

PREPARATION OF SOME COMPOUNDED SOUP POWDERS

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ABSTRACT

Recipes for the preparation of some compounded soup powders from tomatoes, potatoes, carrots, green peas, dried peas, chicken and mutton using components like corn starch, skim milk powder, hydrogenated groundnut oil, common salt, mixed spices (black pepper, caraway and ginger) and monosodium glutamate have been developed.

Pre-treatments and drying conditions for the preparation of pre-cooked dry bases from tomatoes, potatoes, carrots, green peas, dried peas, chicken and mutton have been determined. Except for tomatoes where vacuum drier is necessary, other bases can be easily prepared in a simple cross-flow hot air cabinet drier and used subsequently in the preparation of soup powders.

Introduction

During the Second World War, necessity to produce quick cooking dehydrated foods led to increased effort in the preparation of soup powders. Even after the war, civilian interest in these products continued, resulting in the development of a highly competitive industry in the western countries. Although some published papers on this subject are available¹⁻⁷, major advances in the field are still believed to be industrial secrets.

In India Date *et al*^{8,9} standardised a composition suitable for drying into a soup powder in a double drum drier. In view of the high cost of this equipment and difficulties in its import, work was taken up in the preparation of compounded soup powders using simpler driers available within the country. Present communication is a brief report of this work.

Experimental

Fully ripe red coloured tomatoes, potatoes, carrots, green peas, dried peas, chicken and mutton available in the local market were used for drying as bases for the preparation of soup powders. Other components of soup powders were corn starch, skim milk powder, hydrogenated ground nut oil, common salt, spices and monosodium glutamate. After various trials in a cross-flow hot air drier, drying conditions for potatoes, green peas, dried peas, chicken and mutton were determined. In the case of tomatoes vacuum drier was used. Final choice of recipes was based on numerous organoleptic tests conducted by a taste panel selected from the staff of the Institute. Dry mixing of ingredients was done with hand or mechanical mixer.

Results and Discussion

Drying of bases for soup powders—Drying conditions determined for tomatoes, potatoes, carrots, green peas, dried peas, chicken and mutton used as bases in the preparation of compounded soup powders are given in Table 1. Except tomatoes, other materials could be easily dried in simple cross-flow hot air cabinet drier. The drying time was 4 hours in chicken, mutton and cooked dried peas; 6 hours in potatoes; 7 hours in green peas and 9 hours in carrots. In the case of tomatoes, addition of 10% of corn starch was necessary for drying in a vacuum drier. Cooking of starch to a thick paste in a minimum quantity of water gave a dried base of uniform deep red colour. Reducing the acidity of tomato concentrate by adding calcium carbonate or addition of common salt as a drying aid were not helpful. Addition of about 1.5% slow set pectin helped in easy removal of dried tomato concentrate from the drying aluminium trays. In case of green peas, soaking of peas in 2% sodium bicarbonate solution and blanching in sulphited solution containing 0.1% magnesium oxide helped in retaining the green colour of dried green peas. All bases were ground to pass through 50 mesh sieve before use in soup powders.

Recipes

Some of the recipes developed are given in Table 2. Various concentrations of monosodium glutamate were tried and 0.125% concentration of this salt in the reconstituted soup was found to be the optimum. Higher concentrations imparted a characteristic saltish after taste and lower concentrations brought out only a mild flavour. Contribution of this salt in the flavour development was very significant in case of chicken, mutton, potato, carrot and pea soups and least significant in case of tomato soup. Higher *pH* in the medium seems to help in the better development of flavour by monosodium glutamate.

In spite of using lean meat from which fatty portion was trimmed as far as possible, sufficient fat remained in case of mutton soup powder and further addition of hydrogenated groundnut oil was not necessary.

Except in potato, where sufficient original starch was present, and further addition of starch was not necessary, in other soup powders addition of corn starch helped in maintaining a more or less uniform suspension in the reconstituted soup and checked the sediment settling down.

Out of the spices tried, mixture of equal weights of black pepper, caraway and ginger ground to 60 mesh received the greatest measure of acceptability from the taste panel. Spices like cinnamon imparted a strong flavour to the soups and were not equally liked by all tasters.

Addition of skim milk powder, besides enriching the protein content of soup powders, helped in improving the body of reconstituted soups.

Reconstitution

All the soup powders were found to reconstitute readily in boiling water. For reconstitution the optimum dilutions (by weight) with boiling water were found to be 8 times in tomato, 12 times in green peas, dried peas, chicken

and mutton and 16 times in potato and carrot soup powders. Addition of soup powder to the boiling water and simmering for 4-5 minutes with continued stirring gave a well reconstituted soup in all cases.

Work on the development of recipes of compounded soup powders containing mixed vegetables and storage studies is in progress.

Acknowledgement

Grateful acknowledgement is made to Dr. V. Subrahmanyam, Director of the Institute, for the keen interest taken in this investigation.

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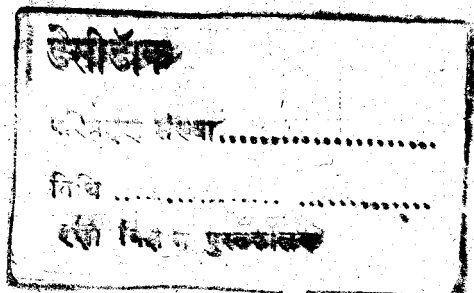


TABLE 1

Drying of some vegetables, chickens and mutton used as bases in the preparation of compounded soup powders

	Pre-treatments	Tray loading lbs. per sq. ft.	Drying Conditions
1. Tomatoes ..	Juice prepared by hot-break method is concentrated at 20° Brix in an open kettle in the presence of SO ₂ which is added as 600 ppm potassium metabisulphite solution (on the wt. of juice) at three stages of concentration, namely initial, 11° Brix and 16° Brix. Corn starch (10% of concentrate cooked to a thick paste with a minimum quantity of water is added to tomato concentrate and passed through 30 mesh sieve.	1	Vacuum drier, 60-65°C temperature and 28" of vacuum, drying time about 4 hours.
2. Potatoes ..	Steamed 1/8" thick peeled potato slices for 3-4 minutes and soaked for 10-minutes in 0.25% potassium metabisulphite solution using about 0.5 lb. solution per lb. of slices.	1½	Cross-flow cabinet drier, 85°C,—1 hr.; 80°C—1 hr.; 70°C—2 hrs.; 60°C—2 hrs.
3. Carrots ..	As above but steamed for 8—10 minutes.	1½	As above but drying time at 60°C prolonged to about 5 hours.
4. Green Peas ..	Soaked in 2% sodium bicarbonate solution for 30 minutes, washed well in water and blanched in boiling water containing 0.2% potassium metabisulphite and 0.1% magnesium oxide.	1½	85°C—1/2 hr.; 80°C—½ hr. 70°C—2 hrs. 60°C—4 hrs.
5. Dried Peas ..	Soaked for 4 hrs. in water and cooked at 240°F for 1 hr.	1½	As above.
6. Chicken ..	Cooked at 240°F for about 30 minutes; deboned and minced along with concentrated gravy after decanting its fatty layer.	1½	85°C—1 hr.; 70°C—1 hr.; 60°C—2 hrs.
7. Mutton ..	As above but increased the cooking time to about 1 hr.	1½	As above.

All dried materials are powdered to pass through 50 mesh sieve.

TABLE 2
Recipes of Soup powders

	Tomato*	Potato	Carrot	Green Peas	Dried Peas	Chicken	Mutton
Dried base	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Corn starch	2.00	2.00	2.00	2.50	2.50
Skim Milk Powder ..	1.60	2.30	2.00	2.70	2.70	2.00	2.00
Hydrogenated groundnut oil.	1.60	2.30	2.00	2.70	2.70	2.00	..
Common salt	1.60	3.10	4.00	2.70	2.70	2.00	1.80
Mixed spices†	0.48	1.20	0.60	1.00	1.00	0.80	0.80
Monosodium glutamate ..	0.16	0.20	0.20	0.25	0.25	0.33	0.33

* Includes 33% corn starch.

† Mixture of equal weights of black pepper, caraway and ginger ground to 60 mesh.