Die Verwendung von Blut aus Schlachthäusern

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Das Blut von geschlachteten Schafen wurde hygienisch gesammelt,unter Verwendung von Na-Zitrat als Anticoagulans, es wurde dafür gesorgt, daß keine Haemolyse wegen der Reibung zwischen dem Blut und dem Gewände der Apparatur stattfand. Mit Hilfe von Zentrifugen verschiedener Art wurde das gekühlte, zitratenthaltende Blut in zwei Teile getrennt, nämlich in die zellulären und die plasmatischen Teile. Beide Teile wurden entweder gefrier- oder vakuum-getrocknet und ihre funktionellen Eigenschaften, z.B. Farbe, Durchlässigkeit, Lösbarkeit, chemischer Aufbau, mikrobiologische Qualität, Schaumfähigkeit und Stabilität bestimmt. Getrocknetes Plasma kann in einer Anzahl von Industrien, die gutes Protein brauchen, Verwendung finden; der zelluläre Teil kann entweder als Bestandteil von Würsten gebraucht werden, wobei er den Würsten eine ansprechende rosarote Farbe verleiht; oder nach einer einfachen Trocknung als Geflügelfuttermittel.

Utilization of Blood from Slaughter Houses

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Blood from the slaughtered sheep was collected under hygienic conditions using anti-coagulant Na-citrate, care being taken to avoid any haemolysis, due to friction of the blood against the walls of equipment. The citrated blood in chilled condition was separated into two fractions, the cellular and the plasma, using different types of centrifuges at appropriate rpm. The two separated fractions of blood were either freeze-dried or vacuum shelf dried & their functional properties determined such as colour, transmission, solubility, proximate composition, microbiological quality, foam capacity and stability. Dried plasma can find use in a number of industries which require good quality protein, while cellular fraction can be utilized as one of the ingredients for meat sausage making to give it a nice pink-red colour or it could be dried by simple technique as a poultry feed.

L' Utilization du Sang des Abattoirs

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Le sang des moutons abattus etait recuelli dans des conditions hygieniques, et en prenant soin d' eviter toute haemolyse a cause de la friction entre le sang et les parois de l'apparature. Le sang, citré et réfrigéré, était separé en deux fractions ont été lyophilisees, ou bien séchées a vide, et leur propriétés fonctionelles - par example, couleur, transmission, solubilité, composition, chimique, qualité microbiologique, propriété écumant, et stabilité - ont été determinées. Le plasma desséché peut etre utilisé dans plusieurs industries où on a besoin d'une bonne proteine; la fraction ullulaire peut constituer un ingrédient des saucisses auxquelles elle donne une couleur rose, attractive - ou bien elle peut etre utilisé, apres une séchage simple, comme aliment pour volailles.

Utilization of blood from slaughter houses

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Introduction:

Blood, although, one of the major slaughter house by-products is grossly underestimated as a source of food. According to a report[1] nearly 64% of blood is wasted or underutilized. Only a small quantity finds use in pharmaceutical industry and some quantity of fresh clotted blood is used for edible purpose especially by low income group. Estimated annual blood available in India is around 30,000 tonnes.[2]

In commercial practice blood from bovine and porcine animals is mostly used for preparation of plasma.[3-7] As ovine animals are principally used for slaughter, it was felt that techniques should be developed for treatment of ovine blood which could be further upgraded on large scale and to study the characteristics of the resulting plasma. Use of blood fractions for industrial and food purpose, is not given much importance so far in India; Separation of blood protein fractions and their drying and utilization form the objectives of the present study.

Materials and Methods:

Collection and Separation of Blood: Blood was obtained from freshly slaughtered sheep from the local slaughter house; under the conventional methods animals are slaughtered on floor by a small knife by severing jugular vein . The blood from slaughtered animals was collected into a round bottomed glass flask containing glass beads through a wide mouthed funnel to which a plastic tubing was attached. All the apparatus was smeared with liquid paraffin to avoid any haemolysis due to friction with the walls of the vessel. Sodium citrate was added as an anticoagulating agent and flask was stirred continuously to prevent it from coagulation. As soon as the blood was brought to the laboratory the specific gravity was checked to determine if any incipient coagulation has occurred. The citrated blood was cooled to room temperature and filtered through a mull cloth to sieve out hairs and other suspended material which may have accidentally contaminated the blood at the time of slaughter. The blood was chilled for 5-6 hours before centrifugation. The blood fractions i.e. plasma and blood solids were separated centrifugally by using laboratory centrifuge but when quantity was large Westfalia Multipurpose Centrifuge was used.

The separated plasma was freeze dried in Stokes freeze drier (Freezing at -20°C and drying time 6 - 7½ hr). The product was kept in air tight containers and stored at room temp. The colour transmission was read at 575 μ in Spectronic 20-colorimeter. Total Plate Count was determined by APHA method. The proximate composition was carried out by A.O.A.C. methods.[8] Foaming capacity and solubility of dried plasma were determined by the method outlined by Lawton & Cater.[9]

Results & Discussions

When sodium citrate was added to the blood on the basis of 0.2% of blood weight, the specific gravity was 1.07 and the blood showed incipient coagulation. When the percentage of anti-coagulant was increased to 0.54%(3.8% Na-citrate solution in the ratio of 1:6 parts in blood) the specific gravity was 1.02-1.04.

The bacterial load of whole blood varied according to the conditions of the slaughter house, from 3.6×10^4 to 2.0×10^5. Even after seven days of storage at 5°C with the addition of 0.4% ammonia,[10] blood did not spoil, the colour remained normal.

The yield of plasma and its colour was greatly influenced by the method of separation. The amount of plasma that could be collected by using laboratory centrifuge was below optimum and the process was time consuming, because of the batch type operation and difficulty of separating the upper plasma layer from the lower sedimental layer; lower temperatures helped separation to a certain degree. The Westfalia separator served this purpose by producing a continuous flow of plasma whose colour was also of good straw-yellow colour. The time was considerably reduced; fractionation of 5kgs of blood took only 20-30 minutes.

The effect of pH on solubility was determined. The solubility measurements were done at different pH ranging from 3 to 10 and the results are represented in the graph. The protein solubility of the plasma powder is plotted against pH in Fig.I. It exhibited good solubility over the range 3-9. The minimum solubility was observed at pH 4.0 and the maximum solubility at pH 3.0 & 7-9. The solubility of lyophilised serum protein shows only a slight dependence on pH; about 10-12% decrease at pH range of 4-5. Tybor et al.[7] also indicated that solubility of plasma protein was not much affected by pH changes while temp. of drying affected solubility.

The functional properties of plasma proteins from ovine make it a suitable substitute for egg albumin while the cellular portion could be incorporated into comminuted meat products. Earlier attempts were mainly directed in utilizing whole blood as a poultry feed, as an adhesive in plywood industry and as foam material for fire extinguishing.

With the commissioning of the Training Abattoir(Equipment gifted by DANIDA) at this Institute very shortly, the animals will be sacrificed on conveyer type rail system.

With this arrangement the use of blood for food purpose will be greatly facilitated by application of "hollow sticking knife" where anticoagulant is continuously mixed with blood drawn from the animals. The blood thus collected will be free from contamination.

Summary:

A process for the separation of bovine blood into cellular and plasma fractions has been developed. The proximate composition, total plate count and functional properties of freeze-dried plasma are reported.

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Yield and color of plasma separated by bench-top centrifuge & Westfalia Separator

rpm	Time in minutes	Yield of plasma wt.%	% trans mission
2000	60	50.0	93
2500	60	57.7	95
4000	60	59.4	95
5000	60	63.8	94
6000	60	63.8	95
10000*		68.0	97

* Westfalia Centrifuge

Proximate Composition of Freeze-Dried Plasma

	%
Protein ...	75
Moisture ...	9
Ash content ..	12
Fat ...	1

Yield: Freeze dried Plasma 4.5% from whole blood

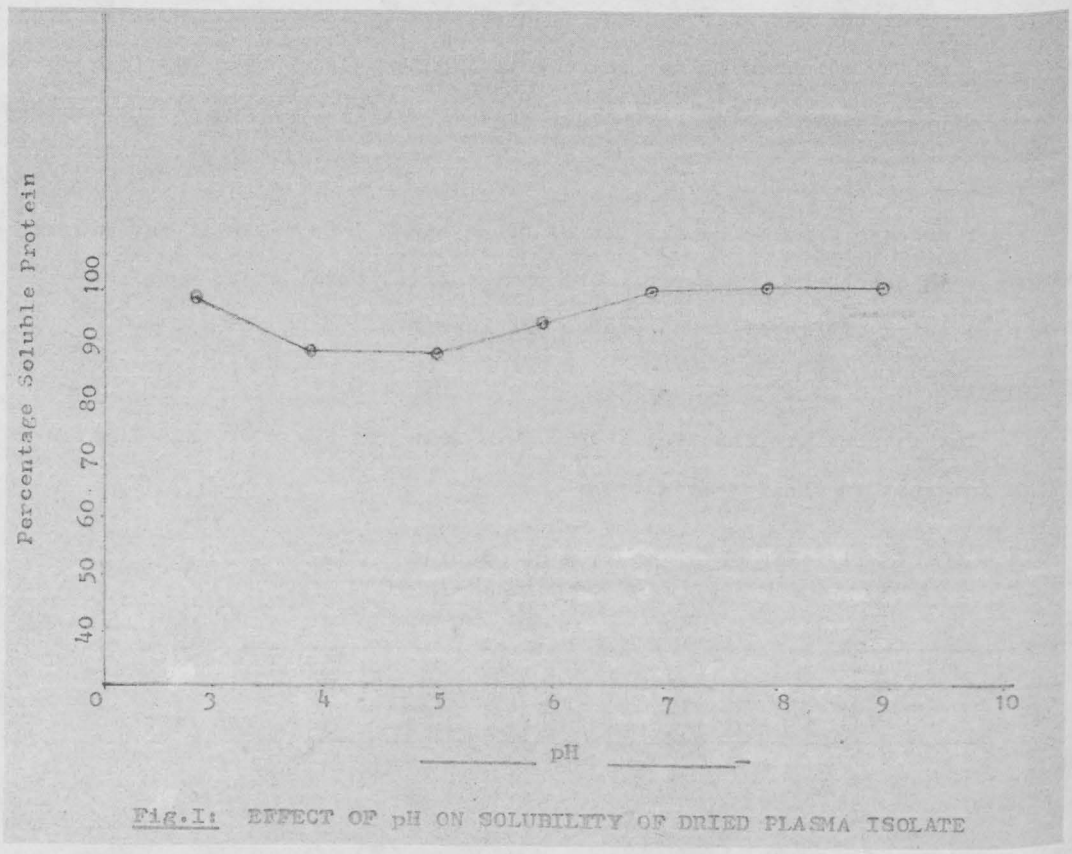

Fig.I: EFFECT OF pH ON SOLUBILITY OF DRIED PLASMA ISOLATE

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