Sol
Lecithinated Cocoa Powders
An Answer to ‘Solubility’ Problems of Cocoa Powder

One of the challenges with which a user of cocoa powder might be confronted is slow ‘solubility’. The manufacturers of instant products especially are often confronted with this phenomenon. In fact, the problem refers not only to solubility, but also to the whole complex of wettability and dispersability of cocoa powder.

By its nature cocoa powder is not inclined to disperse, but rather to float on the surface of a fluid. This is primarily the result of the cocoa butter contained in the powder, which repels water and prevents wetting of the particles. ADM Cocoa has found a solution to this problem through the development of its ‘Sol powders’. These are cocoa powders where particles are coated with soya lecithin to ensure wettability and thus easy dispersion.

This brochure provides information on ADM’s range of lecithinated cocoa powders and the benefits they can offer to the cocoa powder user.

Wettability, Dispersability

When cocoa is added to cold water or cold milk the powder tends to float on the surface because its wettability is poor. When one tries to disperse the cocoa powder in the liquid by stirring, the still insufficiently wetted powder particles will not completely disintegrate, but instead will remain partly in and on the liquid as small lumps. This means that especially at normal ambient temperatures, the consumer can be confronted with problems of dispersion, therefore making the product unacceptable.

Wettability and dispersability in cold liquids can be significantly improved by coating the cocoa powder with lecithin. As an emulsifying agent lecithin is a mixture of phosphatides, which are surface active. The so-called lipophilic (fat-attracting) part of the molecule attaches to the cocoa butter present in the cocoa powder and the so-called hydrophilic (water-attracting) part attracts the water in the solution. As a result, the powder particles are more easily wetted and thus dispersed.

For the manufacture of dry instant cocoa mixes various techniques can be used to make the cocoa and other ingredients, including sugar and milk powder, agglomerate. During the process of agglomeration, the cocoa powder covers the already integrated particles because cocoa powder particles are much smaller than sugar or milk powder particles. Therefore, to ensure good wettability of the final product, the lecithin must be well dispersed in the fat (cocoa butter) of the cocoa powder. As a result of ADM Cocoa’s processing method used to produce Sol powders, a good dispersion of the lecithin into the fat of the cocoa powder is guaranteed. It is therefore recommendable to use Sol powders as an alternative to the addition of lecithin during the production of dry instant mixes since in most cases a better wettability and dispersability is obtained.
**Wettability of Lecithinated Cocoa Powder**

The following method can be used for a rough estimate of the wettability of lecithinated cocoa powder:

Pour 100 ml of demineralized water at 20°C into a 150 ml beaker. Then 0.75 g of Sol powder is weighed out on a 1 mm sieve and is brushed through the sieve onto the water surface. A stopwatch is used to record the time it takes until the last powder particles submerge. For a properly lecithinated cocoa powder this time should not be more than 2 1/2 minutes.

**Range of Applications**

Instant cocoas are products in which Sol powders are often used for the preparation of cocoa or chocolate drinks. A distinction is made between two groups of dry instant mixes as follows:

- **2-component mixes** consist of sugar and cocoa powder as the main components for the preparation of a cocoa drink with hot or cold (or hot) milk.

- **3-component mixes** contain sugar, cocoa powder and milk powder as the main components for the preparation of a cocoa drink with cold (or hot) water.

**Types of Sol Powders**

Sol powders from ADM Cocoa are produced from cocoa powders, which have been alkalized to various degrees. To respond to special requirements, the quantity of lecithin added can be adapted or alternative emulsifying agents can be used. The following are brief product descriptions and standard specifications of 2 Sol powder types.
D-11-Asol
Sol powder based on cocoa powder type D-11-A to which approximately 5% soya lecithin has been added. D-11-A is a lightly alkalized cocoa powder with 10-12% cocoa butter and a mild, full flavour. It is light reddish brown in colour and has an almost neutral pH of 7.0-7.4.

D-11-Ssol
Sol powder based on cocoa powder type D-11-S to which approximately 5% soya lecithin has been added. D-11-S is an alkalized cocoa powder with a strong cocoa flavour. It is dark brownish red in colour and has a cocoa butter content of 10-12%.

By adding citric acid, the pH value of D-11-Ssol is reduced to 7.0-7.4. This is done specifically to enable a processor to add vitamins to a dry mix without running the risk that the vitamins will be degraded. The characteristic flavour and colour of D-11-S are retained.

<table>
<thead>
<tr>
<th></th>
<th>D-11-Asol / D-11-Ssol</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>sol powders,</td>
</tr>
<tr>
<td></td>
<td>cocoa powders, dutch</td>
</tr>
<tr>
<td></td>
<td>process, 10-12% fat,</td>
</tr>
<tr>
<td></td>
<td>with lecithin.</td>
</tr>
<tr>
<td>Colour</td>
<td>up to standard</td>
</tr>
<tr>
<td>Flavour</td>
<td>up to standard</td>
</tr>
<tr>
<td>Fat content (%)</td>
<td>10.0-12.0</td>
</tr>
<tr>
<td></td>
<td>extraction with petroleum ether. Fat content of lecithin excluded.</td>
</tr>
<tr>
<td>Lecithin content (%)</td>
<td>approx. 5</td>
</tr>
<tr>
<td>pH</td>
<td>7.0-7.4</td>
</tr>
<tr>
<td>Fineness (%)</td>
<td>99 min. wet, through 200 mesh sieve (0.075 mm)</td>
</tr>
<tr>
<td>Moisture content (%)</td>
<td>5.0 max.</td>
</tr>
<tr>
<td>Standard plate count</td>
<td>5,000 max.</td>
</tr>
<tr>
<td>Molds per g</td>
<td>50 max. median 300</td>
</tr>
<tr>
<td>Yeasts per g</td>
<td>50 max. median 5</td>
</tr>
<tr>
<td>Enterobacteriaceae in 1 g</td>
<td>negative</td>
</tr>
<tr>
<td>E. coli in 1 g</td>
<td>negative</td>
</tr>
<tr>
<td>Salmonellae</td>
<td>negative</td>
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</tbody>
</table>

These specifications apply to an average sample covering the goods when they leave the production plant.
Shelf Life

If lecithinated cocoa powder is stored correctly and under proper conditions, it can be kept for at least two years.

The presence of lecithin makes a Sol powder more sensitive to high temperatures and temperature changes. Pressure exerted, for instance, by bags that are stacked high, may also cause Sol powders to become lumpy, however such lumps easily disintegrate when the bags are emptied. Sol powders should thus be stored under the following optimal conditions:

- In an area with low relative humidity if possible under 50%;
- At a storage temperature below 20°C, if possible between 15° and 18°. Fluctuations in temperature should be avoided;
- In clean storage areas, free from insects, rodents, birds and other pollutants;
- No exposure to direct sunlight;
- In the absence of strong smelling products such as coffee, tea, tobacco and spices. Paints and cleaning substances are other examples of products with detrimental odours;
- The bags stacked at a distance from walls and floor sufficient to avoid local temperature variations and pest infestation.

Naturally, the transportation of cocoa powders is also critical to the quality of delivered materials. All trucks and containers are carefully inspected by ADM prior to loading for cleanliness, sharp protrusions and foreign odours.

Technical Service and Application

Formed in 1997, ADM Cocoa has integrated and implemented the technologies and expertise from fifteen cocoa and industrial chocolate operations in eight countries. Part of the world leading Archer Daniels Midland Company, ADM Cocoa benefits fully from the acknowledged operational and organisational excellence of its parent company.

ADM Cocoa’s global expertise in combination with manufacturing and marketing know-how is founded on more than 100 year’s experience. The heritage of the DE ZAAN® brand is alive and strong at ADM Cocoa.

The Product Support & Development Department, staffed by food technologists and cocoa specialists, is naturally at the service of our customers. Challenges in manufacturing, in new product development, in product applications and national and international food regulations are handled regularly. If you are not already one of the many thousands around the world enjoying these benefits, then we invite you to start working with us today.
For customers around the world, ADM draws on its resources – its people, products, and market perspective – to help them meet today’s consumer demands and envision tomorrow’s needs. RESOURCEFUL BY NATURE™

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