New Generation Floor Cleansers Based On Glycerol And Phthalic Anhydride Based Polymers

Suraj R. Mathane[1], Vishakha V.Bute[2], B. B Gogte[3], M. K. N. Yenkie[4]
[1, 2, 3, 4] Wainganga college of Engineering and Management ,Nagpur.

Abstract- *New generation floor cleansers were formulated by using ecofriendly polymers mainly containing glycerol and phthalic anhydride with other organics in very small quantity. Ecofriendly polymers have been synthysaied and analyzed by using standard laboratory methods. Novel ecofriendly polymers based on glycerol and phthalic anhydride have been successfully introduced in new generation floor cleanser samples.*

Flower cleansers samples have been systematically analyzed for cleaning of tile and antimicrobial activity by agar diffusion method. From this analysis we found that new generation glycerol and phthalic anhydride polymer based floor cleansers gave comparatively good results as compared with commercial ones.

I. INTRODUCTION

The household cleaners mainly contain floor cleansers. The main use of floor cleanser is to remove dust, sand, mud, oils and fats present on the surface of floor. A normal customer expects is following performance characteristic in a floor cleanser.

a) It should quickly and completely remove dust, sand, mud, oils, fats and grease present on the surface of floor.
b) It should not adversely affect the surface smoothness and shine of tile.
c) It should be pourable and quickly soluble in water and spared easily.
d) It should contain pleasant perfume so that aroma gives a pleasant atmosphere.
e) it should have excellent antimicrobial activity.

In India very large amount of glycerol is available. Glycerol[1-3] is by product of biodiesel and soap manufacturing industry. Now a days in India biodiesel production is continuously increasing and from biodiesel production 10% glycerol is obtained as by product. Mainly 5 % glycerol is used in cosmetic and medicinal industry and remaining is unused, so we desired to synthesized polymer using glycerol as main ingredient for synthesis of ecofriendly polymers.

In this Research paper we synthesized polymer mainly based on glycerol and phthalic anhydride beside these main ingredient small amount of polyethylene glycol(400) , sorbitol, $NaHSO_3$ and $NaHSO_4$ are used .

Synthesized polymers have been systematically analyzed for surface tension, viscosity, pH and H.L.B ratio by standard laboratory methods[4-7]. Synthesized novel polymers were successfully introduced in new generation formulated floor cleansers. These new floor cleansers have been analyzed for surfactant properties like foam, surface tension and cleaning of tile by standard methods. Antimicrobial activity is also analyzed by agar diffusion method[8-9].

II. MATERIAL AND METHODS

1) Preparation of Novel Polymers[10]

Polymers of various combinations were prepped in batch process. The mole ratio, addition of ingredients and reaction temperature were standardized for synthesis of polymers. All given ingredients were added in to ketals and mixed it well by electrically control homogenizer till all ingredients were convert into homogeneous suspension. This suspension was slowly heated up to 120-130^{0}Cby using electrical heating menthal. The heating is continued for three hours and then the mass was cooled to 800C. Samples were stored in tightly corked bottles. These Polymer samples were systematically analyzed for viscosity, pH and H.L.B ratio by standard laboratory methods.

2) Preparation of new generation floor cleanser[11]

All ingredients given in table 3 were added into the homogenizer pot and allowed to mix well by electrical control homogenizer .All the ingredients were stirred together for 20 mint to get homogeneous mixture which was then allowed to settle down for 24 Hr, Then above floor cleansers are analyzed for cleaning of tile and antimicrobial activity by agar diffusion method.

Table 1. Composition of polymers

Sr.No.	Polymer (Ingredients in %)	S23	S25
1	Glycerol	55	45
2	Polyethylene Glycol (400)	10	20
3	Sorbitol	10	10
4	phthalic anhydride	20	20
5	$NaHSO_4$	2.5	2.5
6	$NaHSO_3$	2.5	2.5

Table 2. Physiochemical analysis of polymers

Sr. No.	Polymer Properties	S23	S25
1	% Solids	92.46	89.18
2	pH(1% solution)by Digital pH meter	3.32	3.05
3	Viscosity In Seconds (ford cup no4. At 30^0C)	220	225
4	H.L.B Ratio	16.2	16.5

Table 3. New generation floor cleansers based on polymers

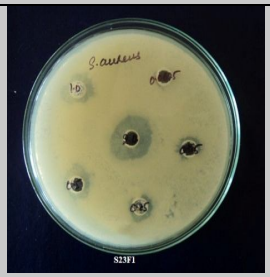
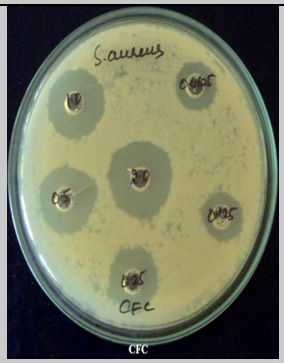
Sr.No	% Ingredient	S23F1	S25F1
1	Polymer	15	15
2	Sodium lauryl sulphate (40% Solids)	2	2
3	Sodium lauryl ether sulphate	15	15
4	Sodium bicarbonate	2	2
5	NaOCl (5% Solution)	10	10
6	perfume	1	1
7	Distill water	55	55

Table 4. Antimicrobial analysis of floor cleanser

Antimicrobial activity of new generation floor cleansers analysis using staphycocus Aurenus						
Sample	**0.0625mg**	**0.125 mg**	**0.5 mg**	**1.0 mg**	**2.0 mg**	**MIC**
S23F1	0	3	7	9	11	0.125
S25F2	0	3	9	10	11	0.125
CFC	10	11	15	16	19	0.0625

Note: CFC:- Commercial floor cleanser

Plate No:1 Antimicrobial activity and Cleaning on tile analysis

SR. No	Sample	Agar plats shows antimicrobial activity	Cleaning Analysis on tile
1	**S23F1**		
2	**S25F1**		
3	**CFC**		

III. RESULTS AND DISCUSSION

1) In this research paper we prepared new generation floor cleanser using ecofriendly polymers mainly based on glycerol and phthalic anhydride.
2) All polymers have been synthesized by batch process using glycerol and phthalic anhydride as major ingredient and polyethylene glycol(400) ,sorbitol and $NaHSO_3$ and $NaHSO_4$ were as minor ingredients.
3) We took glycerol as main ingredient in both batches because it is vegetable origin biodegradable product and it is also available in India in high quantity.
4) Synthized polymers were analyzed for physicochemical analysis given in Table 2. H.L.B ratio was found in between 16.2-16.5. From this ratio it is clear that synthesized polymers can be used in floor cleanser compositions.
5) New generation floor cleanser formulation S23F1 and S25F1 have been systematically analyzed for cleaning and antimicrobial activity. Simultaneously commercial floor cleanser was also tested.
6) Cleaning analysis and antimicrobial activity suggest that the new generation floor cleanser S25F1is shown comparatively good result as compared with commercial floor cleanser (CFC).
7) Antimicrobial activity of samples is good, more improvement can be archive by using high proportion of antimicrobial agents.

IV. CONCLUSION

1) Polymers based mainly on glycerol and phthalic anhydride can be used as base for floor cleansers.
2) The analysis of polymers for acid value, H.L.B ratio and cleaning of tiles positively indicate that they will be excellent material for floor cleanser.
3) Floor cleansers prepared have been compared with commercial samples and results indicate that our floor cleansers are techno economically viable prepositions.
4) The recipe of floor cleansers is based mainly on vegetable origin therefore they are ecofriendly in nature.

V. ACKNOWLEDGEMENT

The authors are thankful to the Director of Laxminarayan Institute of Technology R.T.M Nagpur University Nagpur, for laboratory facilities and BIOGENICS research and training center in biotechnology, Hubli (Karnataka) for providing facility for antimicrobial activity analysis.

REFERENCES

[1] Israel A.U., Obot I.B., Asuquo J.E., " Recovery of glycerol from spent soap lye by- product of soap manufacture",E-JournalofChemistry2008,5,pp.940–45.

[2] Gerard Hillion, Bruno Delfort , Dominique le Pennec ,Laurent Bournay, Jean-Alain Chodorge, "Biodiesel production by a continuous Process using a heterogeneous catalyst", Pap.-Am. Chem.Soc., Div. Fuel Chem.2003, 48(2), p. 637.

[3] Khandelwal Shikha, Chauhan Y. R., "Biodiesel production from non-edible-oils", Journal of Chemical and Pharmaceutical Research, 2012, 4(9), pp.4219-4230.

[4] ASTM Standard method 6.01, D1639-61(for Non volatile contains of resin solutions), 1981.

[5] ASTM Standard method, 6.01, D1200-82 (for viscosity by ford cup method), 1982.

[6] Garrett H E, Surface Active Chemicals Programmer Press, New York, 1972.

[7] BIS: 4955, Methods for the test of detergency for house hold detergents, 2000.

[8] Threlfall EJ, Fisher IST, ward L, Tschape H, Gerner Smidt P. Harmonization of antibiotic susceptibility testing for Salmonella, Results of a study by 18 national reference laboratories within the European Union-funded Enter-Net group. Microb. Drug Resist.1999; 5: 195–199.

[9] Baggot J D, Walker RD. et al. Antimicrobial susceptibility testing and interpretation of results. In: Antimicrobial Therapy in Veterinary Medicine, Prescott., eds. Ames, IA, Iowa State University Press. 2000:12–26.

[10] Suraj R. Mathane, P.D Gawande,B. B Gogte, M.K.N Yenkie, "Glycerol and Citric acid based biodegradibal novel polymers", International journal of Advance research and innovative ideas in education,2016,2(2),pp.359-364.

[11] Suraj R. Mathane, V.V Bute ,B. B Gogte, M.K.N Yenkie, "Glycerol based novel polymers used in formulation of floor cleansers", International journal of scientific review and research in engineering and technology". March-April 2016,1(3),pp 139-145.