Flexibility: The Byword for Hunt-Wesson Foods' New Research and Development Center

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Hunt-Wesson Foods' new $3.5 million Research and Development Center in Fullerton, Calif., can best be described with one word—flexibility. Flexibility is apparent throughout the Center's functional interior multilevel design which allows for almost unlimited future change or expansion, and for flexibility through the ability to adapt laboratory facilities to permit wide diversification in food research.

Hunt-Wesson is committed to aggressive and diverse new product explorations and is embarking soon on increased seafood and meat product research. With greater diversification planned for the future, the need for adaptable, flexible facilities becomes apparent.

Equipped with suspended cantilever lab bench systems in all laboratory areas and totally modular offices, whole areas can be relocated or expanded. A laboratory which at one time specialized in oil research can be altered with ease to facilitate organic chemistry testing or food formulation.

Incorporating the concept of the "open lab," supervisors are not confined to cubby-hole offices or cubicles, but maintain adjacent modular offices within the labs, which encourages freer working conditions and more open communications with their staffs.

Flexibility is also noted in the soon to be completed, refrigerated facility for processing meat products and other perishables. Composed of modular aluminum panels with urethane foam insulation, the "room," foregoing traditional construction of masonry and brick, is easily expanded or relocated.

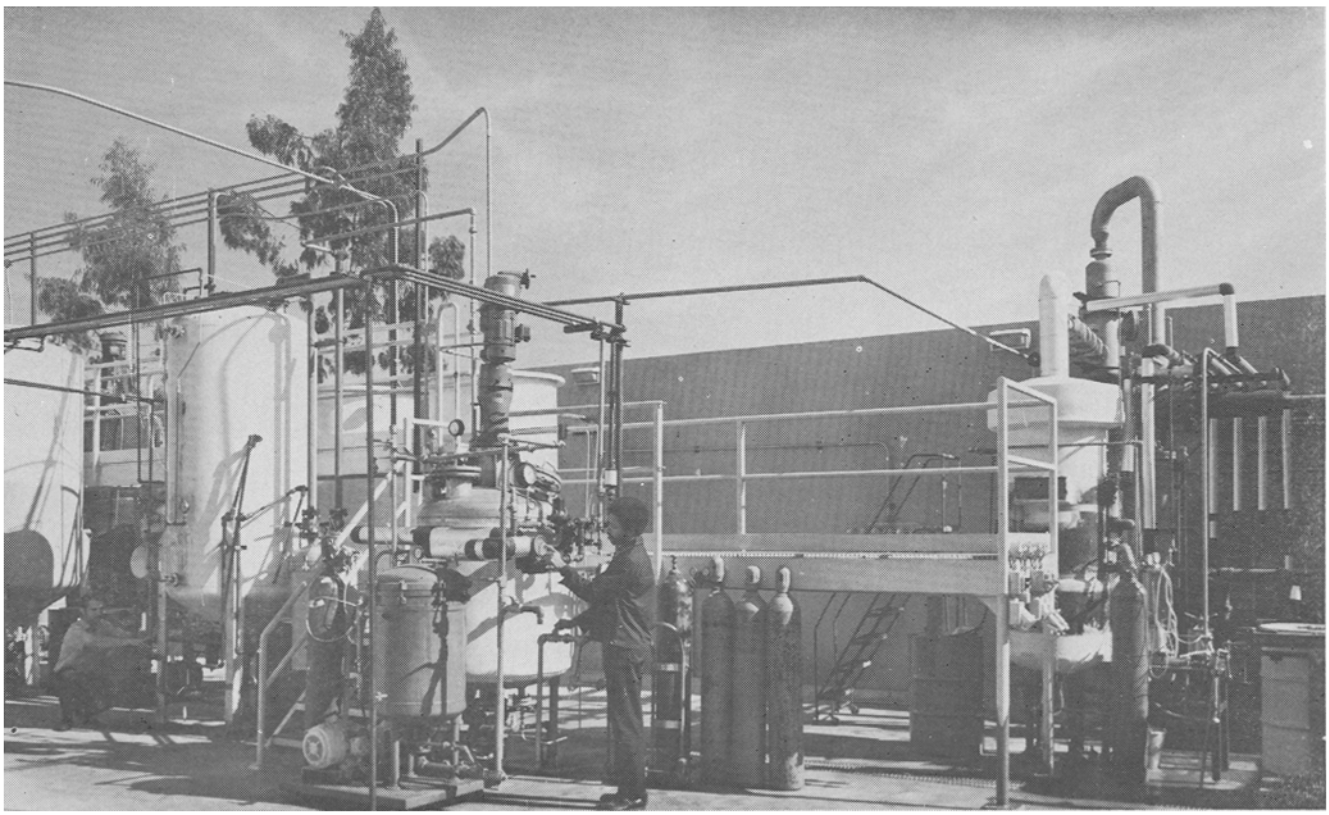
Devoted to research and study in new food products, food processing innovations and food improvement activities, the Center provides 84,600 ft^2 and houses all Hunt-Wesson Research and Development. Under the leadership of R.J. Moshy, vice-president, the current staff numbers ca. 140 with expansion capability for approximately another 110 employees.

Developing a single new food item embraces the full spectrum of all specialized areas of research and development. A protocept may be born in the newly equipped Hunt-Wesson Consumer Kitchens with a pot bubbling on the stove, or it may see the light of day in a beaker through the technology of the Experimental Kitchens.

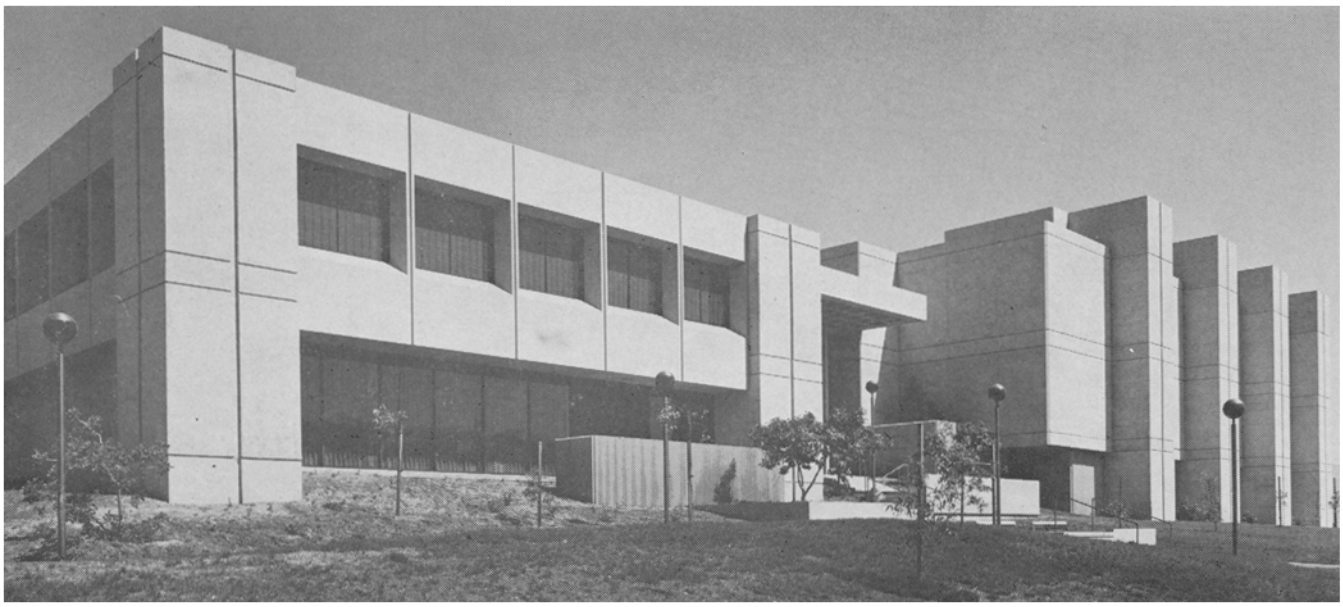
The actual development of the new product is the responsibility of Product Development. Using lab equipment resembling full scale processing, the protocept is made "commercially" in small batches, while constantly refining the product for optimum qualities and costs. Storage studies which predict shelf life are then carried out on the fully optimized product.

In all stages of progression from birth to full plant production, the new product is tested repeatedly in the Sensory Evaluation center to determine optimum consumer acceptance. Uniquely designed with twin panel booths separated by a kitchen, this area of research and development is capable of serving 12 taste panelists at one sitting. With six panelists at opposite sides of the kitchen, two separate tests may be conducted simultaneously.

With the support of Technical Services, chemical, physical and microbiological testing help to characterize the product and suggest changes which will provide further optimization. Each change in the prototype formula or in processing procedures calls for additional sensory



Oil pilot plant, located behind the Center Plant produces shortenings, salad oils or component fats throughout the year for use in new product development.



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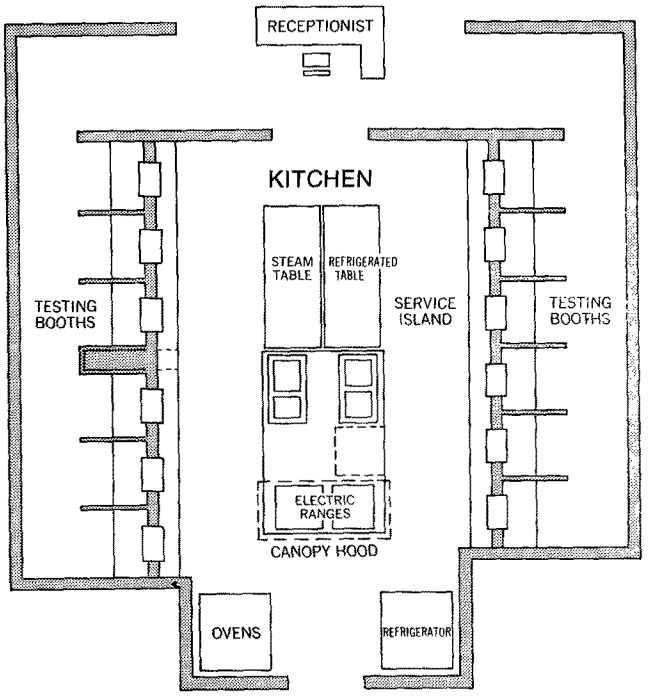
evaluation. The development of an appropriate package proceeds concurrently with formula optimization, ultimately leading to a detailed specification for the purchase of this important component.

Developing scale-up production processes from lab to plant scale, Engineering Development utilizes the self-contained pilot plant located on the ground floor of the center. It mirrors the numerous food processes used by Hunt-Wesson or the food industry generally.

TASTE PANEL



Modular cabinets provide controlled temperature storage ranging from 0–100 F, a vital necessity in predicting the shelf life of a new product. There are two fully equipped packaging laboratories, one for detailed examination and physical testing of packaging materials and the other for dynamic and static tests of the abuse resistance of the final package and shipping carton.

Southern California's balmy weather plays a helpful role in Hunt-Wesson's Research and Development program. At the south end of the center, an exterior oil pilot plant functions year round, producing shortenings, salad oils or component fats for new products.

Another area taking advantage of the mild climate is a mobile Sensory Evaluation unit. A Dodge Mobile Home, outfitted with a small kitchen and several tasting booths, makes its way each week of the year to nearby shopping centers, testing consumers' reactions to new food

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Hunt-Wesson Foods' new Research and Development Center incorporates new concept of "open lab." Supervisors maintain adjacent modular offices within labs encouraging freer working conditions and more open communications with their staffs.

THE CHEMISTRY OF CARPESTEROL, A NOVEL STEROL FROM SOLANUM XANTHOCARPUM. J.A. Beisler and Y. Sato (Lab. of Chem., National Inst. of Arthritis & Metabolic Diseases, National Inst. of Health, Bethesda, Md. 20014). *J. Org. Chem.* 36, 3946–50 (1971). The structure of carpesterol has recently been shown to be (22R)-22-hydroxy-6-oxo-4α-methyl-5α-stigmast-7-en-3β-yl benzoate. The present work describes some chemical transformations of the sterol as well as its degradation to 4α-methyl-5α-stigmast-8(14)-en-3β-ol from which the 24R configuration of the stigmasterol ethyl group was confirmed. The possible implications of carpesterol to the biogenesis of steroidal alkaloids and sapogenins are presented. The ORD spectra of carpesterol and some of its derivatives are contrasted with the spectra of the ecdysterols.

USE OF AN ANTIBODY TO STUDY THE LOCATION OF CARDIOLIPIN IN MITOCHONDRIAL MEMBRANES. M. Guarniere, B. Stechmiller and A.L. Lehninger (Dept. of Physiol. Chem., Johns Hopkins Univ. School of Med., Baltimore, Md. 21205). *J. Biol. Chem.* 246, 7526–32 (1971). Rabbit antiserum to cardiolipin, which is reactive with the polar head but not the nonpolar fatty acid moieties of cardiolipin, was used to explore the location of the polar head of cardiolipin in mitochondrial membranes. Only a few percent of the cardiolipin in intact mitochondria from rat liver, blowfly flight muscle, *Saccharomyces cerevisiae*, and *Neurospora* and none of the cardiolipin in intact beef heart mitochondria are available for binding of anticardiolipin antibody. Freezing and thawing, aging at 45C or sonication, in the absence or presence of the antibody, increased only slightly the anticardiolipin antibody binding activity of various types of mitochondria. The only mitochondrial preparation showing complete ability to bind anticardiolipin antibody was a mitochondrial precursor fraction isolated from glucose-repressed, anaerobic yeast cells. The isolated outer and inner membrane fractions from rat liver mitochondria also showed very little capacity to bind the antibody; both the cytoplasmic side and the matrix side of the inner membrane, which contains most of the cardiolipin showed little antibody binding activity. Removal of the F_1 ATPase molecules from inner membrane vesicles of beef heart mitochondria also failed to unmask antibody binding activity. Neither oxidative phosphorylation nor energy-linked Ca^{++} transport in intact rat liver mitochondria were influenced by addition of excess anticardiolipin antibody. It is concluded that the polar heads of most of the cardiolipin molecules in the mitochondrial membranes are buried within the structure of the membrane or shielded by the binding of other membrane components.

ω-OXIDATION OF FATTY ACIDS. I. MECHANISM OF MICROSOMAL ω1- AND ω2-HYDROXYLATION. M. Hamberg and I. Bjorkhem (Dept. of Med. Chem., Royal Veterinary Coll.; Dept. of Chem., Karolinska Inst., Stockholm, Sweden). *J. Biol. Chem.* 246, 7411–16 (1971). Rat liver microsomes in the presence of NADPH and 0_2 catalyzed ω1- as well as ω2-hydroxylation of decanoic acid. 10-Hydroxydecanoic acid accounted for 92% of the products formed, L-9-hydroxydecanoic acid for 6% and D-9-hydroxydecanoic acid for 2%. Incubations of (9-$^2H_2$)- and (10-$^2H_3$)decanoic acids followed by mass spectrometric analyses of the products showed that the hydroxylations occurred with loss of 1 hydrogen atom from the carbon hydroxylated. The two hydroxylations at carbon 9 both proceeded stereo-specifically with retention of the absolute configuration. Significant isotope effects were present in the formation of D-9- and L-9-hydroxydecanoic acids from (9-$^2H_2$)decanoic acid. The formation of 10-hydroxydecanoic acid from (10-$^2H_3$)decanoic acid occurred without isotope effect.

II. ENZYMATIC OXIDO-REDUCTION OF 17-HYDROXYSTEARIC ACID. I. Bjorkhem and M. Hamberg. *Ibid.*, 7417–20. The oxido-reduction of 17-hydroxystearic acid by enzymes present in the microsomal and soluble fractions of homogenates of rat and guinea pig liver was studied. The rate of oxidation of L-17-hydroxystearic acid into 17-ketostearic acid by the 100,000 × *g* supernatant fluid of rat and guinea pig liver homogenate was 2.2 and 6 times, respectively, faster than the rate of oxidation of D-17-hydroxystearic acid. In the presence of microsomal fraction of rat liver homogenate, D-17-hydroxystearic acid was oxidized 1.4 times faster than L-17-hydroxystearic acid. Reduction of 17-ketostearic acid by the 100,000 × *g* supernatant fluid of rat and guinea pig liver homogenate yielded 17-hydroxystearic acid of which 72% and 91%, respectively, was the L-17-enantiomer. Reduction by the microsomal fraction of rat liver homogenate yielded 68% of D-17- and 32% of L-17-hydroxystearic acids. The soluble enzyme was found to utilize the 4A-hydrogen in NADPH whereas the microsomal enzyme utilized the 4B-hydrogen in NADPH.

GENETIC VARIATION IN FATTY ACID COMPOSITION AND STABILITY OF ARACHIS HYPOGAEA L. OIL. R.E. Worthington and R.O. Hammons (Univ. of Georgia). *Oleagineux* 26, 695–700 (1971). A total of 110 peanut genotypes, obtained from many areas of the world and grown in Tifton, Georgia, were examined for effects of genetic diversity of the fatty acid composition and stability of the oil at 60C. Year to year differences in oil stability were large and could not be accounted for by relatively small variations in fatty acid composition. Correlation coefficients among fatty acids showed significant positive correlations between linoleic acid and palmitic, behenic and lignoceric acids, and significant negative correlations between linoleic and stearic and oleic acids.

INCORPORATION OF TRANS FATTY ACIDS IN THE BODY LIPIDS OF RATS FED MARGARINES CONTAINING RAPESEED OIL. J. Budzynska-Topolowska, M. Kuliszewski, A. Rutkowski and S. Ziemlanski (Inst. of Food and Nutr., Warsaw, Poland). *Oleagineux* 26, 701–6 (1971). Rats were fed margarines (18% by weight of the diet) containing hydrogenated rapeseed oils with either high or low contents of erucic acid for 7 and 12 months. Incorporation of trans fatty acids in the body lipids was greater when the diet contained more of them. The quantity of trans double bonds incorporated in the liver phospholipids was the same in all experiments. The greatest quantities of trans isomers were stored in the fatty tissues while their incorporation in the heart lipids was small. The rate of incorporation of trans bonds in the three fractions of the liver lipids differed: the lowest quantities were incorporated in the phospholipids. Feeding the experimental margarines for the longer period did not significantly increase the incorporation of trans fatty acids in the tissues.

EFFECT OF DIETARY FATS ON THE FATTY ACID CONTENTS OF CHICKEN ADIPOSE TISSUE. J.J. Jen, W.P. Williams, Jr., J.C. Acton and V.A. Paynter (Dept. of Food Sci., Clemson Univ., Clemson, S.C. 29631). *J. Food Sci.* 36, 925–9 (1971). Broiler-type chicks were reared from hatching to 4 weeks of age on a low-fat ration and then fed diets containing 10% of either corn oil, lard, beef tallow or hydrogenated coconut oil. The fatty acid content of extracted total lipids was characteristic of the dietary fats, and dietary fatty acid patterns were incorporated into the adipose tissue within 2 weeks after the experimental diets were fed. The total lipids, when separated into solid fats and liquid oils, also reflected the fatty acid pattern of the experimental diets. Neutral triglycerides from the adipose tissue contained less linoleic acid and more

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