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famous for being carried out by farmers This paper gelatin product is produced in Pameumpek area, Garut Regency, West Java Province- Indonesia.

Generally, gelatin extraction is as follows:

1. Washing and Cleaning

Seaweed is washed with fresh water until clean. Dirt that sticks such as sand, coral, mud and other types of seaweed are removed.

2. Immersion and Disbursement

Soaking is done so that the seaweed becomes soft, so that the extraction process can run well. Seaweed is soaked in pure water as much as 20 times the weight of seaweed for 3 days. After that the custan is carried out by soaking in a 0.25% chlorine solution or a 5% tohor lime solution while stirring, after 4-6 hours, the seaweed is washed back for 3 hours to remove the smell of chlorine. Seaweed that has been clean and pale is dried for 2 days, until this stage seaweed can be stored first if not processed immediately.

3. Softening

To further facilitate extraction, the cell wall needs to be broken down by soaking in a 10% acetic acid solution for 15 minutes. Soak seaweed in the solution to break down the cell wall, so that the agar is easy to extract, destroy and dissolve dirt so that the seaweed is cleaner. After soaking in an acidic solution then soaked in clean water for 15 minutes to neutralize.

4. Cooking

Seaweed is cooked in water as much as 40 times the weight of seaweed. After boiling (90-100°C), we add 0.5% vinegar acid to obtain a pH of 6-7. When >7, its pH is lowered by the addition of vinegar acid and when <6, NaOH is added. PH examination can be done using pH paper. This heating is done approximately 45 minutes but can also be for 2-4 hours depending on the way the complainant is. The process after ripening depends on the desired final shape of gelatin, namely in the form of bars, sheets or flour.

### **Rod/Sheet Gelatin Processing Process**

1. Pressing and Printing

The result of cooking is then filtered with calico cloth and pressed. The discharge that comes out is accommodated in a vessel and neutralized by the addition of a NaOH solution so that its pH becomes 7-7.5. When the pH has been reached, the liquid is then recooked while stirring. After boiling, the result is poured into a mold, approximately 6 hours so that it has cooled and frozen. The dregs of the pressing can be used again by adding water as much as 75% of the original amount of water, then the dregs are heated and filtered. The liquid that comes out can be used as a mixture in the next process, so that in the end there is dregs that cannot be used anymore. This dregs can be used as fodder.

## 2. Cooling

Frozen liquids are cooled in a cooling room at  $-20^{\circ}\text{C}$  for 4-5 days. This cooling is done so that compaction really happens perfectly.

## 3. Drying

Agar is removed from the mold. The result obtained is gelatinous bars. When cooled sheet-shaped gelatine, the bar gelatine is cut 0.5 cm thick. As a cutting tool can be used fine wire of steel, gelatin bars or sheets are then dried in the sun.

### **Flour Gelatin Processing Process**

#### 1. Filtering and Grinding

Cooked gelatine is filtered with a press filtrate fillet. The discharge that comes out is accommodated and cooled for 7 hours. Frozen gelatin is crushed and pressed with a cloth. The result is in the form of sheets that are then aerated. Dry sheets are cut about 3x5 mm, then put in a grinder or grinder. The result of grinding is flour gelatin.

#### 2. Packing

Gelatin flour is included in glasin paper coated with wax or can also be inserted plastic then wrapped in paper.

### **Quality and Application of Agar Products**

Agar is an exported commodity and some entrepreneurs are already working on an industrial scale. In Indonesia agar has begun to be produced in

1930 and now there are several industries producing agar. To export gelatin powder, the quality of the product must meet the requirements of the gelatin quality standard. For gelatin sources in Indonesia are generally used *type Gracilaria* sp. Agar quality standards according to Poncomulyo *et al.* (2006) as found in Table 1, while according to Indonesian National Standards there is Table 2.

**Table 1.** Agar Product Quality Standards

Component	Specifications
Particle Size	80-100 mesh
Water Content	<18%
Ash Content	<6.99%
Heavy Metals	<10 ppm
Arsenic	<3 ppm
Ph	6,8-7,0
Solubility	Solution at a temperature of 100°C

**Table 2.** Agar Quality Standards According to SNI

Parameter uji	Satuan	Persyaratan
<b>a Organoleptik</b>	-	Min. 7 (Skor 1-9)**
<b>b Kimia</b>		
- Kadar air	%	Maks. 22
- Kadar abu*	%	Maks. 6,5
- Abu tak larut asam*	%	Maks. 0,5
- Pati*	-	Negatif
- Gelatin dan protein*	-	Negatif
<b>c Cemarkan mikroba</b>		
- ALT	koloni/g	Maks. 5000
- <i>Escherichia coli</i>	APM/g	<3
- <i>Salmonella</i>	per 25 g	Negatif
- Kapang dan khamir	koloni/g	Maks. 300
<b>d Cemarkan logam*</b>		
- Arsen (As)	mg/kg	Maks. 3
- Kadmium (Cd)	mg/kg	Maks. 1
- Merkuri (Hg)	mg/kg	Maks. 1
- Timbal (Pb)	mg/kg	Maks. 3
- Timah	mg/kg	Maks. 40
<b>e Fisika*</b>		
- Absorpsi air	-	Min. 5 kali
- Benda asing tak larut	%	Maks. 1
- Kehalusan (lolos saringan 60 mesh)	%	Min. 80
CATATAN : * Bila diperlukan ** Untuk setiap parameter		

Agar products can be applied in various fields, namely as a consuming material, stabilizer, emulsifier, filler, purifier, gel maker, and others. Some industries that utilize the ability to form gels from gelatin are the food industry, pharmaceuticals, cosmetics, skin, photography and as a medium for growing microbes. The gelatin production industry in Indonesia uses a method that involves the extraction of seaweed with acid solvents at high temperatures (Anggadiredja *et al.* 2002).

### **Conclusion**

Based on the literature study as mentioned above, the manufacture of extraction of agar-agar from *Gracilaria* sp seaweed is washing and cleaning raw materials, soaking and ucasing, softening, cooking and pressing and printing. Gelatin printing is generally in gelatin bars, sheets and flour. The quality of gelatin according to SNI is based on organoleptic, chemical, microbial and metal spruce parameters. Gelatin application as a settling material, stabilizer, emulsifier, filler, purifier, gel maker, and others.

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