

# ALIEN PROPERTY CUSTODIAN

## PROCESS OF OBTAINING COLD GLUE AND CASTOR OIL FROM CASTOR BEANS

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vested in the Allen Property Custodian

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This invention relates to a process of obtaining cold glue and castor oil from castor beans.

It is already known to prepare cold glue of castor albumen.

The castor albumen required for this purpose is obtained by lixiviating with alkalines, acids or other substances extraction residues of castor beans, which consist of

	Percent
Raw protein-----	20.44
Water-----	9.85
Raw fat-----	5.25
Raw fibre-----	49.44
Ashes-----	15.02

which are obtained as a poisonous and troublesome by-product in the manufacture of castor oil, the albumen being precipitated from the resulting solutions. In any one of these processes, the albumen contained in the extraction residue of the castor beans is, in doing so, to be delivered from ballast substances, such as cellulose (raw fibre), starch, mineral substances, etc. A direct preparation of cold glue from the extraction residues is impossible due to the ballast substances, because merely the albumen will form the desired insoluble cold glue with the hydroxide of calcium.

It has now been found that from oleaginous fruits containing high percentage of albumen, e. g. from castor beans, albumen can be obtained, which is excellently suitable to be used for the preparation of cold glue, provided that the most important ballast substance of the castor beans, viz. the cellulose (raw fibre) represented by the husks, is previously removed, whereupon in accordance with already known processes the decorticated castor beans are worked so by first crushing and extracting them, that castor oil and extraction residues are obtained. When the castor beans are thus peeled and at the same time the raw fibre substances are consequently removed, an increased enrichment of albumen is brought about, which thereupon is still considerably increased by the oil-separating process. Whereas standard castor beans are composed as stated above (cf. "Handbuch der Öle und Fette"—Manual of Oils and Fats—by L. Ubbelohde, vol. II, p. 155, year 1920), after decortication and extraction a light-coloured residue is obtained, which, for instance, consists of

	Percent
Protein-----	70.35
Water-----	10.44
Starch-----	8.64
Ashes-----	7.54
Raw fibre-----	2.25
Oil-----	0.80

By the elimination of the black castor peels, which preferably is carried through under the method set forth in applicant's and W. Imkamp's copending patent application "A process and suitable devices for husking seed, especially oil seed" the substances containing pigments, which are soluble in water and partly also in fat, are also removed, which, for instance, would again impart a dark shade to the albumen which can be obtained by lixiviation. It is also unnecessary in future to purify and bleach the extracted castor oil which hitherto was dark-coloured.

It has, moreover, been found that the light residues of the castor beans which are free of peels, can be used for the direct manufacture of cold glues offering excellent qualities, if the residues are mixed with the well known components of cold glue, e. g. sodium carbonate, borate of sodium, ammonia, sodium fluorite, and the like, but to the exclusion of hydroxide of calcium and of other calcium components, and that, if advisable, the mixture is, together with water, broken-up with the aid of pressure and agitation. By finely-grinding up the light extraction residues of castor beans, which are free of peels, well sticking cold glue is, however, also obtained without this breaking-up operation by means of heat and alkalines, if an adequate quantity of calcium-hydroxide is added to the above mentioned mixtures forming either a powder or a paste.

The cold glues thus prepared possess qualities which are superior to those cold glues which are made of lactic casein, in particular with regard to their shearing strength, when dried. It is a surprising fact that the ballast substances which still further continue to be contained in the cold glue, such as starch, mineral substances, residues of raw fibre, are not detrimental, especially so, provided that a breaking-up operation is still carried through with the well known components of cold glue.

The breaking-up operation need not take place immediately, but can also be carried through only a short period prior to the preparation of the cold glue, i. e. shortly before the calcium hydroxide is added. The light extraction residues of the castor beans thus obtained, which are free of peels, are thereafter in a most finely ground condition mixed with the components of cold glue (to the exception of hydroxide of calcium and other calcium components) in a dry state and at room temperature and are stored free of water. It is, however, also possible to add water and preserving substances immediately after grinding at room temperature, and will in this manner obtain the so-called cold glue pastes. The third alternative of preparing cold glue is to break-up

the aqueous paste in a hot condition and also under pressure, if necessary, i. e. that the cellular construction of the extraction residues of the castor beans, which partially still exists, will be destroyed, the albumen laid open and be caused to swell up.

The final products contained after the breaking-up operation, which are of a pasty or pulpy character, can then either be used immediately as a pasty cold glue preparation, or can be dried and ground, whereby a homogeneous cold glue powder is formed. Preferably, however, the pulpy broken-up material is passed through a spray-dryer equipment, as the grinding of the dried material can thus be dispensed with.

#### EXAMPLES

##### (1.) Cold glue powder

The light-coloured residues of castor beans, which must be free of peels, are ground in a rolling-balls grinding mill, until a dust-like powder is obtained. In order to perform the grinding operation quicker, it is also possible to grind the residues in a "Colloplex" mill. In order to pick-out coarser particles, the powder thus obtained is passed through a close-meshed sifting screen. In order to prepare a non-dusting cold glue, mineral oil and also components of cold glue are admixed to the castor beans-extraction powder, i. e. that the following components are mixed:

	Kilograms
Castor beans-extraction powder.....	6,9
Calcium hydroxide .....	2,0
Sodium fluoride .....	0,5
Sodium sulphite .....	0,3
Petroleum .....	0,3

In order to prepare cold glue, one part of this powdered cold glue is mixed by stirring with two parts of water at blood temperature. Prior to using the cold glue, it is highly advisable to allow it to swell for half an hour.

##### (2.) Cold glue paste

Most finely ground powder of castor beans—prepared according to the description given in example 1.)—is mixed with the components of cold glue to the exception of calcium hydroxide, whereupon a paste is made of it with a 2% solution of ammonia. When acting accordingly, an admixture of petroleum can be dispensed with, because dust cannot be formed.

6,5 kilograms of castor beans-extraction powder are mixed with  
0,5 kilograms of trisodium phosphate,  
0,4 kilograms of sodium fluoride,  
0,5 kilograms of sodium sulphite,

whereupon a paste is made of this powder with 8 kilograms of a 1% ammonia solution, in which 0,01 kilogram of Raschit W have been dissolved.

In order to prepare a cold glue of this paste, it is necessary to mix by stirring two parts of the paste with one part of water, in which 0,225 parts of calcium hydroxide have been suspended.

##### (3.) Broken-up cold glue paste

6,4 kilograms of castor beans-extraction powder are mixed with  
0,9 kilogram of sodium fluoride,  
0,1 kilogram of borax, and  
0,1 kilogram of sodium sulphite.

The mixture is admixed by stirring to 15 kilograms of water, this latter mixture being heated for about half an hour in a vat under pressure up to 110 degrees Celsius. Thereupon the autoclave is emptied, which will deliver the finished paste. In order to obtain therefrom cold glue 225 grams of the paste are mixed with a suspension of 25 grams of calcium hydroxide in 25 cubic centimeters of water.

##### (4.) Broken-up powder of cold glue

6,9 kilograms of castor beans-extraction powder are mixed with  
0,9 kilogram of sodium fluoride, and  
0,1 kilogram of sodium carbonate,

and are diluted by stirring in 16 kilograms of water, whereby a pulp is formed, which is broken-up in an autoclave for half an hour at an over-pressure of half an atmosphere. The product resulting from the reaction is then diluted with such a quantity of water, as will still be necessary, whereupon the water is expelled from it by means of an atomising dryer equipment. The dried powder thus obtained is mixed with 2,1 kilograms of calcium hydroxide, and, in order to prevent the formation of dust, with 0,2 kilograms of petroleum. In order to prepare cold glue, one part of dry powder is mixed by stirring with two parts of lukewarm water at a temperature of 40 degrees Celsius.

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