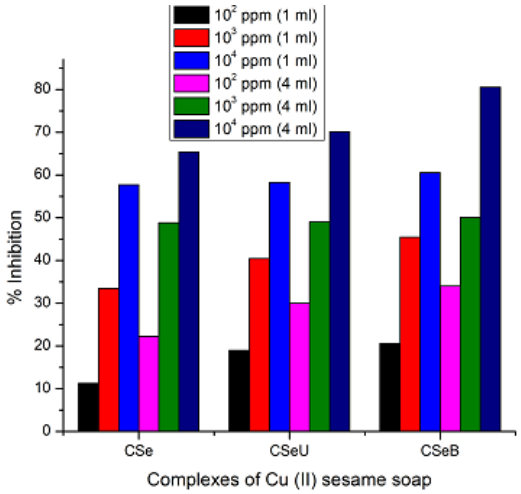

Fig.8 **Antifungal activity of copper sesame agrochemical (CSe), their urea CSeU) &benzothiazole (CSeB) complexes for fungi *Aspergillus Fumigates***

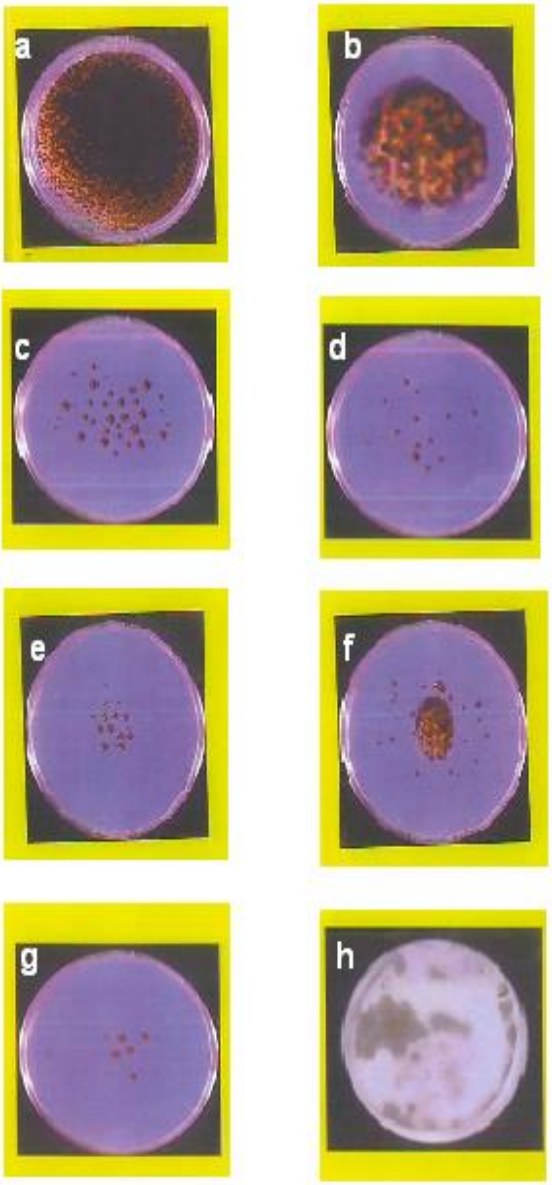

Fig 9 Antifungal effect of CSe soap and CSeB on *Aspergillus Niger a) Blank, b)* CSe, (10^2). c) CSeB, (10^2), d) CSe (10^3), e) CSeB (10^3), f) CSe (10^4), g) CSeB (10^4), h) Pure solvent benzene

Table- 5 Descriptive statics results for antifungal activities of Cu (II) soaps and its complexes

Fungi	*complex*	*Groups (ppm)*	*Subgroups (ml)*	*Count*	*Average % Inhibition*	*Std Error*	***Fungi***	*Average % Inhibition*	*Std Error*
Aspergillus Niger fungi	CSe	10^2	1	3	64.43	0.07	***Aspergillus Fumigates Fungi***	11.40	0.10
			4	3	73.40	0.10		22.30	0.42
		10^3	1	3	82.50	0.20		33.37	0.30
			4	3	84.63	0.13		48.30	0.42
		10^4	1	3	90.43	0.12		57.97	0.12
			4	3	94.53	0.15		65.73	0.27
	CSeU	10^2	1	3	32.00	0.25		19.20	0.17
			4	3	85.53	0.18		30.63	0.30
		10^3	1	3	42.27	0.29		41.30	0.26
			4	3	87.30	0.31		49.50	0.17
		10^4	1	3	50.37	0.30		58.80	0.31
			4	3	95.40	0.45		70.77	0.30
	CSeB	10^2	1	3	70.70	0.15		21.07	0.30
			4	3	80.77	0.30		34.00	0.36
		10^3	1	3	87.57	0.18		45.37	0.12
			4	3	90.87	0.18		50.73	0.33
		10^4	1	3	93.57	0.12		60.64	0.29
			4	3	96.00	0.40		80.87	0.20
	CM	10^2	1	3	11.67	0.12		12.62	0.25
			4	3	22.47	0.20		24.73	0.27
		10^3	1	3	15.37	0.26		44.60	0.26
			4	3	25.60	0.21		51.20	0.17
		10^4	1	3	24.57	0.18		60.60	0.32
			4	3	52.17	0.15		75.43	0.23
	CMU	10^2	1	3	18.37	0.09		19.38	0.09
			4	3	30.47	0.03		29.73	0.07
		10^3	1	3	27.43	0.29		56.63	0.22
			4	3	56.53	0.20		68.52	0.20
		10^4	1	3	40.53	0.20		70.87	0.20
			4	3	75.30	0.10		81.00	0.10
	CMB	10^2	1	3	24.48	0.21		25.87	0.20
			4	3	45.80	0.32		36.73	0.12
		10^3	1	3	50.50	0.21		65.43	0.23
			4	3	72.40	0.10		73.18	0.16
		10^4	1	3	61.53	0.20		80.60	0.15
			4	3	80.53	0.20		90.53	0.20

Table- 6 ANOVA results for antifungal activities of Cu (II) soaps and its complexes

Fungi	*Name of complex*	*SS*	*df*	*MS*	*F*	*P-value*	F_{crit}	*R- SQUARE*
Aspergillus Niger	CSe	1852	5	370	6872	2.7E-20	3.11	0.995
	CSeU	10985	5	2197	7800	1.2E-20	3.11	0.992
	CSeB	1329	5	266	1514	2.3E-16	3.11	0.996
	CM	3045	5	609	5565	9.4E-20	3.11	0.997
	CMU	6672	5	1334	14383	3.2E-22	3.11	0.991
	CMB	6087	5	1217	8619	6.8E-21	3.11	0.992
Aspergillus Fumigates	CSe	6687	5	1337	5015	1.8E-19	3.11	0.992
	CSeU	5281	5	1056	5296	1.3E-19	3.11	0.996
	CSeB	6516	5	1303	5593	9.1E-20	3.11	0.997
	CM	8002	5	1600	8155	9.5E-21	3.11	0.991
	CMU	9053	5	1811	24052	1.4E-23	3.11	0.992
	CMB	9723	5	1945	19312	5.4E-23	3.11	0.995

The data clearly indicates the inhibition power of agrochemical has been increased on complexation. All these studies will play a significant role in selection and promoters of ecofriendly and biodegradable fungicides, pesticides and insecticides.

Conclusion

Owing to proven industrial utility of copper mustard and copper sesame agrochemicals and their complexes with urea and benzothiazole in non- polar solvents have gained considerable popularity, due to their immense use and widespread applications such as wood preservation, foaming, wetting, biocidal, emulsification and lubrication etc.

The above applications stimulated our interest to extend synthetic investigations of ligands. Complexes of this ligand with transition metal surfactant are very important in various fields. In the present work synthesis of copper sesame and mustard agrochemical have been done. Complexation of these agrochemicals with nitrogen and sulphur containing ligand has been done which have remarkable chromogenic properties.

The present work deal with the synthesis spectral studies and biocidal activity of these agrochemicals. All the above studies led to the conclusion that copper mustard and sesame agrochemicals and their complexes due to its toxic and its bio degradable nature having fungicidal, herbicidal and many other biological activities. All these activity will play a significant role in their application in various fields of industries, pharmaceuticals, pesticides, wood preservation etc.

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