

GENERAL INTRODUCTION.

The curing of cacao for the market involves the important processes of fermentation and drying, the main purpose of which is to prepare a stable product possessing the quality of flavour and aroma desirable for the manufacturer. Kempf at the 1953 Cocoa Conference stated that regardless of the value of chocolate products as nutritious, concentrated-energy food, it is without doubt the delightful chocolate flavour which primarily accounts for their widespread marketability.

The processing of cacao for the manufacturer has always been a problem to large and small farmers alike. The difficulties encountered during curing are increased by the rather exacting and specific conditions required during the process for the production of good quality cacao. A thorough knowledge must be had of the reactions taking place within the fermenting material and of the optimum conditions necessary for these processes in order to overcome such problems.

Fermentation and drying have always been regarded by the farmers as two distinct and separate operations. In reality these two stages in the processing of cacao are closely related, for certain changes set in motion during fermentation must be continued in drying. Knapp (1937) and Brigland and Friend (1957) concluded that fermentation and drying must be regarded as different phases of the same process and that the drying of the beans involves a great deal more than the removal of moisture. Even a good fermentation could result in a final product of rather poor flavour and aroma if drying is inefficiently performed.

Since the beginning of this century the need for scientific research in the field of cacao processing has been realised. Sir George Watt (1913) wrote, "I believe that the industry of growing and curing cocoa is very largely groping in the dark". During the past fifty years much work has been done on cacao fermentation.

A fair knowledge of the chemical and biological changes occurring within the fermenting mass has been acquired. On the other hand, relatively little attention has been paid to the drying process and little is therefore known about the effects of drying (especially by artificial means) on the chemical reactions within the beans.

From work done on fermentation there is no doubt that it is the chemical changes going on in the beans up to and including the drying stage that are mainly responsible for flavour and aroma development. Great attention should therefore be directed towards the temperature and moisture relationship of the drying beans.

Many extensive articles and brief speculations on artificial drying can be found in literature written on cacao for the past fifty years. Recommendations have been made as to the conditions which drying machines should provide for the production of cacao of desired quality and flavour. However, little scientific research was followed to elucidate these recommendations and to standardise the optimum conditions of temperature, air velocity and humidity in artificial dryers.

In the past, work on fermentation on a micro- and macro-scale in the laboratory and sweat-boxes had been greatly handicapped. This was due to the fact that there was no standard method by which the fermented beans were satisfactorily dried. Brigland et al (1957) showed the necessity in all experiments on fermentation to standardise the method of drying. A major objective of this project, therefore, was to produce a laboratory-scale dryer in which air velocity, temperature and humidity could be controlled. Simultaneously the induction and progress of the biochemical changes on subsequent physical drying were investigated.

Finally an attempt has been made to define the optimal conditions necessary for the production of high quality artificially-dried cacao.