SUMMARY

The present studies aim at realizing nonconventional method for making use of the black liquor disposed by RAKTA paper pulping factory into the Abu Kier bay waters. The disposed black liquar contains:

a- Silica b- lignin c- hemicelluloses

The present studies succeeded in working out nonconventional method for the desilication and further the delignification of this black liquor.

Anonconventional method for the desilication of black liquor was worked out. The method relies on the use of Na ions for the neutralization of the negative charge on the silicate anions. The addition of NaCI in concentration> 4.5 % followed by the addition of HCL led to the precipitation of silica in the form of an amorphous precipitate and not in gel, to a great decrease in the amount of required HCL to almost the 1/3; silica precipitated at higher PH =10.0 and the precipitated silica was easily separated, washed and obtained as snow white preparation. Using different mineral acids it was formd that equivalent amounts of HCL. HNO, or H, SO_4 are requrid for silication white for great amounts of H_3PO_4 are required. Using different sodium salts for the desilication of black liquor it was shown that it is the Na ion which is responsible for the neutralization of the negative charge of

the silicate ions and that the least weight of salts was when NaC1 is used, moreover it is the cheapest all the used sodium salts.

Using other monovalent cations other than sodium greater amounts were needed for desilication. On using NH,C1 silica precipitated without adding HCl which means far stronger coagulating potentiality than NaCI. Precipitation took place at higher pH (pH 11.0) the threshold of NH_4C1 concentration for coagulation seems to be 2.0 g/100m1 of black liquor. Different ammounium salts were tested for disilication but NH_4C1 proved the best. The use of either divalent of trivalent cations for desilication did not facilitate the process but on the contrary led to serious complication.

For delignification the addition of equivalent amounts of either HCL, HNO, or H, SO_4 led to the precipitation of lignin in the form of brown flakes at high PH value (a' 9.9). the befor added NaCI enabled delignification at such high pH value . NH_4 Cl when added to the desilicated black liquor brought out delignification. The addition of CaC1, , BaC1, , Al Cl, or FeCI, caused delignification at high PH value (= 10.0) for the first two salts while at for lower PH value (= 5.7) for the second two salts.

Using eight soil samples collected from governorates El- Qalubia a big collection of black liquor hemicelluloses consuming fungi were

isolates. The obtained isolates were differentiated into fungal types which were identified as follows:

a- Asperffillus flavus

b- Aspergillus Fumigatus

c- Asperffillus c/a vatus

d- Penicillium notatum

e- Paecilomyces silvatica

f- Paecilomyces divaricata

g- Fusarium oxvsporum

h- Alternaria humicola

is Alternaria tenuis

j- Alternaria geophila

k- Monilia grisea

Moni/ia acremonium

m- Botrvotrichum piluliferum

n- Scopu/ariopsis brevicaulis

According to the linear growth rate of the studied fungi they were differentiated into three groups:

a **High growth rates :** and these were . ***Fusarium oxvsporum*** followed by ***Botrvotrichum pfluliferum*** then ***Scopulariopsis brevicaulis*** followed by ***A/termaria humicola*** then ***Altermaria tenuis.***

b- Slow growth rates : and these were ***Monilia acremonium*** Followed by ***AmendBus Fumieatus*** , ***Alternaria geophila*** and ***Asperpillus clavatus***

c- Very slow growth rates : and these were ***Asperfillus*** , ***Ilavus*** followed by **penicillium** ***notatum,*** ***Monilia grisea, Paecilomvces divaricata*** and ***paeci/omvces silvatica***

According to biomass Production in liquid black liquor salts medium the studied fungi were differemtiated into 3 groups

A-Seven fungal species that gave low biomass in the initial black liquor Salts medium, low biomass on 5 fold, concentrated black liquor but high biomass on 10 Folds medium.

B-Three fungal species that gave low biomass production on the initial black liquor, moderate biomass on 10 folds medium.

C-Four fungal species that gave low biomass on initial black liquor, high biomass on 5 folds medium and lower biomass on 10 flods medium.

The patterns of consumption of black liquor Sugars - total carbohydrates, reducing sugar and hexosamines were studied for 10

fungi of the 14 isolated fungi. These patterns were found to be different for the studied species.

The comparative study of the production of some enzyme by the 10 selected fungi showed that xylanases are produces by ***Fusarium oxysporum*** , ***Scopulariopsis brevicaulis*** , ***paecilomyces silvatica*** , ***Aspergi//us F/avus,*** and ***Aspergillus clavatus.*** Lipases are produced by ***Fusarium oxysporum*** , ***A/ternaria humicola*** , ***Scopu/ariopsis brevicaulis*** , ***Paecilamyces silvatica*** and ***Aspereillus F/avus.*** Proteases were found to be produced by ***Botryotrichum Piluliferum Aspergillus clavatus*** and ***Asperrillus F/avus.*** For Keratinases they were found to be produced by ***Botrvotrichum Piluliferum*** and ***Paecilomvces divaricata.*** while cellulases were produced by ***Scopu/ariopsis brevicaulis, Aspergillus Clavatus*** and ***Aspergillus Ilavus*** None of the studied fungi produced amylases.

Of the ten selected fungal species seven were found to produce aflatoxins while three: ***Fusaviun oxysporum, Scopu/arioopsis brevicaulis*** and ***A/ternaria humicola*** further were non afflatoxin producers studies were restricted to these three species, non aflatoxin producers.

The best organism for single cell protein production was ***Fusarium oxysporum*** as it showed highest total protein content of the produced biomass.

Of the collected soil samples 47 actinomycetes isolates were obtained. These were differentiated into 3 growth types :

The first type was, charaeterized by pale yellow aerial mycelium, nonpigmented substrate growth, short straight spore chains, smooth spores. This type was identified as belonging to the genus ***Streptomyces*** . Two isolates of this type were chosen .

The second type was, characterized by greenish grey aerial hyphae, nonpigmented substrate mycelium, spiral spore chains, spiny spore surface. This type was identified as belonging to the genus ***Streptomyces*** and one isolates was chosen as a representation.

The third type was, characterized by the production of very long flexuous aerial hyphae that fragment into Spore chains, spores are smooth.This type was identified as belonging to the genus ***Actinopolyspora.***

All isolates of the actinomycetes were found not to be aflatoxin producers.

Of the tested actinomycetes highest biomass and single cell protein was shown by Streptomyces No.23, of the Second growth type