Summary

This study aims to prepare surface active agents materials from raw materials to be use as adjuvants to conventional pesticides in order to improve their physicochemical properties then pesticidal efficiency and reduce the used doses and costs of controlling also, to be use as emulsifier for reworking the physically deteriorated pesticides, resulting in utilization of obsolete pesticides.

1- Two types of surface active agents, anionic and non-ionic were prepared from raw materials: fatty acids (Oleic, Lauric and Stearic acid) reacted with diethylene glycol or glycerol to prepared non-ionic mono fatty acid esters. Also, fatty acids reacted with sodium hydroxide for preparing anionic surfactants. Prepared nonionic surfactants were identified using IR and Mass spectroscopy. Physico-chemical properties were assessed such as solubility in different solvents, free acidity or alkalinity and HLB values.

2- To use the prepared surface active agents materials as adjuvants for improving pesticides, the prepared surfactants mixed with tested pesticides directly and with tank mix. The physical compatibility between prepared surfactants and the used insecticides were investigated. Emulsion stability test was considered as a limiting factor for successful combination and would be an important guide for the physical compatibility of the mixed materials. The experiments were carried out with insecticides, sumi-alpha, kendo, match, decies, selecron and deteriorated pesticide (vapathion). All tested surfactants used at concentration 0.5% in case of tank mix and at different concentration in case of direct mix. Experiments were carried out to determine all tested in hard and soft water.

3- To use the prepared surface active agents materials as emulsifier for reworking the physically deteriorated pesticide vapathion 57% EC. The solubility of prepared surfactants in pesticides at different concentration was tested and the emulsion stability test was tested for solublized surfactant in only pesticide. The physicochemical properties were assessed to materials successful in emulsion stability test such as the free acidity or alkalinity, the cold and hot storage.

4- The physicochemical properties of spray solution were studied for conventional insecticides alone and mixed with surfactants to physically compatible mixtures and also for successful mixing materials for reworking the pesticide vapathion 57% EC which were: surface tension, pH, conductivity and viscosity.

5- The pesticidal efficiency was evaluated against the cotton leafworm according the Protocol of the Ministry of Agriculture to conventional pesticides with completely dose, 3/4 dose and 3/4 dose plus the surface active agents materials in case of use as improved materials and the pesticide vapathion at before and after reworking with complete rate.

Result obtained show that, all prepared non ionic surfactants were insoluble in water but they show different solubility in xylene, acetone and insecticides, therefore, they mixed with pesticides using direct mix method. All prepared anionic surfactants soluble in water except sodium stearate partially soluble by heat but they did not soluble in pesticides, therefore, they mixed with pesticides using tank mix method. The obtained data indicated that the surfactants were physical compatibility with sumi-alpha and kendo in case of direct mix at concentrations 2% and 1%, respectively and with all pesticides in case of tank mix. The obtained results indicated that all tested insecticides passed in emulsion stability test in H.W and S.W in case of complete dose and mixed with additives at concentration 0.5, 1

and 2 also passed in emulsion stability test. All prepared non-ionic surfactants used as emulsifying for reworking one deteriorated pesticide. Physico-chemical properties of spray solution of insecticides alone and mixed with prepared surfactants were studied, which were surface tension, viscosity, conductivity and pH value. Also, results showed that all prepared surfactants decrease of both surface tension and pH values and increase of both viscosity and conductivity of spray solution of pesticides. Decrease of surface tension of pesticide spray solution give a prediction of increasing wettability and spreading on the treated surface then increasing pesticidal efficiency. Decrease in pH values of insecticidal spray solution would lead to increase attraction between spray solution and treated plant and increase its deposit and penetration in the tested surface then will increase the insecticidal efficiency. Increasing the viscosity of spray solution caused reduction drift and increasing the retention sticking and insecticidal efficiency. The results also obtained that the tested nonionic surfactants successful for improving physicochemical properties of spray solution of deteriorated pesticides.

The bioassay indicated that all tested surfactants improved the insecticidal efficiency of tested pesticides at 75% of field rate against 4^{th}cotton leafworm larvae near the complete dose.

For direct mix diethylene glycol mono stearate gave the highest initial and general effect with sumi-alpha and glycerol mono srearate with kendo. Also results indicated that sodium laurate gave the highest increased initial and general effect with all tested pesticides in case of tank mix. Results indicated that DEGML gave the highest increase in average residual effect used as emulsifier for reworking the pesticide vapathion at 100% of the dose.