

ALIEN PROPERTY CUSTODIAN

PROCESS FOR THE SEPARATION OF VALUABLE BRAN CONSTITUENTS

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This invention relates to a process for the separation from the bran of all most valuable products, as the starch and the most part of the proteic substances, from the cellulosic and ligneous matters forming the outer scale thereof as well as for the recovering of said valuable products, separated from the bran proper.

Notoriously, the bran as it is now produced by bolting or sifting the raw corn flours consists of an outer scale or cuticle, to which a large quantity of the most valuable foodstuffs of the corn is still attached, that varies according to the quality of the corn, to the fineness of the meal obtained and to the rate of bolting. Anyway it is to be noted that while the average amount of proteic substances in the bolted flour is about 10%, in the corresponding bran proper it amounts to over 16%. It is to be noted also that with the bran a large part of the germs is mixed, which consist of over 35% of proteic matter, so that the total amount of proteic matter in the commercial bran is very high, although also the amount of amylaceous matter is sufficiently high to constitute a valuable product.

The new process for recovering the valuable products of the bran is based on the accurate study of the physio-chemical constitution of the bran proper. Notoriously this is constituted of scale-like constituents, each of which consists of a ligneous frame to which a layer of very large proteic celluloses, constituting the aleuronic layer, is indissolubly attached. These celluloses contain however very valuable proteic nuclei, the aleuron grains, which, according to the invention, can be separated from their outer shell and recovered, either separately or together with the residual starch and gluten attached to the aleuronic layer.

The practical method for the recovering of these valuable products therefore consists in suitably treating the commercial bran with water or other approved liquid while subjecting same to some mechanical treatment for separating the starch and gluten from the aleuronic layer and allow same to pass in suspension into the water, and the shells of the aleuronic cells become sufficiently softened and in promoting by some appropriate mechanical means, the tearing of the aleuronic cells and the coming out of the aleuronic grains.

The aforesaid groups of substances, say the residual flour attached to the aleuronic layer, the aleuronic grains and the branny residue are suitably separated and recovered. The exhausted bran is then suitably employed for the manufacture of fodder, while the most valuable prod-

ucts may be recovered either by producing a flour which contains about 50% of starch and 50% of protein matter, or also by producing a flour having a composition like the usual one and an aleuronic flour consisting almost completely of proteic matter.

The first step consists in suitably wetting with water and allowing to swell the commercial bran, while subjecting same to beating or some equivalent treatment, in order to promote the loosening of the residual flour. This operation can be effected in suitable tanks, rotating drums or other suitable containers by subjecting the mixture of water and bran to stirring, impact, centrifugating action, and the like.

The second step consists in enucleating the aleuronic cells. To this purpose the watery suspension or mixture of bran, either before or after the recovery of the separated meal residues, is projected at a suitable angle against the rough surface of a solid wall of suitably hard material, as pig iron, steel, carborundum, porcelain, glass and so on. Instead of the projection, the bran can be subjected to some other mechanical action, provided it be such as to promote the tearing of the aleuronic cells and the squeezing or throwing out of some of the aleuronic grains.

The separation of the valuable amylaceous and proteic products from the exhausted bran may be effected by any suitable separating device, as decanters, extractors, centrifugators, sifters, filters or the like.

The exhausted bran is preferably dried and transformed into fodder. On the other part of the concentrated watery flour is dried at a suitably low temperature, preferably under vacuum. The drying can be suitably effected also by pulverisation in a suitable chamber of the concentrated watery suspension.

When the first concentration of the watery suspension of meal is effected by some mechanical means, the mother liquor, which contains a low percentage of valuable products, may be employed for treating fresh commercial bran.

According to a practical embodiment of the process, the plant for the separation and recovering of the valuable products of the commercial bran consists of a hopper, from which the bran is allowed to run into a tank provided with automatic stirrer, in which a watery suspension containing 6 to 10% of bran is formed.

The watery suspension of bran is pumped through suitable nozzles against the rough hard wall at a suitable angle thereto, so as to promote an impact of the solid particles in suspension, a

rubbing of same against the rough wall surface, with a tearing effect on the aleuronic shell and a slipping out of the aleuronic grains contained therein.

The separation of the exhausted bran from the remaining parts may be effected preferably by means of a centrifugator, or a sifter holding back the larger bran particles and allowing the remaining finer parts to flow in a watery suspension. The exhausted bran is suitably dried, or it is sent to the mixers for the preparation of composite fodders.

The remaining liquor is constituted by a fine suspension containing from 2 to 4% of valuable flour, i. e. from 20 to 40% of the weight of the commercial bran treated. This liquor is first concentrated by some mechanical means, as by centrifugation or filtering and the solid residue is dried preferably by pulverisation. The clear liquor is employed, as said, for treating a fresh bran batch. This same liquor, or also the liquor obtained after the separation of the exhausted

bran, can be employed directly for other purposes, e. g. as kneading water for the manufacture of bread and food paste. The said watery suspension may be also employed directly as fodder.

If desired, a watery suspension of flour may be recovered before subjecting the bran suspension to the enucleation of the aleuronic cells. From this suspension a flour like the usual one may be recovered by some of the above outlined methods. The remaining bran can be then further treated with fresh water and a flour of aleuronic nature be obtained by subjecting the bran to some suitable enucleating process. The aleuronic flour obtained can be put on the market as a novel very valuable dietetic product.

It is to be noted that the invention may be embodied in different ways. For instance, the bran can be additionally degreased, preferably before the treatment with water, by extracting the fatty matters by means of solvents.

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