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The effect of different binders on the water stability of feeds for prawn

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With the development of pelletized diets for the prawn, the problem of the pellet's stability in water arose. Several binders have been used to overcome this problem. However, many of these binders are either unavailable or too costly for use in shrimp diets in the country. Thus, the search for a suitable binder of *Penaeus monodon* diets for nutritional requirement studies and commercial production is deemed necessary. Without a suitable binder the resulting pellet is unstable in water and feeding efficiency is reduced.

Corn starch, gelatin, sago palm starch, agar, and bread flour were tested for their binding capacity in pelleted diets for the prawn. Water stability was determined by placing 2 g pellets in wire baskets and immersing these in 7 liters of continuously aerated seawater for 2, 6 and 18 hours. The formula used for computing water stability is:

$$\% \text{ water stability} = \frac{\text{final wt. x \% dry matter}}{\text{original wt. x \% dry matter}} \times 100$$

Availability in the local market, cost, capacity to bind, stability in water, acceptability to the prawn, adaptability to large scale production, susceptibility to attack by micro-organisms and competition with human consumption were the criteria used for the selection of good binders.

Agar was found to be a good binder but its cost makes it impractical for use. Breadflour provided for additional proteins and calories and the presence of gluten made it a good binder. However, because of its common use for human consumption its use for animal feed should be minimized. The stability of pellets made with sago palm starch was similar to those made with corn starch (65.4 and 63.9%).

The use of 20% bread flour, or a combination of 5% sago palm starch or corn starch with 15% bread flour is recommended depending on the cost and availability in the locality.

Table 1. Basic composition of the formulated diet

Ingredient	Percentage
Shrimp head meal	15
Fish meal	30
Soybean cake	15
Rice bran	15
Bread flour	15
Corn oil	4
Vit-mineral mix[a]	1
Binder[b]	5

[a] V-22, a poultry mix

[b] Binders: agar bar, bread flour, corn starch, gelatin, sago palm starch

Table 2. Water stability of 2 and 4 mm diameter steamed pellets after 2, 6 and 18 hrs.

	Binders	2 Hrs.		6 Hrs.		18 Hrs.	
		2 mm	4 mm	2 mm	4 mm	2 mm	4 mm
I.	5% Sago palm starch and 15% bread flour	$81.8^{a,b}$	81.6^{a}	82.4^{a}	82.3^{b}	74.4^{b}	65.4^{b}
II.	5% Cornstarch and 15% bread flour	78.8^{b}	83.3^{a}	$77.9^{b,c}$	83.2^{a}	70.5^{c}	$63.9^{b,c}$
III.	5% Gelatin and 15% bread flour	78.8^{b}	78.3^{a}	74.1^{c}	62.4^{b}	67.1^{d}	--
IV.	5% Agar and 15% bread flour	83.2^{a}	86^{a}	82.9^{a}	83.2^{a}	77.3^{a}	67.6^{a}
V.	20% Breadflour	84.6^{a}	88.3^{a}	82.3^{a}	84.6^{a}	76.6^{a}	68.1^{a}

-- Totally disintegrated

Figures with the same superscripts are not statistically different from each other. $P < 0.05$.

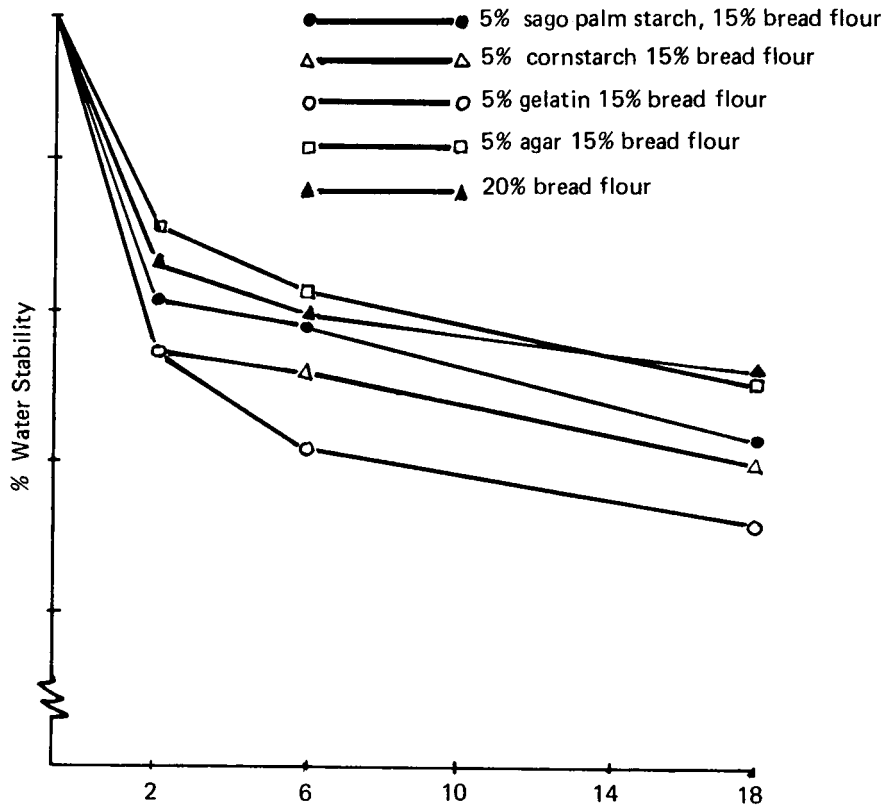

Fig. 1 Water stability of steamed 2 mm diameter pellets after 2, 6 and 18 hours.

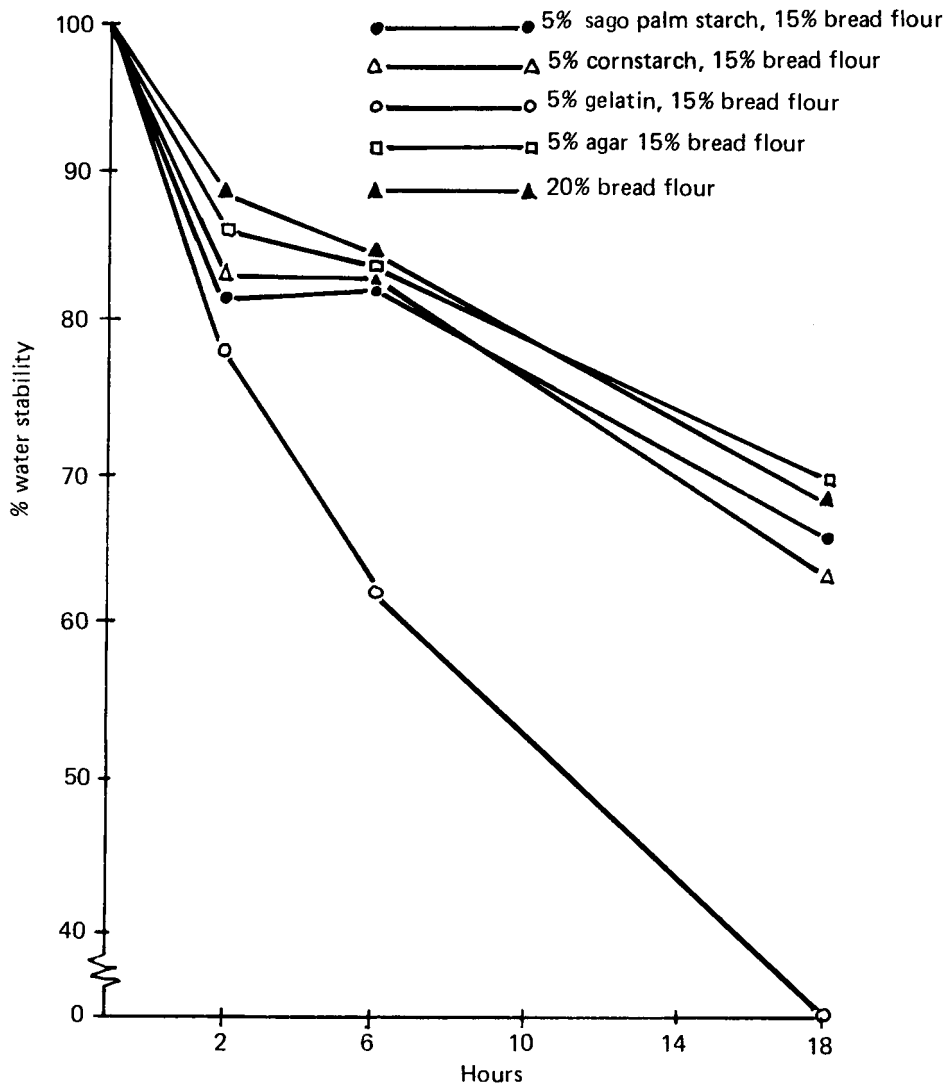

Fig. 2 **Water stability of steamed, 4 mm diameter pellets after 2, 6 and 18 hours.**

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