

102. 自動分析機(RFA-300)を利用して amylose 分析法

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A Simplified Procedure of Amylose Analysis by Rapid Flow Analyzer, RFA - 300
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To develop a simplified recipe of amylose analysis using the Rapid Flow Analyzer(Alpkem, RFA-300) and to obtain the regression formula by comparing the result of RFA amylose analysis with those of Williams' and Juliano's recipe.

Materials and Method

Materials : 45 rice cultivars(Japonica : 18, Tongil-type & Indica : 27)

* Both rice flour and starch were prepared for seven varieties.

Amylose analysis : o Williams' method (1958)
o Juliano's method (1971)
o RFA recipe(Newly modified amylose analysis)
(CES, 1988)

Results and Discussion

o Simplified Recipe of RFA amylose analysis

<Working solution>

- 0.045N sodium hydroxide : 0.1N sodium hydroxide 45ml + Deionized water 55ml + Triton X - 405 0.1ml.
- Iodine/acetic acid reagent : I₂-KI solution(KI 20g + I₂ 2g + H₂O 700ml Fill upto 1l with H₂O after soluting) 8ml + 1N acetic acid 5 ml + Deionized water 87ml + Triton X-405 0.1ml.
- Neutralizer : Stock neutralizer(Acetic acid, glacial, 1.5ml + Citric acid 1.5g + H₂O 800ml. After soluting fill upto 1l with H₂O) 100ml + Triton X-405 0.1ml
- Sampler washing solution : 1N sodium hydroxide 20ml + Deionized water 80ml

<Sample preparation>

- Mass sample ① Put 100 mesh rice flour(polished rice) 50mg into 100ml mass flask
- ② Add 0.5ml ethanol and 1N sodium hydroxide 4.5ml
- ③ Station for two hours to gelatinize
- ④ Fill upto 100ml with deionized water and shake
- One kernel ① Weigh a kernel
- ② Put the kernel into 40ml mass flask
- ③ Add 1N sodium hydroxide 2ml
- ④ Station for 24 hrs. to gelatinize
- ⑤ Fill upto 40ml with deionized water and shake.

<Running condition of Rapid Flow Analyzer >

Refer to Fig. 1.

o Comparing the result of RFA amylose analysis with those of Williams' and Juliano's assay.

The analyzed results by Rapid Flow Analyzer are very highly correlated with those by Williams' and Juliano's method($R^2=0.9-0.94$) (Fig.2 & Fig. 3). The relative amylose content of starch is higher than those of rice flour, although correlations between these analyzed results by the three method are quite resemble (Fig. 4.).

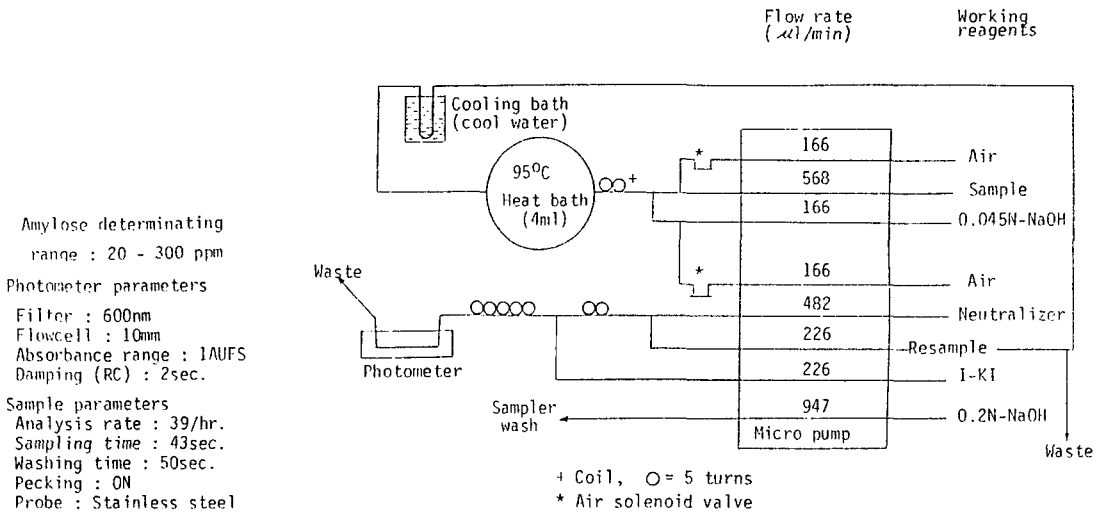


Fig. 1. Flow diagram of amylose analysis by rapid flow analyzer(Alkem RFA-300). (CES, 1988)

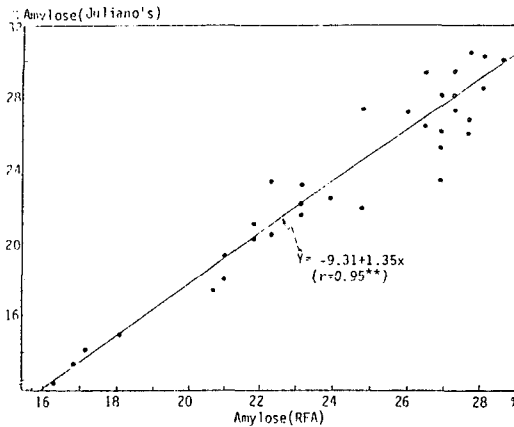


Fig. 2. Relationship between results of amylose analysis by Rapid Flow Analyzer and those by Juliano's recipe.

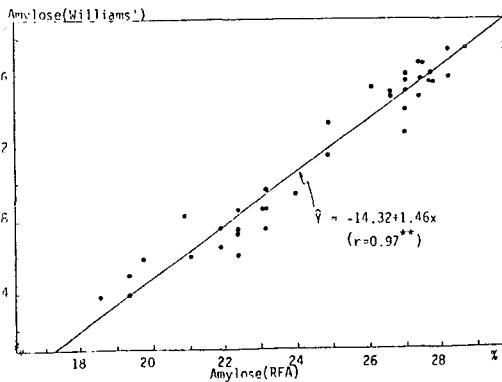


Fig. 3. Relationship between results of amylose analysis by Rapid Flow Analyzer and those by Williams' recipe

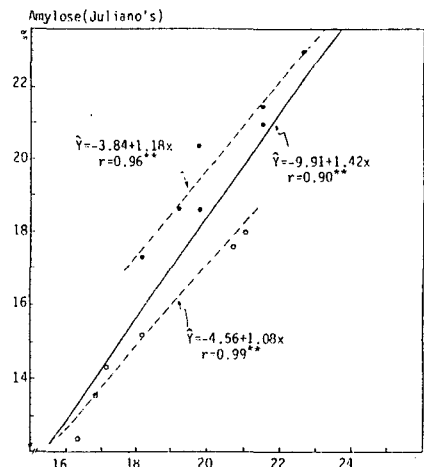


Fig. 4. Comparison among three kinds(RFA,Juliano's and Williams' method) of amylose analyses by the analyzed amylose content in starch(\bullet) and flour(\circ) of seven rice cultivars.