

CHAPTER IV

CONCLUSIONS

The FTIR results have shown that the main functional group of yellow oil is a carbonyl which leads to further polymerization by aldol condensation. Results of the gel permeation chromatography show that yellow oil is a low molecular weight polymer having a degree of polymerization about 50-100.

Laboratory simulation of yellow oil using acetaldehyde showed similar color transition and the molecular weight was found to increase with time. FTIR results indicate that the C-H and carbonyl functionalities of the condensation products are almost identical with the yellow oil which has a higher content of C-H groups versus carbonyl groups. This is probably due to the presence of higher molecular weight aldehydes and ketones as well as the presence of catalytic surfaces in the actual dehydrogenation plant.

Hydroxylamine hydrochloride was found to interrupt the carbonyl polymerization by formation of an inert oxime. The reaction product is stable and does not polymerize further, even when heated. This chemical treatment may be used in the plant by feeding hydroxylamine with the fresh caustic into the caustic tower. The proper amount of inhibitor to be used in the plant can be calculated if the amount of aldehydes remaining in the cracked gas can be determined.