and drops to 127, 113, 118, 124 and 120 ppm for oil bleached by natural, 10, 20, 30 and 40% acid concentrations, respectively.

The drop in the phosphorus content indicates that some of the positively charged trace metals are adsorbed onto the clay lattice structure. Such behavior suggests chemisorption between metallic ions and the charge-deficient montmorillonite clay.

The results obtained so far show that bleaching clay assists not only in the removal of coloring matter, but also removal of phosphatides.

SPECIFIC SURFACE AREA

The specific surface area of clay particles can be used as a tool to assess its bleaching ability and this has been adopted widely by manufacturers of bleaching clay.

The procedures to measure specific surface area adopted in the current study follows ASTM (204-55) designation (6). The results of specific surface area with concentration are given in Figure 4.

It can be seen that the specific surface area increases with acid concentration up to an optimum, after which the surface area decreases. With reference to Figures 2 and 4, it can be suggested that the surface area gives an indication of its decolorization capability.

By acid leaching, some of the organic matter or impurities covering the active adsorption sites are leached. This increases the pore area and hence exposes more of the active adsorption sites. Furthermore, as discussed earlier, acid leaching creates a deficiency in charges in the clay due to removal of $A\ell^{3+}$. Thus, the initial increase in bleachability is the result of (a) increasing pore area and (2) leaching of $A\ell^{3+}$.

However, when the concentration of sulfuric acid passes the optimum, in this case, 20% acid concentration, the specific surface area decreases. The subsequent decrease in bleaching ability and surface area is a consequence of the collapse of the clay lattice structure.

ACKNOWLEDGMENT

Part of the work reported here was done at the laboratory of Guan Soon Heng Edible Oil Sdn. Bhd., where A.L. Kheoh encouraged the authors in this project.

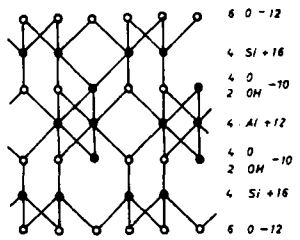

FIG. 3. Atomic structure of typical montmorillonite clay.

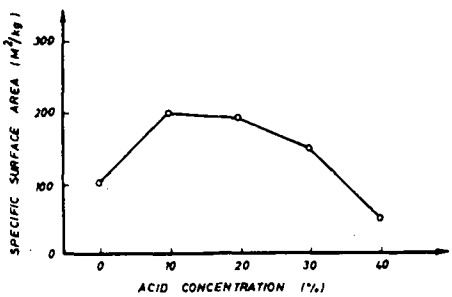

FIG. 4. Effects of acid concentration on specific surface area.

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[Received September 29, 1981]