

CHEMISTRY

Synthesizing Penicillin

Removing molecule of water stands between success and failure. Dr. Woodward predicts it will be done on a practical scale.

► A MOLECULE of water stands between success and failure to synthesize penicillin, Dr. R. B. Woodward of Harvard University told members of the American Association for the Advancement of Science.

Dr. Woodward is one of two young chemists who in 1944 performed the difficult feat of synthesizing quinine.

Penicillin, he declared, has not yet been synthesized except in micro amounts which can be detected by their effect on disease germs but are not yet available in the form of pure crystals. As an organic chemist, he believes that penicillin can be synthesized on a practical scale.

The trick seems to involve removing that molecule of water from another chemical, penicilloic acid. This acid is penicillin plus one molecule of water. When chemists got as far as penicilloic acid in their attempts to produce penicillin in the laboratory during the war, mold production of the drug was far behind the need for it. They thought then the problem was solved, because penicilloic acid can be synthesized easily by about a dozen different methods, a number of which are commercially practical.

Removing the molecule of water to produce penicillin seemed easy. But for two years it has stumped leading chemists in forty laboratories in this country and England.

The chemical structure of penicillin is known. It is a beta lactam. At first chemists rejected this structure for penicillin because beta lactams are very solid compounds whereas penicillin breaks down easily into a number of different chemicals. X-ray pictures of beta lactams, however, showed an unsuspected weakness in their structure. It might be called a bent or twisted molecule with its two parts on different planes, and at the bend or twist, one part can easily break off to form all the compounds which penicillin becomes under various chemical treatments.

One of the parts that breaks off when penicillin is given these chemical treatments is penicillamine. This is the part of penicillin that is effective in stopping disease germs. The rest of the compound is like the hilt of a dagger, useful for

getting the killing edge to the scene of action.

Penicillamine stops germs by competing with either valine or cysteine according to present theories. These are amino acids needed by disease germs for food. Penicillamine from penicillin therefore may kill the germs by starving them through depriving them of necessary nourishment.

Even with fairly plentiful supplies of penicillin available from mold production, a synthetic product would have the advantage of being pure penicillin. The commercial penicillin now on the market may contain as many as four different penicillins, some of which are more effective remedies than others. Artificial production of one or another of these penicillins in pure form is now being attempted by forced feeding of the mold. This involves adding to its nourishment certain chemicals which will force or enable it to produce penicillin G or X or one of the other two varieties.

Science News Letter, April 6, 1946

ENGINEERING

Improved Methods for Extracting Cottonseed Oil

► NEW AND IMPROVED methods that extract more oil from cottonseed at less cost were revealed at the spring meeting of the American Society of Mechanical Engineers in Chattanooga, Tenn. N. Hunt Moore, Delta Products Co., Wilson, Ark., said that replacing hydraulic presses now used with a solvent process should enable commercial plants to reduce the residual oil in cottonseed meal from between 5.5% and 6.25% to between 1% and 1.50%.

This saving would mean an increase of about 45 pounds of oil from each ton of seed processed, he pointed out. In addition, Mr. Wilson said that the saving in labor from the solvent extraction would lower the cost of producing cottonseed oil.

Arnold Glass, Arthur H. Morgan and W. H. Baskervill of the University of Tennessee Engineering Experiment Station staff, reported the commercial development of a pressure cooker for cottonseed that increases the oil yield.

They announced studies showing that increases in pressure would reduce the cooking time for the seed to obtain a maximum amount of oil, and said that aging flaked cottonseed meats for 30 days before cooking would increase oil content from 4% to 5%.

Science News Letter, April 6, 1946

CHEMISTRY

Napalm Will Be Made Into G-I Liquid Soap

► NAPALM, that spelled death and destruction as an incendiary ingredient in wartime flame-throwers, will soon be used by the Army as a G-I liquid soap.

Within a few months, the War Department states, 50,000 gallons of a new quick-suds soap made of napalm will be available for everything from scrubbing barracks floors to G-I shampoos.

The new soap can be made by plants that turned out the flame-thrower material without any additional equipment and by using little more labor, it was reported.

Napalm is also reported to have a limited use in some hospital applications.

Science News Letter, April 6, 1946



Photo courtesy Oak Mfg. Co.

TESTING INSTRUMENTS IN ARTIFICIAL CLIMATE

The "climate" (temperature and humidity) in the big chest at left above is regulated by the two Micromax Controllers, on wall beneath window. Chest contains electrical insulation, and engineer is using L&N Insulation-Resistance Test Set to help show how it will stand up under actual weather conditions.

This is one of many similar uses of L&N instruments. If you're interested in such a problem, we'll gladly send further information.



Jr'l Ad EN-500 (1c)