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## PREPARATION OF WATER RESISTANT GLUE FROM MILK PLASTIC

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### ABSTRACT

In this process of extracting Milk Plastic Water Resistant Glue from the casein 3 type of milk soya milk, fresh cow milk and the pastured milk were used. Casein was extracted and vinegar was added while milk was getting heated. Casein was separated, and dried for 2-3 days. Milk Plastic that was obtained was heated with distilled water. A pinch of papain is added and made it hot for 4 hours and then 1N of NaOH is added and heated for few minutes. The collected sample is centrifuged at 12000 rpm and the glue was obtained. The glue is stored at -200C. 2 card board pieces was stacked together by using this glue and dipped in water to check the water resistance. It was stable for about 10 minutes and then it was loosened. It is little expensive comparing to other glues when it was did with pure milk while if it is done with waste milk product its cost will be low.

**Keywords:** Papain, Casein, Glue, Water resistant

### INTRODUCTION

Casein was used for gluing good was reported by many different (American Society of Mechanical Engineers 1932). The gluing of casein was done by craftsmen from Europe in 19<sup>th</sup> Century (Brouse Don 1938). Casein manufacture was found to be separate processing industry, (Browne 1919).US casein glues were used for a limited period in early 19<sup>th</sup> century.The main component of this is milk protein, casein. Adding lime to milk after heating separates whey and curd.It can also be precipitated by the addition of concentrated acids (Butterman 1920).The incorporation of sodium hydroxide helps to stack casein glue without decomposition (Clark 1918). Much different alkali could be added, so milk plastic can be mixed with all the necessary ingredients, may be in solid form and can be stored indefinitely.

### MATERIALS AND METHODS

**PROCEDURE FOR MILK PLASTIC:** Three different types of milks taken.i) Fresh cow milk ii) Soya milk iii) Pastured milk

All the three milk were heated at medium temperature (Dahlberg 1918). While heating few drops of Vinegar has been added. It will separate the casein and water separately. Collect the casein and discard the water content. Let it to dry for 2-3 day and the Milk plastic was obtained.

**PROCEDURE FOR WATER RESISTANT GLUE :** Casein Solution was prepared in distilled water & heated at 85<sup>o</sup>c -15 min. pH of solution is maintained at 6.5 (Snyder 1933). Addition of papain was done at the level of Enzyme: substrate (1 and 4%). Reaction mix was kept in shaking water bath at 65<sup>o</sup>c -110 rpm – 240 min (4 hrs).

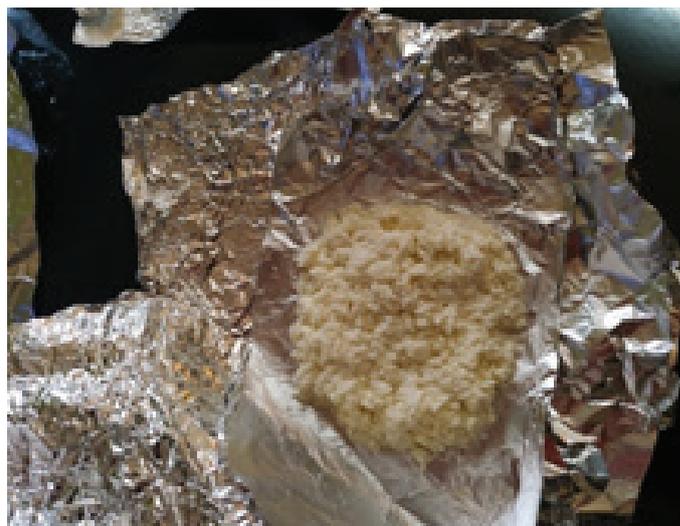


Figure1: Casein of fresh Cow Milk



Figure2: Casein of Pastured Milk



**Figure 3:** Casein of Soya Milk



**Figure 6:** Water Resistant Glue in eppendorf



**Figure 4:** Casein Before Centrifugation



**Figure 7:** Two Card Board Pieces



**Figure 5:** Casein with 1N of NaOH , dis H2O & Papain



**Figure 8:** Applying Glue on Card Board

Acidic pH was maintained by the incorporation of 1N NaOH. Different volume of sample was obtained after 2 hrs & reaction was arrested by heating 90°C for 10 mins sample centrifuged at 12,000 rpm for 15 mins. Supernatant collected freeze dried & stored at -20°C for subsequent analysis.

### **RESULTS AND DISCUSSION**

Casein was extracted from three different milk after heating and by adding lime (Stocks 1917). Figure1, 2, 3



**Figure 9:** Two card Boards were stacked using Glue shows three different dried casein preparations from various types of milk

The casein thus prepared was centrifuged and dissolved for the preparation of glue which is shown in Figure -4,5

The glue was prepared using the extracted milk plastic (Figure- 6) and prepared glue was studied for its efficiency for sticking on two card pieces (Figure-7, 8). Figure-9 shows that the two card pieces were stacked and the glue was found to be water resistant by immersing the stacked card pieces in water

## CONCLUSION

Thus the glue that was prepared has many applications in several industries. Its cost effective strategy has to be worked and production cost has to be reduced for its widespread use.

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