A rapid method for estimating total phosphor content of meat produtcts.

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Determination of polyphosphates-applied to improving water absorbing capacity and consistence of meat products-is very important task.Methods generally used are very lengthy.
In this paper a rapid pyrolytical alkaline oxidizing digestion is suggested, and the lengthy preparatory procedure is shortened to ten minutes.After adding reagent to the digested sample it is ready to a photometric measurement. This method is suitable for controlling both interproduction and final products.

Schnellmethode für Bestimmung des Gesamtphosphorgehaltes der Fleischprodukten.

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Die Bestimmung der im Produktionsgang der Fleischprodukten für die Verbesserung der Konsistenz und Wasserzurückhaltung verwendeten Polyphosphaten ist eine sehr wichtige Arbeit.Der grösste Nachteil der bisheringen angewandten Methoden ist die Langwierigkeit.
Die Verfasser proponieren eine Schnellmethode durch pyrolitischen alkalischen oxidativen Aufschluss der Fleischprodukten,in der sich der weitläufige Vorbereitungsprozess auf 10 Minuten verkürzt.Die vorbereitete Probe ist nach Zugeben der entsprechenden Reagenzien photometrisch direkt messbar.
Die ausgearbeitete Bestimmungsmethode ist anwendbar für Analyse im Produktionsgang wie auch in der Kontrolle der Fertigprodukten.

5.II

Une methode rapide pour le dosage de la teneur totale de phosphore des produits de boucherie.

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Le dosage des poliphosphates usés pour l'amélioration de la substance et de l'aptitude à la prise d'eau est une tâche très importante.Les méthodes usées actuellement sont longues.Les auteurs proposent une méthode rapide basée sur la minéralisation pirolitique,alcaline,oxidative des produits de boucherie pendant laquelle la durée de la préparation de l'échantillon raccourcit à dix minutes.
L'échantillon préparé est propre au dosage spéctrophotmétrique après ajouté réactifs.
La méthode étudiée est propre au contrôle pendant le cours de la production ainsi que au contrôle des produits finis.

Скоростной метод для определения содержания всех фосфоров в мясопродуктах

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Определение полифосфатов,применяемых при изготовлении мясопродуктов для улучшения их свойств консистенции и связывания воды,очень важная задача.

Самая отрицательная сторона применяемых в настоящее время методов стоит в том,что они являются длительными.

Автор предлагает скоростной метод с применением щелочного,окислительного разрушения, в котором длительная подготовка сокращаеться на десять минут.

Подготовленная таким образом проба после добавления реактивов даёт возможность измерять фосфоры фотометрически.

Разработанный метод пригоден для качественного контроля в производственном процессе и проверки мясного конечного продукта.

5.11

Rapid method for estimating total phosphorus content of meat products.

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The addition of certain phosphate increases the water-holding capacity of raw and cooked meat and therefore phosphates are used in the production of sausages in curing how.Sodium tripolyphosphate is the most commonly added phosphate to processed meat.
Many researchers have published the results of their studies on the toxicity of phosphates added to foods during processing.Phosphates as all inorganic salts,are toxic to any organism ingesting excess quantities of salts.Excess ingestion of any inorganic salt may upset mineral balance in the body,adversely affect the osmotic pressure of body fluids, and prevert absorption on utilization of necessary mineral nutrients.
It is very important duty to control the phosphate content of meat and meat products.A lot of methods of phosphate determination can be found in the technical literature.Gravimetric and photometric methods are used for measuring the total phosphates,and different chromatographic ones for the polyphosphates.Determination of total phosphates is the most frequently used,because the polyphosphytes transform in to orthophosphate during processing and storing,so its quantities are uncharacteristic for the meat and meat products.The analysis of total phosphates is suitable for determination of phosphates applied in the meat processing,because the content of natural phosphorus of the meat and so of the meat products is almoust constant.
Gravimetric methods have more and more been replaced by photometric ones.The photometric methods are more modern,quick than the gravimetric ones and their automatisation is easier.
The most of the photometric methods are based upon measuring the coloured molibdene complex of the orthophosphate ion.In these methods the complex is formed with ammonium-molibdate reagent,when the orthophosphate ions form a precipitation with the reagent in first. This yellow compound is dissoluble in water.This compound forms a blue complex solution with reducing material as stannochloride,phenylhydrazine,hydroquinone and p.methyl-aminophenol etc.We can measure the absorbance of this blue complex at 660 nm or at 830 nm.
In other methods the yellow precipitation is solved in organic solvent as for example butanol-chloroform mixture,and the extinction of this solution is measured at 310 nm.
In 1950 Hanson and coworkers proposed a simple method for phosphate determination.Their method based on the reaction of Misson.It was well-known.that in acidic solution the orthophosphate ions formed a vanadomolibdophosphate-acid complex with molibdenic-acid and vanadic-acid.This yellow complex is soluble in water and its extinction can bee measured in 420-480 nm.interval.Donald established,that this complex had absorption maximum at 330 nm.,in the UV region.The Hungarian standard and many foreign methods applied this way of determination to measure the total phosphorus in meat and meat products.The absorbance has been measured in the visible region.
In our work we set ourselves the task of revising the Hungarian standard.The disadvantage of the standard method is that the sample preparation is very lengthy and therefore it cant be used for control of processing.
We have applied a new method for sample preparation.It is applied in the metallurgy.We have carried out the photometric measuring in the UV region.
The alkali pyrrolitic fusion is realized with sodium-hydroxide and sodium-peroxide.This destruction is very advantageous,because the activity of oxigene is very strong at the melting point of the sodium-hydroxide.This effect is increased by sodium-peroxide.The

The alkali pyrrolitic destruction of meat or meat products takes 10-15 minutes.It is much quicker than the dry ashing.It is also very advantageous,that the phosphate content the sample becomes orthophosphate during the procedure.It is well-known,that the vanadomolibdophosphate-acid complex forms only with orthophosphate ions.After the dry ashing we must transform polyphosphates into orthophosphate with sulfuric-acid hidrolysis.

We have made experiments to establish how much time is necessary to transform the polyphosphates into orthophosphate after the dry ashing.We present this on the figure 1 and 2.On the figure 1 it can be see,that it takes then one and a half hours after dry ashing,while in the acidic hydrolysation the polyphosphates are totally transformed into orthophosphate.On the figure 2 it can be see,that it takes nearly one and a half hours even with 3 n sulfuric-acid.

We have made the photometric measuring in the UV region. The vanadomolibdophosphorus-acid complex has a visible spectrum,that we present on the figure 3.As it can be see this spectrum has no absorption maximum in the visible region.Though it is possible to measure the phosphate content about 420 nm.,but usually it is not generally used in the analytical practice.In the figure 4.we present the spectrum in the UV region.As it can be see this spectrum has an absorption maximum at 326 nm.It suits better the

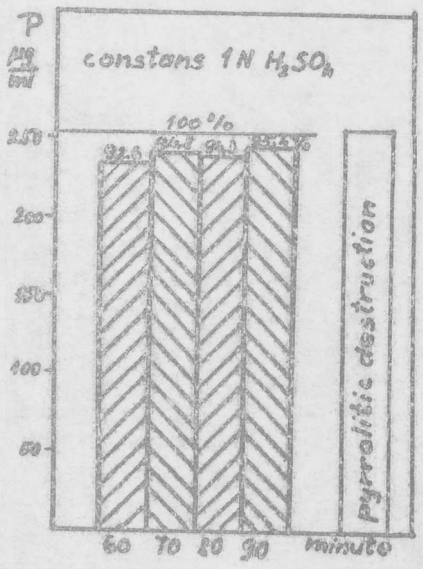


figure 1.
hydrolyse time from polyphosphate to orthophosphate

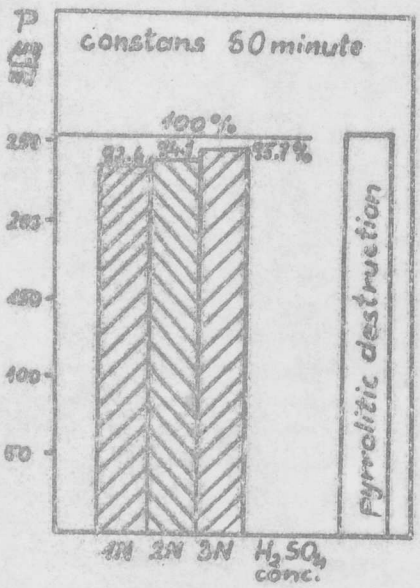


figure 2.
polyphosphate hydrolyse with different normale sulfuric acid

figure
vanadomolibdophosphorus acid complex spectra in visible region

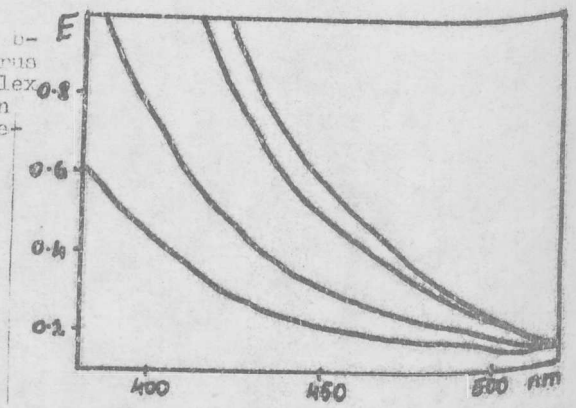
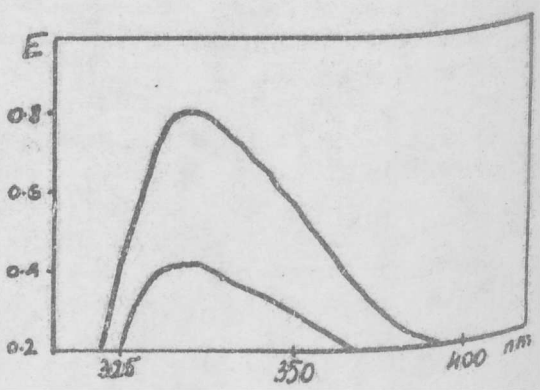


figure 4
vanadomolibdophosphorus acid complex spectra in UV region



analytical paractice and it has an other advantage too,namelly the measuring in this absorbtion maximum is more sensitive than in the visible region.The molaric extinction coeffitient is about 1500 in the visible region,and about 15000 when measuring at the absorption maximum.On the basis of experiments we worked out the following method for the total phosphorus determination:

After homogenizing the meat and meat products we weigh about 1 or 2 g sample,depending on the total phosphorus content into a nickel dish.We add 6 g sodium-hydroxide and 4 g sodium-peroxide to it and we melt the mixture.After melting we cool the mixture and solve the material out of the dish with about 100 cm^3 distillated water.After this we boil the solution to releive of the hydrogenperoxide.We neutralize the solution with sulfuric-acid,diluted with distilled water in equal ratio.We pour the cooled solution into a 200 cm^3 of normal flask and fill it up to sign with distillated water.We filter this solution,becouse some carbon or nickeloxide may remain in it.We pipette 5 cm^3 of the filtered solution into a 50 cm^3 normal flask,add 2,5 cm^3 1 n sulfuric-acid and 6,3 cm^3 reagent to it,fill it up to almoust the sign with distillated water and warm it in a water bath for 10 minutes.After cooling we fill it up to sign and measure the phosphate content with a spectrophotometer at 336 nm.We define the extinction in relation to the extinction of a blind solution containing the colour producing reagents.

For sodium-hydroxide and sodium-peroxide can contain phosphates,we must make a blind probe with them and phosphorus content of the chemicals must be taken into correction.With this method we can measure total phosphorus content of meat and meat products quickly and exactly.On the table 1 we show the results that we got for different kind of meat products as debreceni,krinolin,szafaládé and párizsi.We compared the alkaline pyrrolitic fusion and the dry ashing method.Both prepared material were measured at 420 nm.and 336 nm,As it can be see both spectrophotometric methods gave the some results,but we got higher results with the alkali destruction than with the dry ashing.We explain this deviation with that the polyphosphate hydrolysation was not complete in the case of dry ashing.

Summarizing for determination of the total phosphorus content of meat and meat products. This method is very quick,therefore it is suitable for controlling the meat processing. This method quarantees the total transformation of polyphosphates into orthophosphate. The measuring in the UV region has high sensitiveness.This method of meat and meat product preparation is very suitable for automatical instruments as technicon autoanalyser or contiflo.

Table 1.

foods	pyrrolitic destruction		dry ashing	
	420 nm.	336 nm.	420 nm.	336 nm.
debreceni	1,86 mg/g	2,62 mg/g	1,62 mg/g	1,55 mg/g
krinolin	1,52 "	1,47 "	1,49 "	1,12 "
szafaládé	2,35 "	2,37 "	1,89 "	1,94 "
párizsi	1,76 "	1,65 "	1,54 "	1,59 "

DIE HALTBARMACHUNG VON WÜRSTCHEN IN NATURDÄRMEN ALS KONSERVE MIT PRAKTISCHER STERILITÄT

von Ing. /grad./ Manfred EISNER, Hamburg

Bedingt durch die erhöhte Neigung der Naturdärme zum Platzen und des Brühwurstbrätes zur Emulsionszerstörung bei Anwendung von höheren Haltbarmachungstemperaturen, wurden Würstchen im Natursaitling und im Schweinedarm bis Mitte der sechziger Jahre vorwiegend als Halbkonserven mit begrenzter Haltbarkeitszeit hergesstellt. Eine Kühllagerung im Anschluss an die Haltbarmachung war erforderlich, um ein "Shelf-life" von ca. 6 Monaten zu erzielen.

Die zunehmende Verbreitung von industriell einsetzbaren Überdruck-Rotationssterilisatoren und damit die Anwendung des Hochtemperatur-Kurzverfahrens /HTSH/ bei der Haltbarmachung von Würstchenkonserven, gestattete der Fleischkonservenindustrie etwa ab 1965 die sichere Herstellung von Würstchenkonserven mit praktischer Sterilität /.
Zahlreiche Untersuchungen über die Vielfalt der Faktoren, die für den Erfolg der Hitzekonservierung von Brühwürstchen von entscheidender Bedeutung sind, wurden seitdem durchgeführt. Sie erstrecken sich von der Rohwarenbeschaffenheit bis zur Überdrucksterilisation und - kühlung.