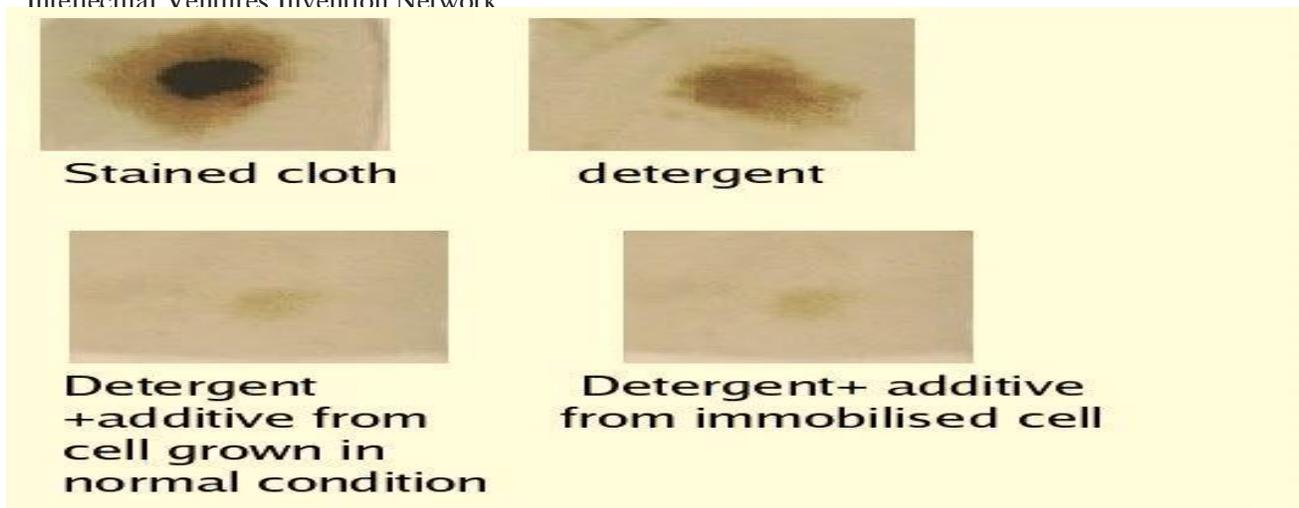


Microbial enzymes as detergent additive

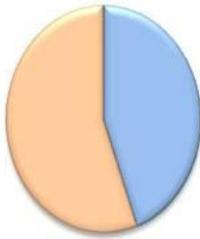
Detergents are used for cleaning various types of fabrics and hard surfaces. These are necessary evil as the effluent generated from detergents has adverse effect on the environment, mostly in form of phosphate which causes eutrophication. Often the detergents are made for efficient by addition s of enzymes. Enzymes, such as protease, amylase and lipase may be used as detergent additives to improve cleaning efficiency. Protease hydrolyzes proteins into soluble amino acids. Amylase catalyzes the breakdown of starch-based stains into smaller segments of oligosaccharides and dextrans, which are water soluble. Lipase hydrolyzes triglycerides into mono and diglycerides, glycerol, and free fatty acids, which are more soluble than fats. These more soluble reaction products may be more easily removed from fabrics and surfaces, increasing the cleaning efficiency of the detergent used. Microbial isolates from different environments may be used to produce enzymes. Similar combinations that include isolated microbial enzymes, such as amylases, lipases, and proteases as detergent additive for enhanced stain removal were developed. One of the formulation has been filed as a patent bearing the number 599/KOL/2010 dt June 1 2010 (Indian patent), US20120021489A1 (US patent) and PCT No. PCT/IB2010/001816; China Patent Application No. 201080067214.0 (IN-700651-04-CN-NAT). This technology has been transferred to Intellectual Ventures Invention Network



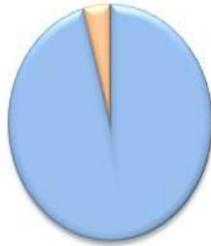
Both the formulations were subjected to market survey and the data was represented as pie chart. The survey shows wide spread acceptability. Pie chart of the market survey of the modified detergent is represented below. The detergent with and without additive were supplied to 50 different households to get a feedback on the wash performance efficiency as per the supplied questionnaire. Pie chart of steel utensil wash performance (b) revealed maximum acceptance (95.74%) followed by 94.59% for glassware

(c), 88.24, 92.86, 93.33 and 91.67% for the purpose of kitchen (d), floors (e), commode (f) and sink (g) cleaning respectively. In case of cloth washing (a) the performance of the formulated detergent was poor. It might be due to the detergent which was used here as base and was itself not suitable for cloth washing.

Washing

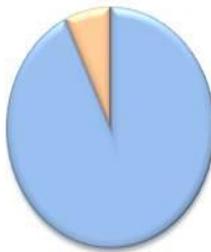


Glassware

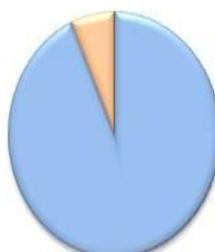


Kitchen

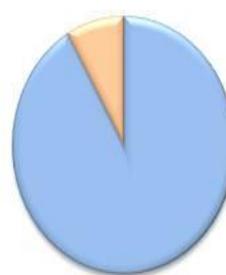
Stainless steel



Floor



Commode



Sink