

sugar necessary. Recent experiments with fruit jellies show that upon reducing the percentages of pectin, sugar, and acid to the point where a jelly will not form, and then adding 0.5–1.0 per cent. calcium chloride, jelly formation occurred. Two possible explanations were offered: (1) Calcium has with pectin a higher gelatinizing power. (2) Calcium chloride increases the H-ion content by lowering the buffering action for the pectin. The most efficient acid for jelly making is thought to be tartaric, since it furnishes a higher concentration of H ions than either malic or citric.

The mixing of flour and liquid in making dough as well as the swelling of the dough and the changes taking place in baking present interesting phases of colloidal actions. The fermentation is a process which can only occur in substances which absorb water for the use of the yeast and permit swelling to get rid of the carbonic acid. The gluten absorbs the water and forms the elastic mass or gel, which stretches under the influence of the carbon dioxide. There is some discussion as to whether the strength of the flour depends upon the tenacious gel formed by the gluten or upon the salt or acidity content of the flour. A recent article by Gortner indicates that the strength of the flour probably depends to a great extent on the physical properties of the gluten as it is laid down in the wheat berry. Flours vary greatly

in the gluten quality but are quite uniform in gliadin. He also states that the weak flours are suited to the manufacture of pastry and crackers rather than for leavened bread. Colloidal phenomena stand out in the baking process as the proteins are coagulated by the heat and produce the firm, porous structure.

PARTICLE SIZE AND SEDIMENTATION

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Reprinted from the Chemist-Analyst

The removal of suspended particles such as dust or smoke in air and fine suspensions in liquids is an important problem in many industries. These particles are nearly always electrically charged, the sign of the charge depending upon the nature of the material and the conditions. The static charge on combustible dusts, such as arise in flour mills and mines, is often sufficiently great to introduce the hazard of explosion due to ignition by a spark discharge. Many explosions which have occurred in mills and mines of various types have been attributed to this cause.

Due to the recent emphasis upon vitamins and ultra-violet light as necessary to normal health and growth, much attention has been directed to the menace of smoke and dust in the atmosphere over cities. In some communities on occasions the quantity of suspended material in the atmosphere is sufficient to absorb all of the beneficial ultra-violet rays. It would seem practically impossible to remove such materials from the atmosphere once they are there, but considerable progress has been made in remedying the source of the evil. The lines of development have been to improve methods of combustion so that less smoke is produced and to