

Ecofriendly Liquid Detergent for Washing Machine Based on Sugar Polymeric Surfactants

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Abstract— In today's world where environmental concerns are paramount it is essential to make sustainable choices in our everyday lives. The demand for sustainable and eco friendly household products has led to significant reason in detergent formulation. Special eco friendly, moderate forming and efficiency liquid laundry detergents must be developed which are moderate in cost yet effective in performance. Traditional Laundry detergents often contain harmful chemicals that can harm aquatic life and pollute water sources. Eco friendly laundry detergent made from biodegradable and plants ingredients that breakdown naturally and causing less harm to the environment.

This paper reviews recent developments in sugar polymeric surfactants based liquid detergent for washing machines, including cleaning performance, environmental benefits and challenges in formulation.

Index Terms: Emulsification, polymeric surfactants, Eutrophication, sustainable.

I. INTRODUCTION

A large number of household and Industrial Products are mainly based on crude Petroleum. India is imparting 2/3rd of our requirement from other countries. Soft acid slurry and alpha olefin sulphonate are the active ingredient for powder and liquid detergent which pose significant environmental concerns including non-biodegradability, toxicity to aquatic life. The total dependence on petroleum product is not a wise investment. There has been growing interest in developing eco friendly alternatives that are biodegradable and effective. Surfactants are amphiphilic molecules composed of Polar head group and non polar chain. Due to this constitution the head is hydrophilic and chain is hydrophobic which gives the surfactants, the ability to auto aggregate in aqueous solution.

Sugar based polymeric surfactant providing excellent cleaning efficiency with less environmental impact.

This reviews explain use of sugar to develop high efficiency active material which will give moderate foaming (high forming is totally undesirable for washing machine) and excellent performance characteristics. A detergent is an effective cleaning product as it contains one or more surfactant. Surfactant is briefly defined as material that can greatly reduce the surface tension of water when using small quantity. Surfactants unique class of high performance product for the emulsification of wide range of disperse phases into variety of continuous media and is used as a dispersing agent. Forming river and eutrophication were often linked with surfactants so polymeric surfactant were introduced which are biodegradable in nature and prepared from renewable Sources.

A. Polymeric surfactants based on sugar

Sugar is a produced in very large quantity in our quantity. Sugar being a vegetable origin will be harmless to skin

clothes and various surfaces and have better chance of biodegradability. It is a class of non ionic surfactant consist of hydrophilic hydrophobic arrangement and are electrically neutral.

B. Execution in washing machines

a. Cleaning ability

Dual nature of surfactants molecules boosts the wetting ability of water can then remove easily, penetrates and disperse dirt and stains. One end of surfactant molecule dissolves and emulsifies the grease that traps soil particles on fabrics. The other end dissolves in the surrounding water. Washing machine agitation also helps loosen the greasy soil. The suspended droplets and the soil clinging to them are then easily rinsed away by the water.

b. Compatibility with other ingredients

Detergent contains additives like enzyme, builders; fragrances sugar base polymeric surfactants are compatible with these additives.

c. Mildness and skin compatibility

Sugar base polymeric surfactants are mild on the skin so we use this with sensitive skin and used as a gentle effective cleaning agents.

d. Biodegradability

Sugar based polymeric surfactants are biodegradable as ingredient used are plant based and causing less harm to environment. Degrade rapidly into harmless by products, breaking down completely under aerobic conditions.

e. Renewable Sources

Conventional surfactants are petro based product they produced byproducts that are harmful to the environment.

Sugar based polymeric surfactants are biodegradable in nature and prepared from renewable Sources.

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f. Low aquatic toxicity

Conventional petro based surfactant is responsible for eutrophication results in the abrupt and explosive growth of algae and other plankton which consume oxygen dissolved in the water, suffocating fish and other aquatic plant and animal, increase in turbidity sedimentation.

g. Cost and production scalability

The production of sugar based surfactant can be more expensive as compared to petro based conventional surfactant so the cost and production process can limit the scalability of sugar polymeric surfactants. Detergents based on Sugar are used in washing machine because it produces less amount of foam as compared to convention petro based polymeric surfactants.

II. FUTURE SCOPE

Sugar base polymeric surfactant has numerous advantages over Petro base conventional surfactants. Now a day's consumer awareness to environmental issues grows the demand of eco friendly liquid laundry detergent will likely increase. Biodegradability and Green Chemistry may help to lower the prices of sugar base polymeric surfactant and continue research will be essential to use these of eco friendly detergent.

III. CONCLUSION

The use of eco friendly detergent reduces the release of harmful chemicals into water bodies, safe guarding aquatic life and preserving water quality for future generation. Switch to eco friendly liquid laundry detergent for washing machine is an impact full step towards protecting your health and preserving the environment. This detergent effectively clean clothes without compromising on safety and reduce water pollution and promote sustainable practices that benefit future generation by adopting eco friendly liquid and more sustainable future.

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